

IBM System Storage SAN Volume Controller



Service Guide

Version 4.2.1

IBM System Storage SAN Volume Controller



Service Guide

Version 4.2.1

Note:

Before using this information and the product it supports, read the information in **Notices** and **Safety and environmental notices**.

This edition applies to the IBM System Storage SAN Volume Controller, release 4.2.1, and to all subsequent releases and modifications until otherwise indicated in new editions. This edition replaces GC26-7901-01.

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About this guide

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

The chapters that follow introduce you to the SAN Volume Controller, the redundant ac power switch, and the uninterruptible power supply (UPS) and describe how you can install and maintain the software for the SAN Volume Controller. The vital product data (VPD) topic provides information about the VPD that uniquely defines each hardware and microcode element that is in the SAN Volume Controller.

You can also learn how to configure and check the status of one SAN Volume Controller node or a cluster of nodes through the front panel, as well as to diagnose problems using the SAN Volume Controller, the UPS, and the master console.

The maintenance analysis procedures (MAPs) can help you to analyze failures that occur in a SAN Volume Controller. With the MAPs, you can isolate the FRUs (field replaceable units) of the SAN Volume Controller that fails. Begin all problem determination and repair procedures from MAP 5000: Start.

You are also provided with step-by-step procedures to remove and replace parts for the SAN Volume Controller and the UPS. The parts are outlined for you in our parts catalog.

Who should use this guide

This guide should be read by the Systems Services Representative who is responsible for the service of the SAN Volume Controller, the redundant ac power switch, the uninterruptible power supply, and the master console.

Summary of changes

This summary of changes describes new functions that have been added to this release.

This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

Summary of changes for GC26-7901-02 SAN Volume Controller Service Guide

The following information describes the changes to this guide since the previous edition (GC26-7901-01).

New information

This section lists new information that was added to this document.

- An example of redundant ac power switch cabling.
- The description of a configuration node.

- Instructions on discovering, or rescanning, MDisks using the CLI and the SAN Volume Controller Console.
- Procedures for removing and replacing the SAN Volume Controller 2145-8G4 cable retention bracket.
- Procedures for removing and replacing the 2145 UPS-1U power cable retention bracket.
- Cluster error codes 1627, 2600, and 2601.

Changed information

This section lists the topics that were updated in this document.

- Preparing your redundant ac power switch environment.
- “Using the SAN Volume Controller Console to power off a node”
- “Using the SAN Volume Controller CLI to power off a node”
- Understanding the fields for the cluster VPD
- Create cluster?
- Recover cluster navigation
- Error reporting
- Sending notifications
- Boot codes 110, 130, 135, 137, 140, 150, 155, 180, 181, 185, 186, 190, 191, 195, 196, 200, 205, 206, 210, 211, 215, 216, 220, 221, 225, 226, 230, 231, 235, 236, 240, 241, 245, and 246.
- Performing the node rescue
- Node rescue code 350.
- Node error code 550.
- Cluster error code 2040.
- *MAP 5000: Start.*
- *MAP 5350: Powering off a SAN Volume Controller node*
- *MAP 5400: Front panel*
- *MAP 5500: Ethernet*
- *MAP 5600: Fibre channel*
- *MAP 5700: Repair verification*
- *MAP 5800: Light path*
- “Removing the service controller”
- “Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate”
- “Replacing the frame assembly”
- “Replacing the SAN Volume Controller 2145-8G4 fibre-channel adapter assembly”
- “Removing the SAN Volume Controller 2145-8G4 microprocessor”

Summary of changes for GC26-7901-01 SAN Volume Controller Service Guide

The following information describes the changes to this guide since the previous edition (GC26-7901-00).

New information

This section lists new information that was added to this document.

- The SAN Volume Controller hardware updates. The new model is the SAN Volume Controller 2145-8G4. This guide describes the SAN Volume Controller 2145-8G4 hardware and service procedures in various topics.
- The optional redundant ac power switch that can help reduce downtime.
- The ability to specify recipients of SNMP traps, Call Home e-mails, and inventory information e-mails.
- Boot codes 132 and 145.
- Cluster error codes 1011, 1013, 1030, 1055, 1089, 1101, 1106, 1203, 2500, 3000, 3001, and 3010.

Changed information

This section lists the updates that were made in this document.

- There is a new SAN Volume Controller model, the SAN Volume Controller 2145-8G4. This publication continues to document the SAN Volume Controller by model number.

Note: If text is referring to the SAN Volume Controller, it is referring to a generic SAN Volume Controller and can be referring to all SAN Volume Controller models. When the SAN Volume Controller is referred to as the SAN Volume Controller 2145-4F2, the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8G4, the specific SAN Volume Controller is designated.

- The *IBM System Storage SAN Volume Controller Installation Guide* is now titled *IBM System Storage SAN Volume Controller: Hardware Installation Guide*.
- The *IBM System Storage SAN Volume Controller Configuration Guide* is now titled *IBM System Storage SAN Volume Controller: Software Installation and Configuration Guide*.
- The *IBM System Storage Master Console for SAN Volume Controller: Installation and User's Guide* and the *IBM System Storage Master Console for SAN Volume Controller Information Center* are no longer updated and distributed. Instead, all pertinent information from those information units have been incorporated into other SAN Volume Controller publications.
- The description of the shutdown operation of the 2145 UPS-1U and the 2145 UPS
- Boot codes 100, 120, 135, 137, 145, 160, 174, 175, and 181.
- Node rescue codes 310, 320, 330, 340 and 345.
- Node error codes 510, 511, 513, 514, 515, 520, 540, 564, 570, 576, 578, and 580
- Create cluster code 700
- Cluster error codes 1010, 1012, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1025, 1040, 1044, 1050, 1054, 1056, 1057, 1060, 1065, 1070, 1071, 1076, 1077, 1080, 1081, 1090, 1091, 1092, 1093, 1100, 1105, 1110, 1145, 1146, 1400, 1720 and 1920.

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 and 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 cluster.
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

A list of other publications that are related to this product are provided to you for your reference.

The tables in this section list and describe the following publications:

- The publications that make up the library for the IBM System Storage SAN Volume Controller
- Other IBM publications that relate to the SAN Volume Controller

SAN Volume Controller library

The following table lists and describes the publications that make up the SAN Volume Controller library. Unless otherwise noted, these publications are available in Adobe portable document format (PDF) from the following Web site:

<http://www.ibm.com/storage/support/2145>

Title	Description	Order number
<i>IBM System Storage SAN Volume Controller: CIM Agent Developer's Reference</i>	This reference guide describes the objects and classes in a Common Information Model (CIM) environment.	SC26-7904
<i>IBM System Storage SAN Volume Controller: Command-Line Interface User's Guide</i>	This guide describes the commands that you can use from the SAN Volume Controller command-line interface (CLI).	SC26-7903
<i>IBM System Storage SAN Volume Controller: Software Installation and Configuration Guide</i>	This guide provides guidelines for configuring your SAN Volume Controller.	SC23-6628
<i>IBM System Storage SAN Volume Controller: Host Attachment Guide</i>	This guide provides guidelines for attaching the SAN Volume Controller to your host system.	SC26-7905

Title	Description	Order number
<i>IBM System Storage SAN Volume Controller: Hardware Installation Guide</i>	This guide includes the instructions that the IBM service representative uses to install the SAN Volume Controller.	GC27-2132
<i>IBM System Storage SAN Volume Controller: Planning Guide</i>	This guide introduces the SAN Volume Controller and lists the features you can order. It also provides guidelines for planning the installation and configuration of the SAN Volume Controller.	GA32-0551
<i>IBM System Storage SAN Volume Controller: Service Guide</i>	This guide includes the instructions that the IBM service representative uses to service the SAN Volume Controller.	GC26-7901
<i>IBM Systems Safety Notices</i>	This guide contains translated caution and danger statements. Each caution and danger statement in the SAN Volume Controller documentation has a number that you can use to locate the corresponding statement in your language in the <i>IBM Systems Safety Notices</i> document.	G229-9054

Other IBM publications

The following table lists and describes other IBM publications that contain additional information that is related to the SAN Volume Controller.

You can download IBM eServer xSeries, IBM xSeries, and IBM System x publications from the following Web site:

<http://www-304.ibm.com/jct01004c/systems/support/>

Title	Description	Order number
<i>IBM System Storage Multipath Subsystem Device Driver: User's Guide</i>	This guide describes the IBM System Storage Multipath Subsystem Device Driver Version 1.6 for TotalStorage Products and how to use it with the SAN Volume Controller. This publication is referred to as the <i>IBM System Storage Multipath Subsystem Device Driver: User's Guide</i> .	GC27-2122

Title	Description	Order number
<i>IBM TotalStorage DS4300 Fibre Channel Storage Subsystem Installation, User's, and Maintenance Guide</i>	This guide describes how to install and configure the IBM TotalStorage DS4300 Fibre-Channel Storage Subsystem.	GC26-7722
<i>IBM eServer xSeries 306m (Types 8849 and 8491) Installation Guide</i>	This guide describes how to install the IBM eServer xSeries 306m, which is the hardware delivered for some versions of the hardware master console.	MIGR-61615
<i>IBM xSeries 306m (Types 8849 and 8491) User's Guide</i>	This guide describes how to use the IBM eServer xSeries 306m, which is the hardware delivered for some versions of the hardware master console.	MIGR-61901
<i>IBM xSeries 306m (Types 8849 and 8491) Problem Determination and Service Guide</i>	This guide can help you troubleshoot and resolve problems with the IBM eServer xSeries 306m, which is the hardware delivered for some versions of the hardware master console.	MIGR-62594
<i>IBM eServer xSeries 306 (Type 8836) Installation Guide</i>	This guide describes how to install the IBM eServer xSeries 306, which is the hardware delivered for some versions of the hardware master console.	MIGR-55080
<i>IBM eServer xSeries 306 (Type 8836) User's Guide</i>	This guide describes how to use the IBM eServer xSeries 306, which is the hardware delivered for some versions of the hardware master console.	MIGR-55079
<i>IBM eServer xSeries 306 (Types 1878, 8489 and 8836) Hardware Maintenance Manual and Troubleshooting Guide</i>	This guide can help you troubleshoot problems and maintain the IBM eServer xSeries 306, which is the hardware delivered for some versions of the hardware master console.	MIGR-54820
<i>IBM eServer xSeries 305 (Type 8673) Installation Guide</i>	This guide describes how to install the IBM eServer xSeries 305, which is the hardware delivered for some versions of the hardware master console.	MIGR-44200
<i>IBM eServer xSeries 305 (Type 8673) User's Guide</i>	This guide describes how to use the IBM eServer xSeries 305, which is the hardware delivered for some versions of the hardware master console.	MIGR-44199

Title	Description	Order number
<i>IBM eServer xSeries 305 (Type 8673) Hardware Maintenance Manual and Troubleshooting Guide</i>	This guide can help you troubleshoot problems and maintain the IBM eServer xSeries 305, which is the hardware delivered for some versions of the hardware master console.	MIGR-44094
<i>IBM TotalStorage 3534 Model F08 SAN Fibre Channel Switch User's Guide</i>	This guide introduces the IBM TotalStorage SAN Switch 3534 Model F08.	GC26-7454
<i>IBM System x3250 (Types 4364 and 4365) Installation Guide</i>	This guide describes how to install the IBM System x3250, which is the hardware delivered for some versions of the hardware master console.	MIGR-5069761
<i>IBM System x3250 (Types 4364 and 4365) User's Guide</i>	This guide describes how to use the IBM System x3250, which is the hardware delivered for some versions of the hardware master console.	MIGR-66373
<i>IBM System x3250 (Types 4364 and 4365) Problem Determination and Service Guide</i>	This guide can help you troubleshoot and resolve problems with the IBM System x3250, which is the hardware delivered for some versions of the hardware master console.	MIGR-66374
<i>IBM TotalStorage SAN Switch 2109 Model F16 User's Guide</i>	This guide introduces the IBM TotalStorage SAN Switch 2109 Model F16.	GC26-7439
<i>IBM TotalStorage SAN Switch 2109 Model F32 User's Guide</i>	This guide introduces the IBM TotalStorage SAN Switch 2109 Model F32. It also describes the features of the switch and tells you where to find more information about those features.	GC26-7517
<i>IBM System Storage Productivity Center Introduction and Planning Guide</i>	This guide introduces the IBM System Storage Productivity Center hardware and software.	SC23-8824
<i>IBM System Storage Productivity Center Hardware Installation and Configuration Guide</i>	This guide describes how to install and configure the IBM System Storage Productivity Center hardware.	SC23-8822
<i>IBM System Storage Productivity Center Software Installation and User's Guide</i>	This guide describes how to install and use the IBM System Storage Productivity Center software.	SC23-8823

Some related publications are available from the following SAN Volume Controller support Web site:

<http://www.ibm.com/storage/support/2145>

Related Web sites

The following Web sites provide information about the SAN Volume Controller or related products or technologies.

Type of information	Web site
SAN Volume Controller support	http://www.ibm.com/storage/support/2145
Technical support for IBM storage products	http://www.ibm.com/storage/support/

How to order IBM publications

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

The IBM publications center offers customized search functions to help you find the publications that you need. Some publications are available for you to view or download free of charge. You can also order publications. The publications center displays prices in your local currency. You can access the IBM publications center through the following Web site:

<http://www.ibm.com/shop/publications/order/>

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U.S.A.

Safety and environmental notices

Safety must be a concern for anyone using a SAN Volume Controller, redundant ac power switch, or an uninterruptible power supply (UPS).

The **Danger** and **Caution** notices for the SAN Volume Controller and any related UPSs can be found in the *IBM Systems Safety Notices*. Please review the topics concerning the safety notices to ensure that you are in compliance.

Important: Be sure to read the multilingual safety instructions on the SAN Volume Controller web site before you use the product. Go to <http://www.ibm.com/storage/support/2145>, click the current product documentation link, and then click **Multi-language**.

Definitions of notices

Ensure that you understand the typographic conventions that are used to indicate special notices.

The notices throughout the SAN Volume Controller documentation and in the *IBM Systems Safety Notices* document follow specific guidelines for their content.

The following notices are used throughout this library to convey specific meanings:

Note: These notices provide important tips, guidance, or advice.

Attention: These notices indicate possible damage to programs, devices, or data. An attention notice appears before the instruction or the situation in which damage might occur.

CAUTION:

These notices indicate situations that can be potentially hazardous to you. A caution notice precedes the description of a potentially hazardous procedural step or situation.

DANGER

<p>These notices indicate situations that can be potentially lethal or extremely hazardous to you. A danger notice precedes the description of a potentially lethal or extremely hazardous procedural step or situation.</p>

The caution and danger notices that appear in this document are also in the multilingual *IBM Systems Safety Notices* document. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

General safety

When you service the SAN Volume Controller or the uninterruptible power supply, follow general safety guidelines.

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

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object, do the following:
 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 to the customer, or that makes the equipment unsafe.
 - Before you start the machine, ensure that other service representatives and customer's 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 machine.
 - Keep your tool case away from walk areas so that other people will not trip over it.
 - Do not wear loose clothing that can be trapped in the moving parts of a machine. 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 machine.

Electrical safety

Observe these rules when working on electrical equipment.

CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the machine covers, unless instructed otherwise in the installation and configuration procedures. (26)

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 machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine 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 powered-on electrical equipment; 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 above rule, you may 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 it 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 machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine. (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 for unsafe conditions

Use caution when 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 start the safety inspection, make sure the power is off, and the power cord is disconnected.

Each machine has required safety items installed to protect users and IBM service personnel from injury. This guide addresses only those items.

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

If any unsafe conditions are present, you must determine how serious the apparent hazard could 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.

Perform the following steps to inspect each SAN Volume Controller node for unsafe conditions. If necessary, see any suitable safety publications.

1. Turn off the SAN Volume Controller and disconnect the power cord.
2. Check the frame for damage (loose, broken, or sharp edges).
3. Check the power cables 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 machine. Use good judgment about the safety of any such changes.
5. Check inside the SAN Volume Controller 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 have not been removed or disturbed.

9. Before connecting the SAN Volume Controller to the SAN, check the grounding.

Related tasks

“Checking the grounding of a SAN Volume Controller, the UPS, and the redundant ac power switch”

Ensure that you understand how to check the grounding of a SAN Volume Controller, the uninterruptible power supply (UPS), and the optional redundant ac power feature.

External machine check

Ensure that you perform an external machine check before you install the SAN Volume Controller.

Perform the following steps to conduct an external machine check:

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. If the SAN Volume Controller is not installed in a rack cabinet, check for loose or broken feet.
4. Check the power cord for damage.
5. Check the external signal cable for damage.
6. Check the cover for sharp edges, damage, or alterations that expose the internal parts of the device.
7. Correct any problems that you find.

Internal machine checks

Ensure that you perform an internal machine check before you install the SAN Volume Controller.

Perform the following steps to conduct the internal machine check:

1. Check for any non-IBM changes that might have been made to the machine. 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 machine 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 a SAN Volume Controller, the UPS, and the redundant ac power switch

Ensure that you understand how to check the grounding of a SAN Volume Controller, the uninterruptible power supply (UPS), and the optional redundant ac power feature.

All SAN Volume Controller models support the use of the 2145 uninterruptible power supply-1U (2145 UPS-1U) and the optional redundant ac power switch. The SAN Volume Controller 2145-4F2 also supports the use of the 2145 UPS.

Perform the following steps to test the grounding of a SAN Volume Controller. Follow the steps for the SAN Volume Controller configuration you are using. Before you start, confirm you know the SAN Volume Controller model type, the

UPS type, and whether you are using redundant ac power. Note the location of the signal cables that are attached to the SAN Volume Controller.

When you are asked to test the grounding continuity, use your local procedures to perform 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.

1. Ensure that the SAN Volume Controller node is powered off. See “MAP 5350: Powering off a SAN Volume Controller node” in the *IBM System Storage SAN Volume Controller: Service Guide*.
2. If the UPS is a 2145 UPS, ensure that other SAN Volume Controller nodes that are powered from the UPS are powered off.
3. Use the power button to power off the UPS.
4. Disconnect all signal cables from the SAN Volume Controller node, which includes the following cables:
 - The fibre channel cables
 - The Ethernet cable
 - The serial cable that is connected to the UPS.
5. Disconnect all signal cables from the UPS. If the UPS is a 2145 UPS, there might be multiple signal cables.
6. If the UPS 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 UPS power cable from the site power distribution unit.
8. If redundant ac power is used, power off any SAN Volume Controller that is being supplied from the redundant ac power switch, and remove the power cable to this system from the redundant ac power switch.
9. If redundant ac power is used, 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 UPS 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. After you have completed testing the grounding continuity, perform one of the following procedures, depending on the outcome of the test.
 - If the test is successful, reconnect any cables that were removed, and power on any UPSs 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 each component has been tested and the failing ones have been replaced, 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 UPS from the ground pin of the input power receptacle to the ground conductor of the output power receptacle.
- c. If used, the redundant ac power switch 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 UPS power cable assembly, between the two ground conductors of the power cable.
- e. The UPS input power cable, between the two ground conductors of the power cable.
- f. If used, the redundant ac power switch main input power cable, between the two ground conductors of the cable.
- g. If used, the redundant ac power switch backup input power cable, between the two ground conductors of the cable.

Inspecting the UPS for unsafe conditions

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

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.

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 UPS for unsafe conditions. If necessary, see any suitable safety publications.

1. If any equipment has been damaged during the shipment, keep the shipping cartons and packing materials.
2. Perform the following steps to file a claim for the shipping damage:
 - 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 (UPS).

The following list describes requirements for the 2145 UPS:

- Each UPS must be connected to a separate branch circuit.

- A UL listed 15 A circuit breaker must be installed in each branch circuit that supplies power to the UPS.
- The voltage that is supplied to the UPS must be 200–240 V single phase.
- The frequency that is supplied must be 50 or 60 Hz.

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 that the 2145 UPS-1U has an integrated circuit breaker and does not need external protection.

Note: If the UPS is cascaded from another UPS, the source UPS must have at least three times the capacity per phase and the total harmonic distortion must be less than 5%. The UPS 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 and each uninterruptible power supply (UPS) support emergency power-off (EPO) shutdowns.

In the event of a room EPO shutdown, the 2145 uninterruptible power supply (2145 UPS) detects a loss of input power. This power loss is reported to the SAN Volume Controller 2145-4F2, which completes the process of shutting down the UPS within five minutes.

Attention: The 2145 UPS power off shutdown is normally controlled by the SAN Volume Controller 2145-4F2. If an EPO event occurs, but no SAN Volume Controller 2145-4F2 nodes that are connected to a 2145 UPS have been powered on since the 2145 UPS was powered on, you must remove output power from the UPS. To do this, press and hold the off button on the front panel of the 2145 UPS for at least four seconds.

Checking the safety labels on the SAN Volume Controller

Before you install, use, or service the SAN Volume Controller, you must ensure that you understand the safety labels.

1. Locate the following labels for the SAN Volume Controller:
 - **Agency/ratings label for the SAN Volume Controller 2145-8G4**
 - Certified in San Jose, CA USA



- Certified in Vac, Hungary

 <p>Product certified in Vac, Hungary Made in Hungary 匈牙利製造 SAN控制器 網路儲存容體控制器</p> <p>原号Type : 2145-8G4 額定电压 : 200-240 V ~ 額定电流 : 3.5 A 額定频率 : 50/60 Hz</p> <p>Copyright Code and Parts Contained Herein. ©Copyright IBM Corp. 2007 All Rights Reserved.</p> <p>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</p>	<p>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。</p> <p>EU Only</p>	<p>Apparaten skall anslutas till jordat uttag Apparatet må tilkoples jordet stikkontakt Laito on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan</p> <p>This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p> <p>Canada ICES/NMB-003 Class/Classe A</p> <p>PN 31P085 LISTED I.T.E. Equip. 167G UL US CE R33026 IBM-2145-XXX(A) ME01 UL AR S</p>
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• Agency/ratings label for the SAN Volume Controller 2145-8F4

 <p>Product certified in San Jose, CA USA 美国制造</p> <p>Licensed Machine Code - Property of IBM ©Copyright IBM Corp. 1981, 2002 All rights reserved. US Government Users Restricted Rights. Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.</p> <p>This machine is manufactured from new parts, or new and used parts. Canada ICES/NMB-003 Class/Classe A</p> <p>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。</p>	<p>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。</p> <p>EU Only</p>	<p>This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p> <p>PN 31P085 LISTED I.T.E. Equip. 167G UL US CE R33026 IBM-2145-XXX(A) ME01 UL AR S</p> <p>TotalStorage SAN Volume Controller SAN控制器 網路儲存容體控制器 TYPE 型号: 2145-8F4 服务器 額定电压: 200-240 V ~ 額定电流: 3.2 A 額定频率: 50/60 Hz</p>
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• Agency/ratings label for the SAN Volume Controller 2145-8F2

 <p>Product certified in San Jose, CA USA 美国制造</p> <p>Licensed Machine Code - Property of IBM ©Copyright IBM Corp. 1981, 2002 All rights reserved. US Government Users Restricted Rights. Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.</p> <p>This machine is manufactured from new parts, or new and used parts. Canada ICES/NMB-003 Class/Classe A</p> <p>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。</p>	<p>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。</p> <p>EU Only</p>	<p>This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p> <p>PN 64P8160 LISTED I.T.E. Equip. 167G UL US CE R33026 IBM-2145-XXX(A) ME01 UL AR S</p> <p>TotalStorage SAN Volume Controller SAN控制器 網路儲存容體控制器 TYPE 型号: 2145-8F2 服务器 額定电压: 200-240 V ~ 額定电流: 3.2 A 額定频率: 50/60 Hz</p>
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• Agency/ratings label for the SAN Volume Controller 2145-4F2

<p>MACHINE TYPE 2145 MODEL: 4F2 RATING: 100-240V ~ 50/60Hz 3.5-1.75A P/N 64P7937</p>	 <p>Registered Trademark of International Business Machines Corporation IBM Canada Ltd Registered User</p> <p>Canada ICES/NMB-003 Class/Classe (A)</p> <p>This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.</p> <p>MIC E-0019-00-390(A) PC ME01 LR34074C IEC 60950 CE NOM-018</p>	<p>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。</p> <p>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。</p> <p>VCCI-A</p>
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• No user access label



- Class 1 laser label



Class 1 Laser Product
 Laser Klasse 1
 Laser Klass 1
 Luokan 1 Laserlaite
 Appareil À Laser de Classe 1

svc00334




2. Before you continue, ensure that you understand each of these labels.

Checking the labels on the redundant ac power switch

Before you install, use, or service the redundant ac power switch, you must ensure that you understand the safety labels.

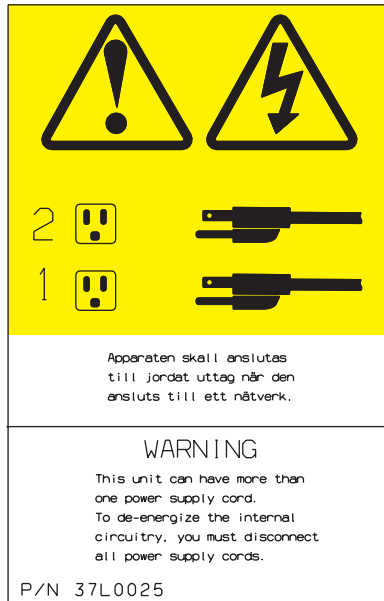
Locate the following labels on the redundant ac power switch.

- Agency label

<p>Manufactured for  © Registered Trademark of international Business Machines Corporation Marca Registrada This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference received including interference that may cause undesired operation. 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。</p>	<p>BY DELTA ELECTRONICS, INC. 3,Tung Yuan Road, Chungli Industrial Zone Taoyuan Shien, Taiwan, R.O.C.</p>	<p>IBM P/N: 95P5083 IBM Option P/N (Cordless Version): 37L6863 Model: Dual Line Cord PDU IBM FRU P/Ns – Unit Only: 95P5083 Hardware Kit Only: 09N9671 MFG DATE:XXXX Manufacturer S/N:YMD001 MADE IN CHINA</p>
<p>100-127 VAC 15 A 200-240 VAC 10 A 50/60 Hz</p>	 NRTL/C	 11S95P5083ZN10HOYMD001

svc00316

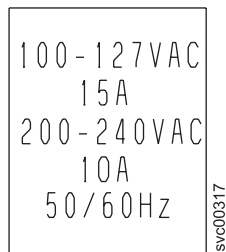
- Dual power cord warning label



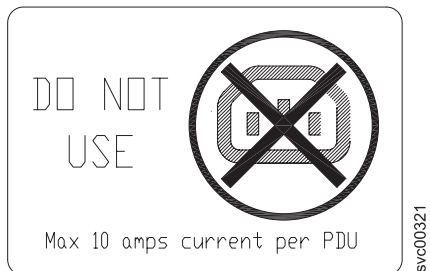
- **No user access label**



- **Input ratings label**



- **Output port warning label**



Checking the labels on the outside of the UPS

Before you install, use, or service the uninterruptible power supply (UPS), you must ensure that you understand the safety labels.

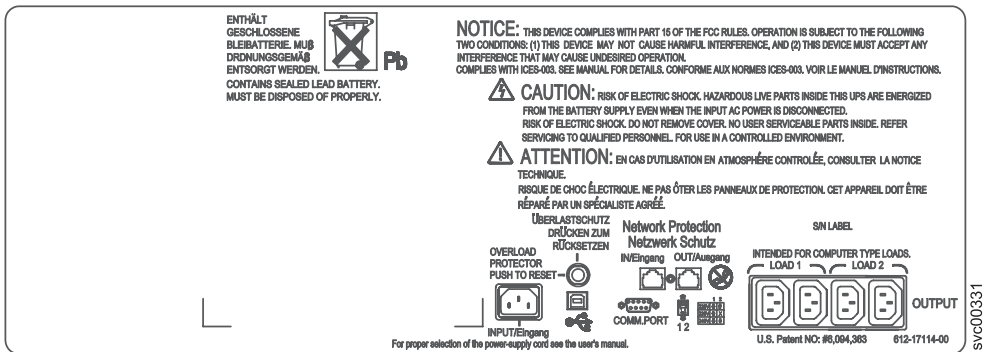
Checking the 2145 UPS-1U labels

Before you continue, ensure that you locate and understand each of the following 2145 uninterruptible power supply-1U (2145 UPS-1U) labels:

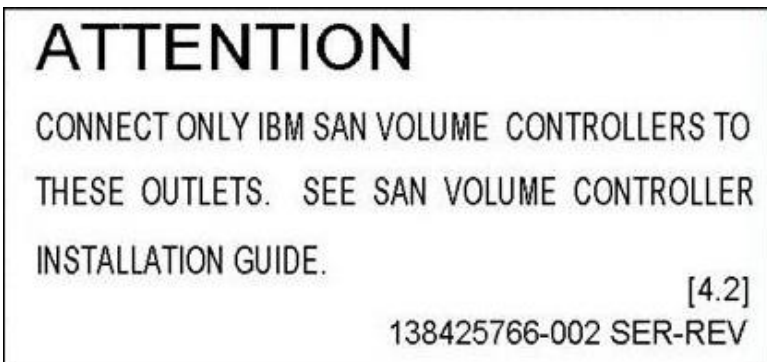
- Weight caution label



- Safety label




- Power output warning label



- Agency label

EC: G41049
 IBM Model: 2145UPS-1U
 P31P0875
 Input~: 220/230/240V, 50/60Hz,
 4.1/4/3.7A, 1 ϕ
 Output~: 220/230/240V, 50/60Hz
 3.4/3.3/3.1A, 1 ϕ
 750VA/520W
 2007-04-02
 Made in China-U1407



svc00328

- People's Republic of China Electronic Information Products (EIP) mark - 20 years



- Taiwan agency label

不斷電式電源供應器
 型號: 2145UPS -1U
 輸入: 220/230/240Vac, 50/60Hz
 4.1/4/3.7A, 1 ϕ
 輸出: 220/230/240Vac, 50/60Hz
 3.4/3.3/3.1A, 1 ϕ
 750VA/520W

 R31183

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
 被要求採取某些適當的對策。

svc00326

- IT compatible label

IT
COMPATIBLE

- Do not discard the UPS or the UPS batteries in the trash label


Note: The UPS can contain sealed, lead-acid batteries, which must be recycled.






Checking the 2145 UPS labels


Ensure that you locate and understand each of the following 2145 uninterruptible power supply (2145 UPS) labels:



- Agency label

EC: H80784
IBM Model: 2145UPS
P64P8103
SNYM1000YMDXXX [4.4]
Input ~ :
200-240V, 50/60Hz
16A MAX
Input  : 120V, 30A
Output ~ :
200-240V, 50/60Hz
15A MAX
3000VA/2700W
Made in Mexico - TWWYY [4.11]


LISTED
UPS
33C0
E82662

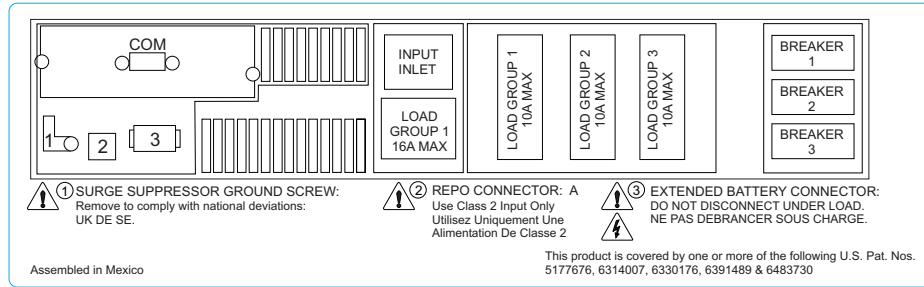


svc00149

- Rear panel configuration label

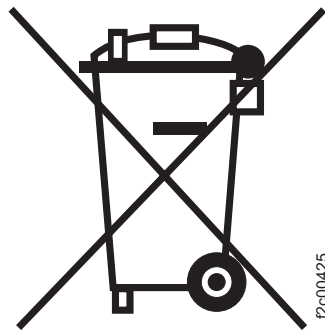
Note: This label is installed on the cover of the power supply of the SAN Volume Controller.



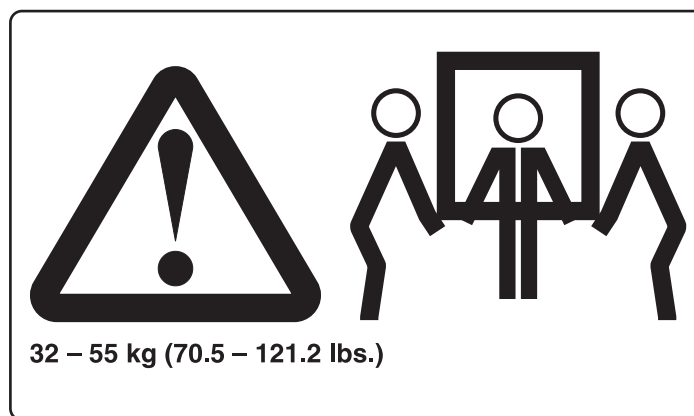
- Do not discard the UPS or the UPS batteries in the trash label

Notes:

- The UPS can contain sealed, lead-acid batteries, which must be recycled.
- If you have a 2145 UPS unit that is already installed, you might not have this label affixed to the outside of the UPS due to changing labeling requirements.



- Three-person lift label



- Weight caution label



- IT compatible label



- Power ratings and no user access label



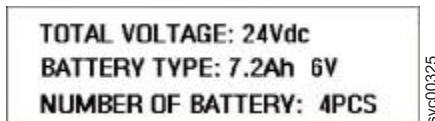
Checking the labels on the battery of the UPS

Before you install, use, or service the battery of the uninterruptible power supply (UPS), you must ensure that you understand the safety labels.

Checking the battery label of the 2145 UPS-1U

Locate the following labels for the battery of the 2145 uninterruptible power supply-1U (2145 UPS-1U).

- Battery rating label



svc00325

- Battery safety label

CAUTION:

- .The lead acid battery may cause chemical hazard.
- .The battery presents a risk of electric shock and energy hazard.
- .For disposal instructions for the battery, see user's manual.

ACHTUNG:

- .die Blei-Akkumulatoren können bei unsachgemäßer Handhabung chemische Gefahren hervorrufen.
- .die Batterie birgt eine Gefahr eines elektrischen Schlages und sehr hoher Kurzschlußströme.
- .Entsorgungsanleitungen für die Batterien, siehe Bedienungsanleitung.

09471

svc00329

- Electric shock hazard

CAUTION: Risk of electric shock. Battery supply circuit is grounded. Refer to user's manual before working on batteries.

09488

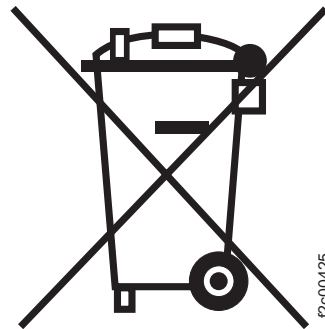
svc00330

- People's Republic of China Electronic Information Products (EIP) mark - 5 years



- Do not discard the UPS or the UPS batteries in the trash label

Note: The UPS can contain sealed, lead-acid batteries, which must be recycled.



f2c00425

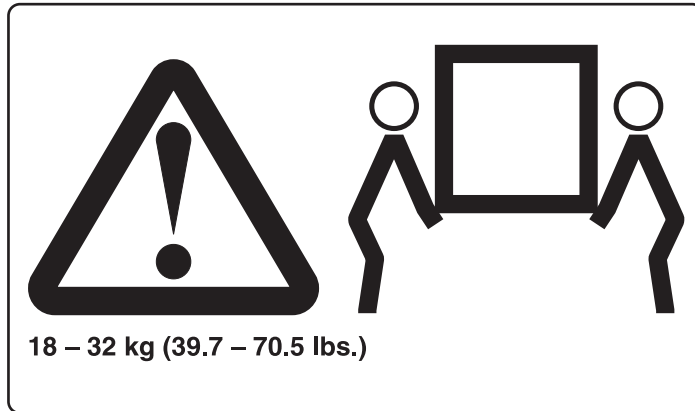
- Recycling label



Checking the battery labels of the 2145 UPS

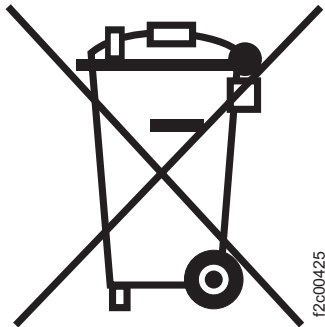
Ensure that you can locate and understand the battery labels for the 2145 uninterruptible power supply (2145 UPS).

- **Two-man lift label**



- **Do not discard the UPS or the UPS batteries in the trash label**

Note: The UPS can contain sealed, lead-acid batteries, which must be recycled.



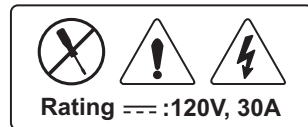
- **Recycling label**



- **Weight label**



- Power ratings and no user access label



- Battery faceplate label

Note: You must remove the front panel to see the faceplate.

<p>CAUTION:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>For use in a controlled environment</p> <ul style="list-style-type: none"> More than one live circuit Qualified service personnel ONLY <p>Precaución:</p> <ul style="list-style-type: none"> Para utilizar en un entorno controlado Más de un circuito activo SOLO personal de servicio cualificado <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY 	<p>تنبه:</p> <ul style="list-style-type: none"> استخدم في بيئة تشغيل منضبطة أكثر من دائرة واحدة فقط موظفين لتعليم الخدمة <p>Precaución:</p> <ul style="list-style-type: none"> Para utilizar en un entorno controlado Más de un circuito activo SOLO personal de servicio cualificado <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY 	<p>CUIDADO:</p> <ul style="list-style-type: none"> Para utilización en un ambiente controlado Más de un circuito activo APENAS para equipo de mantenimiento cualificado <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY 	<p>注意:</p> <ul style="list-style-type: none"> 電子受控環境中 具有多个带电电路 仅限合格的服务人员使用 <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY 	<p>POZOR:</p> <ul style="list-style-type: none"> Použití v řízeném prostředí Více než jeden aktivní elektrický obvod POUZE kvalifikovaný servisní personál <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY <p>Precaution:</p> <ul style="list-style-type: none"> For use in a controlled environment More than one live circuit Qualified service personnel ONLY
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Environmental notices and statements

You must become familiar with the environmental notices and statements.

The following topics describe the environmental notices and statements that are applicable to this product.

1089CORE

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

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

The equipment is suitable for installation in the following:

- Network telecommunications facilities

- Locations where the NEC (National Electrical Code) applies

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

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

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

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

Product recycling and disposal

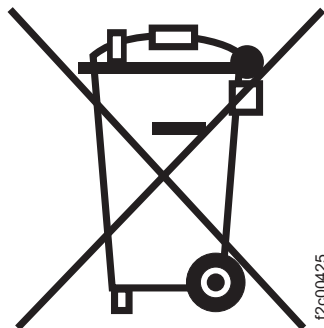
Ensure that you are aware of the materials of the product that can be recycled.

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at

<http://www.ibm.com/ibm/environment/products/prp.shtml>

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. IBM dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM.

<http://www.ibm.com/ibm/environment/products/prp.shtml>



Note:

This mark applies only to countries within the European Union (EU) and Norway.

Appliances are labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the EU. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown previously, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential affects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'étiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

Battery return program

Ensure that you understand the precautions you need to take when disposing of batteries.

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, contact your local waste disposal facility or go to the following Web site:

<http://www.ibm.com/ibm/environment/products/batteryrecycle.shtml>

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and other battery packs from IBM Equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Please have the IBM part number listed on the battery available prior to your call.

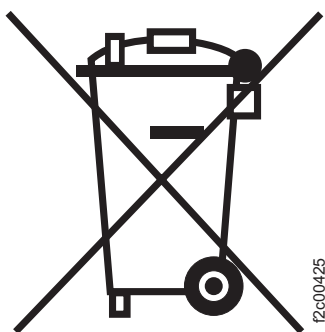
For Taiwan:



Please recycle batteries

廢電池請回收

For the European Union:



Note: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、および廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。このラベルは、使用済みになったときに指令に従って適正な処理をする必要があることを知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling and treatment of batteries and accumulators. Customer

participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

For California:

Perchlorate Material - special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate>.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5, Chapter 33. Best Management Practices for Perchlorate Materials. This product, part, or both may include a lithium manganese dioxide battery which contains a perchlorate substance.

Flat panel display

The fluorescent lamp or lamps in the liquid crystal display contain mercury.

Dispose of it as required by local ordinances and regulations.

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 anti-static bag, touch it to an unpainted metal part of the system unit for at least 2 seconds. (This action removes static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your 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 because heating reduces indoor humidity and increases static electricity.

Chapter 1. SAN Volume Controller overview

The SAN Volume Controller combines hardware and software into a comprehensive, modular appliance that uses symmetric virtualization.

Symmetric virtualization is achieved by creating a pool of managed disks (MDisks) from the attached storage subsystems. Those storage systems are then mapped to a set of virtual disks (VDisks) for use by attached host systems. System administrators can view and access a common pool of storage on the SAN. This lets the administrators use storage resources more efficiently and provides a common base for advanced functions.

A SAN is a high-speed fibre-channel network that connects host systems and storage devices. It allows a host system to be connected to a storage device across the network. The connections are made through units such as routers, gateways, hubs, and switches. The area of the network that contains these units is known as the *fabric* of the network.

The SAN Volume Controller is analogous to a logical volume manager on a SAN. The SAN Volume Controller performs the following functions for the SAN storage that it controls:

- Creates a single pool of storage
- Provides logical unit virtualization
- Manages logical volumes
- Provides the following advanced functions for the SAN:
 - Large scalable cache
 - Copy Services
 - FlashCopy[®] (point-in-time copy)
 - Metro Mirror (synchronous copy)
 - Global Mirror (asynchronous copy)
 - Data migration
 - Space management
 - Mapping that is based on desired performance characteristics
 - Metering of service quality

Each SAN Volume Controller node is a rack-mounted unit that you can install in a standard Electrical Industries Alliance (EIA) 19-inch rack. The nodes are always installed in pairs, with one-to-four pairs of nodes constituting a *cluster*. Each pair of nodes is known as an *I/O group*.

All I/O operations that are managed by the nodes in an I/O group are cached on both nodes. Each virtual volume is defined to an I/O group. I/O groups take the storage that is presented to the SAN by the storage subsystems as MDisks and translates the storage into logical disks, known as VDIs, that are used by applications on the hosts. Each node must reside in only one I/O group and provide access to the VDIs in that I/O group.

There are four models of SAN Volume Controller nodes:

- SAN Volume Controller 2145-8G4

- SAN Volume Controller 2145-8F4
- SAN Volume Controller 2145-8F2
- SAN Volume Controller 2145-4F2

Related reference

“SAN Volume Controller 2145-8G4 hardware” on page 44

It is good to familiarize yourself with the SAN Volume Controller 2145-8G4 hardware.

“SAN Volume Controller 2145-8F4 hardware” on page 47

It is good to familiarize yourself with the SAN Volume Controller 2145-8F4 hardware.

“SAN Volume Controller 2145-8F2 hardware” on page 51

It is good to familiarize yourself with the SAN Volume Controller 2145-8F2 hardware.

“SAN Volume Controller 2145-4F2 hardware” on page 53

It is good to familiarize yourself with the SAN Volume Controller 2145-4F2 hardware.

SAN fabric overview

The SAN fabric is an area of the network that contains routers, gateways, hubs, and switches. A single cluster SAN contains two distinct types of zones: a host zone and a disk zone.

In the host zone, the host systems can identify and address the SAN Volume Controller nodes. You can have more than one host zone. Generally, you create one host zone for each host type. In the disk zone, the SAN Volume Controller nodes identify the disk drives. Host systems cannot operate on the disk drives directly; all data transfer occurs through the SAN Volume Controller nodes. Figure 1 on page 3 shows several host systems that are connected in a SAN fabric.

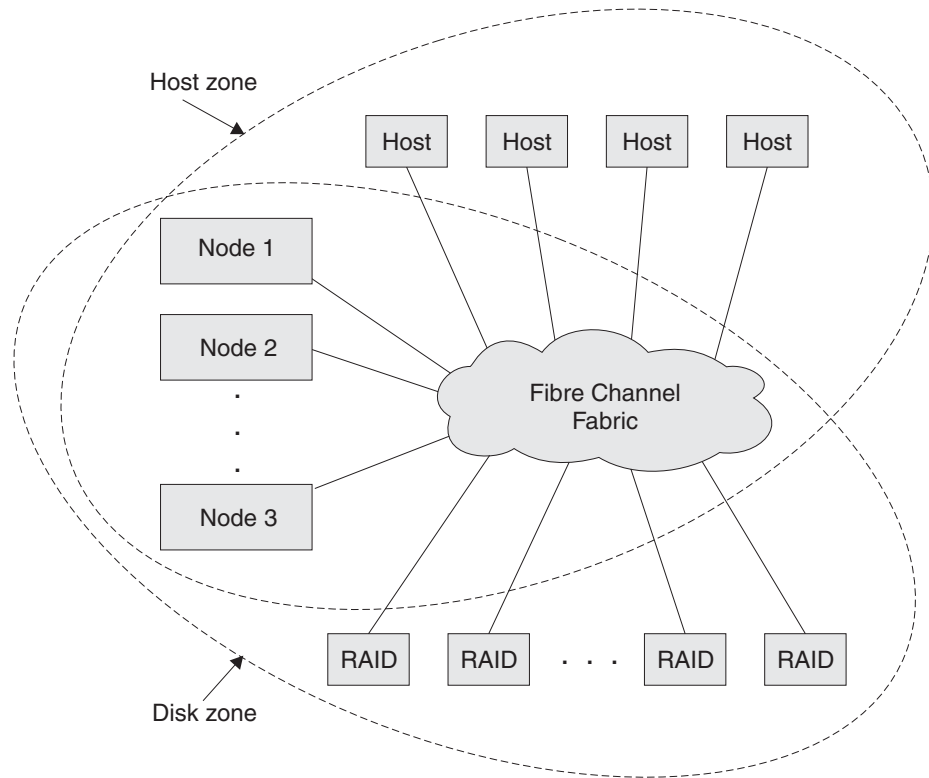


Figure 1. Example of a SAN Volume Controller cluster in a fabric

A cluster of SAN Volume Controller nodes is connected to the same fabric and presents virtual disks (VDisks) to the host systems. You create these VDisks from units of space within a managed disk (MDisk) group. An MDisk group is a collection of MDisks that are presented by the storage subsystems (RAID controllers). The MDisk group provides a storage pool. You specify how each group is created, and you can combine MDisks from different manufacturers' controllers in the same MDisk group.

Note: Some operating systems cannot tolerate other operating systems in the same host zone, although you might have more than one host type in the SAN fabric. For example, you can have a SAN that contains one host that runs on an AIX® operating system and another host that runs on a Windows® operating system.

You can remove one SAN Volume Controller node in each I/O group from a cluster when hardware service or maintenance is required. After you remove the SAN Volume Controller node, you can replace the field replaceable units (FRUs) in the SAN Volume Controller node. All communication between disk drives and all communication between SAN Volume Controller nodes is performed through the SAN. All SAN Volume Controller node configuration and service commands are sent to the cluster through an Ethernet network.

Each SAN Volume Controller node contains its own vital product data (VPD). Each cluster contains VPD that is common to all the SAN Volume Controller nodes in the cluster, and any system that is connected to the Ethernet network can access this VPD.

Cluster configuration information is stored on every SAN Volume Controller node that is in the cluster to allow concurrent replacement of FRUs. When a new FRU is

installed and when the SAN Volume Controller node is added back into the cluster, configuration information that is required by that SAN Volume Controller node is read from other SAN Volume Controller nodes in the cluster.

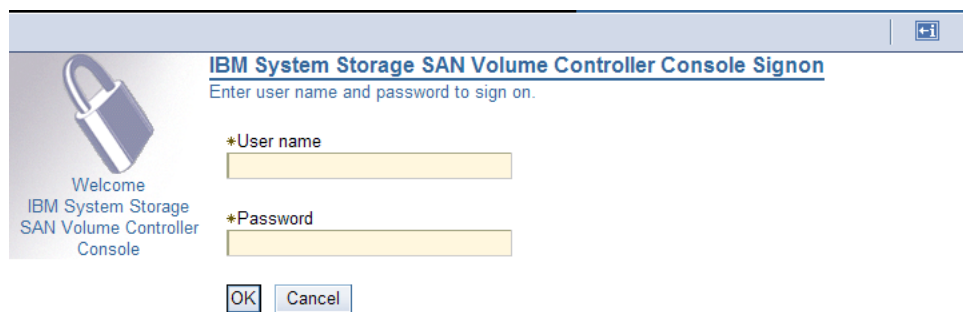
Using the SAN Volume Controller Console application

The SAN Volume Controller Console is a component of the master console software. It can also be installed on any other server that meets the requirements.

You can access the SAN Volume Controller Console directly from the master console system or remotely by pointing your Web browser to the SAN Volume Controller Console on the master console system. Your Web browser must be connected to the same Ethernet used by the master console system. You can access both service and configuration tools using this application.

Perform the following steps to access the SAN Volume Controller Console application:

1. Log on to the master console using the user name and the password that is provided by the customer. Double-click the SAN Volume Controller Console icon to display the SAN Volume Controller Console Signon panel.



IBM System Storage SAN Volume Controller Console Signon
Enter user name and password to sign on.

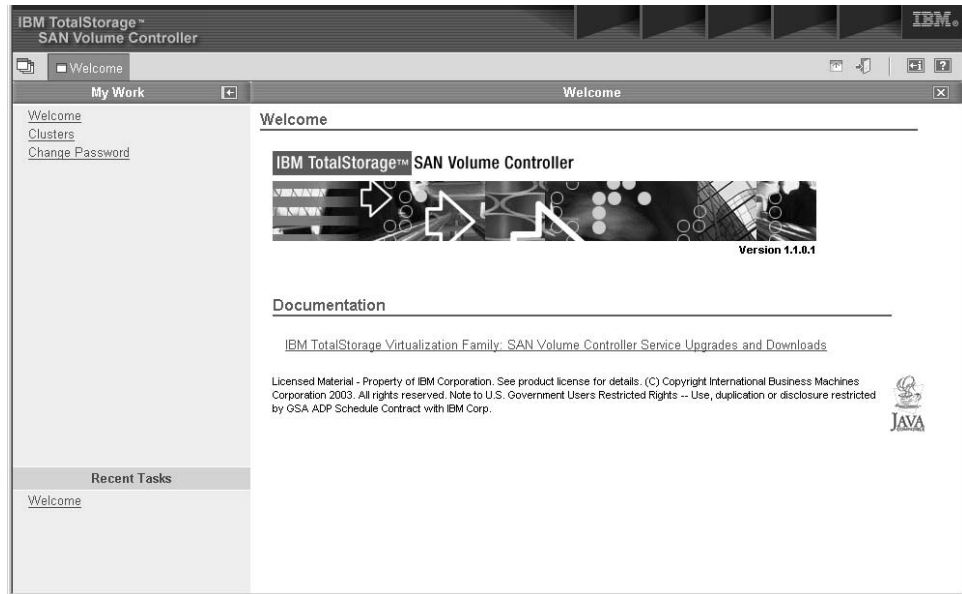
Welcome
IBM System Storage
SAN Volume Controller
Console

*User name

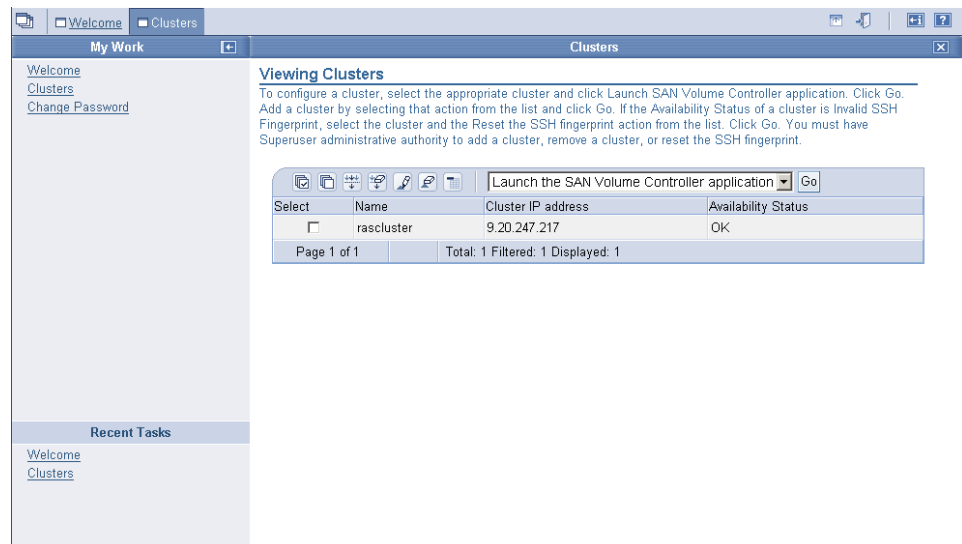
*Password

OK Cancel

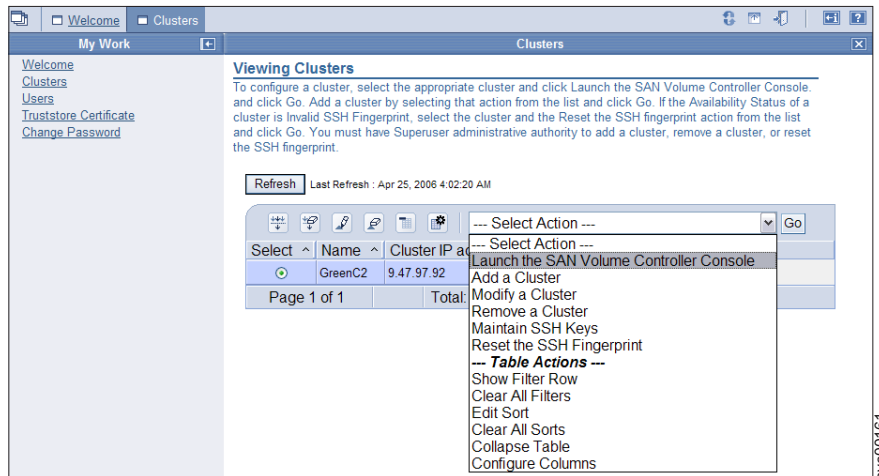
2. Enter the SAN Volume Controller Console user name and password that is provided by the customer. The following Welcome panel is displayed.



3. Click **Clusters** in the portfolio to access the configuration and service tools. The Viewing Clusters panel is displayed.



4. Select the SAN Volume Controller cluster that you want to service and select **Launch the SAN Volume Controller Console** from the task list.



5. Click **Go**. The Welcome panel for the cluster opens in a new window.

If the error message *The specified cluster is currently unavailable* is displayed and the Availability Status of the selected cluster is shown as *No Contact*, go to MAP 5000: Start. If you return to this step, contact the IBM Support Center to resolve the problem with the SAN Volume Controller.

From this menu, you can perform the following procedures:

- View the status of a node
- Delete a node from a cluster
- Add a node to a cluster
- View the status of a virtual disk (VDisk)
- View the status of a managed disk (MDisk)
- View the vital product data
- List and save dump data
- Start maintenance
- View the error log

Analyzing the error log

You can analyze the error log from the Analyze Error Log panel.

This task assumes that you have already launched the SAN Volume Controller Console.

Note: Log files that are copied to the configuration node are *not* automatically deleted by the SAN Volume Controller.

Perform the following steps to analyze the error log:

1. Click **Service and Maintenance** → **Analyze Error Log** in the portfolio. The Error log analysis panel is displayed.

The Error log analysis panel lets you analyze the cluster error log. You can display the whole log or filter the log so that only errors, events, or unfixed errors are displayed. In addition, you can request that the table is sorted by either error priority or time. For error priority, the most serious errors are the lowest-numbered errors. Therefore, they are displayed first in the table.

Either the oldest or the latest entry can be displayed first in the table. You can also select how many error log entries are displayed on each page of the table. The default is set to 10 and the maximum number of error logs that can be displayed on each page is 99.

2. After selecting the options, click **Process** to display the filtered error log in the table. The Analyze error log continued panel is displayed.

Forward and backward scroll buttons are displayed, depending on the existing page number and the total number of pages that are in the table. If the table contains more than two pages of entries, a **Go to** input area is displayed in the table footer. This input area enables you to skip to a particular page number.

If you click on the sequence number of a table record, more information about that error log entry is displayed. If the record is an error (instead of an event), you can change the fixed or unfixed status of the record; that is, you can mark an unfixed error as fixed or a fixed error as unfixed.

3. Click **Clear log** to erase the entire cluster error log.

Note: Clicking **Clear log** does *not* fix the existing errors.

Running the cluster maintenance procedure

You can use the SAN Volume Controller Console to run the cluster maintenance procedure.

This task assumes that you have already launched the SAN Volume Controller Console.

Perform the following steps to run the cluster maintenance procedure:

1. Click **Service and Maintenance** → **Run Maintenance Procedures** in the portfolio. The Maintenance Procedures panel is displayed.
2. Click **Start Analysis** to analyze the cluster error log. The Maintenance panel is displayed.

If you click the error code of a error log entry, you are guided through a series of actions that help you estimate the state of the cluster and determine if the error was an isolated event or a component failure. If a component has failed, it might be necessary to exchange that component. Where necessary, images of the failing component are displayed. If a repair is performed successfully, the state of an error record in the error log changes from an unfixed error to a fixed error.

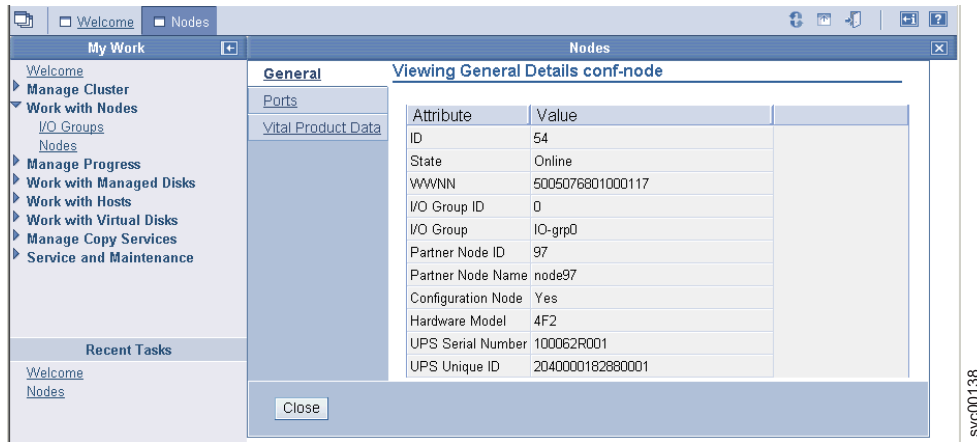
Viewing the node status

You can view the properties for a node from the Viewing General Details panel.

This task assumes that you have already launched the SAN Volume Controller Console.

Perform the following steps to view the node properties:

1. Click **Work with Nodes** → **Nodes** in the portfolio. The Viewing Nodes panel is displayed.
2. Click the name of the node for which you want to view detailed information. The Viewing General Details panel is displayed.



3. Click **Ports** to view the worldwide port name (WWPN) details. The Viewing Port Details panel is displayed.
4. Click **Vital Product Data** to view the node hardware details. The Viewing Vital Product Data panel is displayed.
5. Click **Close** to close the panel.

Fibre-channel port numbers and worldwide port names

Fibre-channel ports are identified by their physical port number and by a worldwide port name (WWPN).

The physical port numbers identify fibre-channel cards and cable connections when you perform service tasks. The WWPNs are used for tasks such as fibre-channel switch configuration and to uniquely identify the devices on the SAN.

The physical port numbers are 1 - 4, counting from left to right when you view the rear panel of the SAN Volume Controller. The WWPNs are derived from the worldwide node name (WWNN) of the SAN Volume Controller in which the card is installed.

The WWNN is in the form 50050768010XXXXX, where XXXXX is initially derived from the unit and is specific to a SAN Volume Controller. You can change the XXXXX value by using the front panel to facilitate service controller concurrent replacement and to enable some concurrent upgrade operations.

The WWPNs are in the form 5005076801QXXXXX, where XXXXX is as previously stated and Q is related to the port number as follows:

Port	Value of Q
1	4
2	3
3	1
4	2

Related reference

“Fibre-channel LEDs” on page 39

The fibre-channel LEDs indicate the status of the fibre-channel ports.

SAN Volume Controller 2145-8G4 fibre-channel port numbers and worldwide port names

The SAN Volume Controller 2145-8G4 fibre-channel ports are identified by their physical port number and by a worldwide port name (WWPN).

Figure 2 provides a view of the rear of the SAN Volume Controller 2145-8G4.

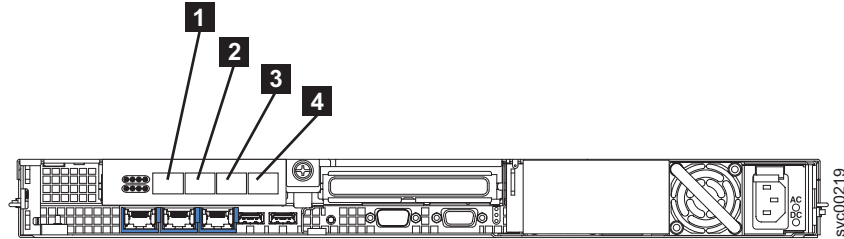


Figure 2. The physical port numbers for the SAN Volume Controller 2145-8G4

SAN Volume Controller 2145-8F4 fibre-channel port numbers and worldwide port names

The SAN Volume Controller 2145-8F4 fibre-channel ports are identified by their physical port number and by a worldwide port name (WWPN).

Figure 3 provides a view of the rear of the SAN Volume Controller 2145-8F4.

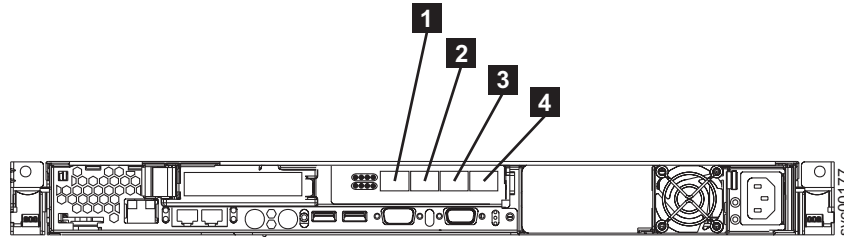


Figure 3. The physical port numbers for the SAN Volume Controller 2145-8F4

SAN Volume Controller 2145-8F2 fibre-channel port numbers and worldwide port names

The SAN Volume Controller 2145-8F2 fibre-channel ports are identified by their physical port number and by a worldwide port name (WWPN).

Figure 4 provides a view of the rear of the SAN Volume Controller 2145-8F2.

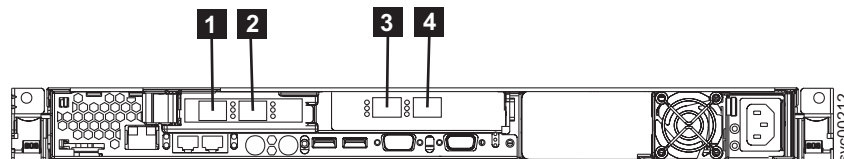


Figure 4. The physical port numbers for the SAN Volume Controller 2145-8F2

Deleting a node from the cluster

If it is required, you can delete a node from a cluster.

You might want to delete a node from a cluster if the node has failed and is being replaced with a new node, or if the repair that was performed has caused the node to be unrecognizable by the cluster. For example, if the disk drive or the software on the node has been replaced, that node is no longer known by the cluster.

This task assumes that you have already launched the SAN Volume Controller Console.

Perform the following steps to delete a node from a cluster:

1. Click **Work with Nodes** → **Nodes** in the portfolio. The Viewing Nodes panel is displayed.

Viewing Nodes
Click on a node to view its details, or select a node and an action from the list and click Go. Add a node to the cluster by selecting that action from the list and clicking Go.

Refresh Last Refresh : Apr 25, 2006 7:28:34 AM

--- Select Action --- Go

Select	ID	Name	Status	World Wide Node Name (WWNN)	I/O Group Name	Config Node
<input type="radio"/>	1	node1	Online	500507680100018C	io_grp0	Yes
<input type="radio"/>	2	node2	Online	5005076801000173	io_grp0	No

Page 1 of 1 Total: 2 Filtered: 2 Displayed: 2 Selected: 0

2. Record the Name and the I/O Group Name of the offline node. You will use this information when you add the node back into the cluster.

Attention: If more than one node in this or in other clusters on the same SAN is offline, you must take special precautions when you add the node back into the cluster.

3. Select the node that is offline and select **Delete a Node** from the task list.
4. Click **Go**. The Deleting Node from Cluster panel is displayed.
5. Click **Yes** to delete the node.

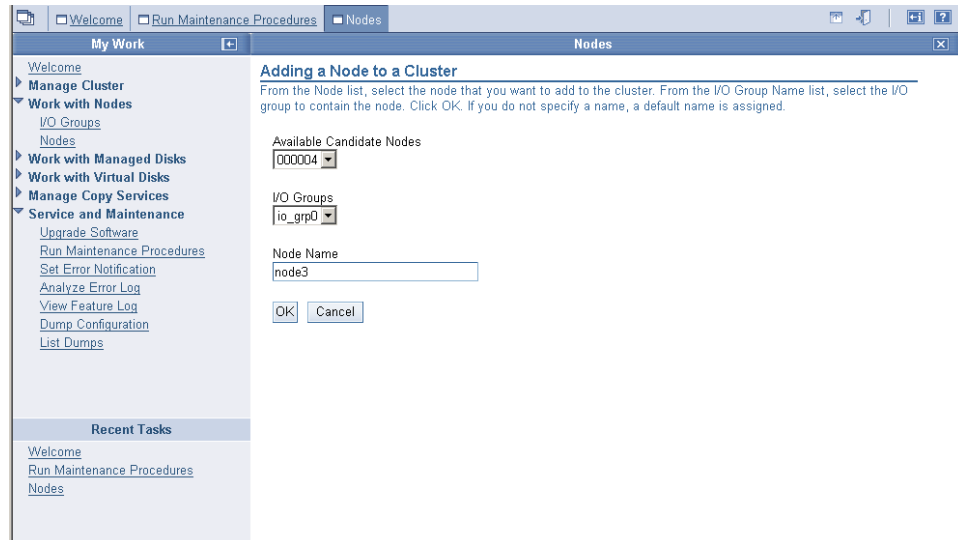
Adding a node to a cluster

You might have to add a node into the cluster if it has been removed or rejected by a cluster.

This task assumes that you have already launched the SAN Volume Controller Console.

Perform the following steps to add a node into a cluster:

1. Click **Work with Nodes** → **Nodes** in the portfolio. The Viewing Nodes panel is displayed.
2. Select **Add a node** from the task list and click **Go**. The Adding a Node to a Cluster panel is displayed.



3. Select the node that you want to add to the cluster from the **Available Candidate Nodes** list.

4. Select the I/O group that you noted when the previous node was deleted.

Attention: If more than one candidate node exists, you must ensure that the node that you add into an I/O group is the same node that was deleted from that I/O group. Failure to add the correct node can result in data corruption. If you are uncertain which candidate node belongs to the I/O group, shut down all host systems that access this cluster before you proceed. Add all the nodes back into the cluster, and then reboot each system.

For further details, see the *IBM System Storage SAN Volume Controller: Software Installation and Configuration Guide*.

Viewing the VDisk status

You must view the status of virtual disks (VDisks) as part of the repair verification procedures.

When all SAN Volume Controller repairs are complete, all VDisks are shown as online. Any VDisks that remain offline, degraded, or excluded might contain errors or are not recognized because of a problem with the SAN environment. If problems still exist on VDisks after the repair actions on the SAN Volume Controller are complete, resolve the disk drive or SAN problems and then perform repair verification for the SAN Volume Controller to verify that no other problems exist.

See the *IBM System Storage SAN Volume Controller: Software Installation and Configuration Guide* to repair offline VDisks.

Perform the following steps to view the status of VDisks:

1. Click **Work with Virtual Disks** → **Virtual Disks**. The Filtering Virtual Disks panel is displayed.
2. Specify the filter criteria that you want to use and click **OK**, or click **Bypass Filter** to display all objects of this type. The Viewing Virtual Disks panel is displayed.
3. Ensure that all VDisks are online.

Viewing the MDisk status

You must view the status of managed disks (MDisks) as part of the repair verification procedures.

When all SAN Volume Controller repairs are complete, all MDisks are shown as online. Any MDisks that remain offline, degraded, or excluded might contain errors or are not recognized because of a problem with the SAN environment. If problems still exist on MDisks after the repair actions on the SAN Volume Controller are complete, resolve the disk drive or SAN problems and then perform repair verification for the SAN Volume Controller to verify that no other problems exist.

Perform the following steps to view the status of MDisks:

1. Click **Work with Managed Disks** → **Managed Disks** from the portfolio. The Filtering Managed Disks panel is displayed.
2. Specify the filter criteria that you want to use and click **OK**, or click **Bypass Filter** to display all objects of this type. The Viewing Managed Disks panel is displayed.
3. Ensure that all MDisks are online.

Discovering MDisks

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

This task assumes that you have already launched the SAN Volume Controller Console.

Perform the following steps to discover MDisks:

1. Click **Work with Managed Disks** → **Managed Disks** in the portfolio. The Filtering Managed Disks panel is displayed.
2. Specify the filter criteria that you want to use and click **OK** or click **Bypass Filter** to display all objects of this type. The Viewing Managed Disks panel is displayed.
3. Select **Discover MDisks** from the task list and click **Go**. The Discovering Managed Disks panel is displayed. The newly discovered MDisks are displayed in a table on the Discovering Managed Disks panel.
4. Click **Close** to return to the Viewing Managed Disks panel.

Related tasks

“Discovering MDisks using the CLI” on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

Viewing discovery status

You can view the status of a managed disk (MDisk) discovery from the Viewing Discovery Status panel.

This task assumes that you have already launched the SAN Volume Controller Console.

Perform the following steps to view status of an MDisk discovery:

1. Click **Work with Managed Disks** → **Discovery Status**. The Viewing Discovery Status panel is displayed.

2. Click **Close** to close this panel.

Viewing the vital product data

You can view the vital product data for a node from the Viewing Vital Product Data panel.

Perform the following steps to view the vital product data for a node:

1. Click **Work With Nodes** in the portfolio.
2. Click **Nodes** in the portfolio. The Nodes panel is displayed.
3. Click on the node whose details you want to view.
4. Click **Vital Product Data** to view the data.
5. Click **Close** to return to the Viewing Vital Product Data panel.

Displaying and saving log and dump files

You can save the log and dump files for nodes.

You can save dump data for any node in the cluster. When you use this procedure to display dump data only, the dump files for the configuration node are displayed. An option on the dumps menu allows you to display data from other nodes. If you choose to display or save data from another node, that data is first copied to the configuration node.

The software dump files contain dumps of the SAN Volume Controller memory. Your IBM service representative might ask for these dumps to debug problems. The software dumps are large files (approximately 300 MB). Consider copying these files to your host using secure copy methods.

The **List dumps** option supports the following file types:

- Error logs
- Configuration logs
- I/O statistic logs
- I/O trace logs
- Feature logs
- Software dumps

Perform the following steps to display log and dump files:

This task assumes that you have already launched the SAN Volume Controller Console.

1. Click **Service and Maintenance** → **List Dumps** in the portfolio. The List Dumps panel is displayed.

The List dumps (other nodes) continued panel displays the number of log files or dumps of a particular type that are available on the cluster. If there is more than one node in the cluster, the **Check other nodes** button is displayed. If you click this button, the log files and dumps for all nodes that are part of the cluster are displayed. Dumps and logs on all nodes in the cluster can be deleted or copied to the configuration node.

If you click on one of the file types, all the files of that type are listed in a table.

Note: For error logs and software dumps, the file names include the node name and time and date as part of the file name.

2. Copy the files to your local workstation by right-clicking on the filename and using the **Save Link As...** (Netscape) or **Save Target As...** (Internet Explorer) option from the Web browser.

Marking errors as fixed

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

This task assumes that you have already launched the SAN Volume Controller Console. Perform the following steps to mark errors as fixed:

1. Select a cluster and launch the SAN Volume Controller Console.
2. Click **Service and Maintenance** → **Analyze Error Log** in the portfolio.
3. Select the analysis option from the list of options:
 - Show all errors and events
 - Show all errors
 - Show all events
 - Show all unfixed errors
 - Show all errors or events matching code
4. Select the display option:
 - Sort by error priority
 - Sort by date with the newest first
 - Sort by date with the oldest first
 - Number of entries to display (per page)
5. Click **Process**
6. Click on the sequence number of the error that you have just fixed to display the error log in more detail.
7. Click **Mark Error As Fixed**.

The error log entry for this error is now marked as fixed and it will not be used as part of future error log analysis.

Viewing the fibre-channel fabric connections

Failures of the SAN Volume Controller hardware, fibre-channel cables, fibre-channel switches, fibre-channel hardware in host systems, or disk controllers can cause fibre-channel connectivity problems.

Note: The term *fibre-channel fabric* describes all of the interconnections between the ports on a fibre-channel network.

Other SAN Volume Controller procedures isolate the hardware errors that cause storage area network (SAN) connectivity problems. You were sent to this topic because it is suspected that a problem exists elsewhere on the SAN. The resolution of problems on the fibre-channel fabric is outside of the scope of current documentation. The procedures here describe how to use the fibre-channel fabric viewing tool to help you understand the SAN Volume Controller view of the SAN. When you work with support personnel or with the customer to isolate SAN failures, this is valuable information.

Perform the following steps to start the fabric-viewing tool:

1. Log on to the SAN Volume Controller Console.
2. Click **Clusters**. The **Viewing Clusters** panel is displayed.
3. Select the cluster for which you want to view fabric information, and select **Launch the SAN Volume Controller Console** from the task list.
4. Click **Go**.
5. Click **Work with Hosts** → **Fabrics**. The **Viewing Fabrics** panel is displayed. See Figure 5.

Select	Name	State	Type	Node ID	Node	Cluster	Local WWPN	Local Port	Local NPort ID	Remote WWPN
<input type="radio"/>	cimhwd12806598	inactive	host	1	node1	-	500507680120018C	4	0A1900	5005076801400173
<input type="radio"/>	cimhwd12806598	inactive	host	1	node1	-	500507680130018C	2	091900	5005076801400173
<input type="radio"/>	controller0	inactive	controller	1	node1	-	5005076801400117	1	091300	200500A0B80F35D1
<input type="radio"/>	controller0	inactive	controller	2	node2	-	5005076801300183	2	0A1400	200500A0B80F35D1
<input type="radio"/>	controller0	inactive	controller	2	node2	-	5005076801400183	1	091400	200400A0B80F35D1
<input type="radio"/>	controller0	inactive	controller	2	node2	-	5005076801100183	3	0B1400	200500A0B80F35D1
<input type="radio"/>	controller0	inactive	controller	2	node2	-	5005076801200183	4	0C1400	200500A0B80F35D1
<input type="radio"/>	controller0	inactive	controller	2	node2	-	5005076801100183	3	0B1400	200400A0B80F35D1
<input type="radio"/>	controller0	inactive	controller	1	node1	-	5005076801200117	4	0C1300	200400A0B80F35D1
<input type="radio"/>	controller0	inactive	controller	1	node1	-	5005076801300117	2	0A1300	200400A0B80F35D1

Figure 5. Viewing Fabric panel

The contents of each displayed field is described in Table 1.

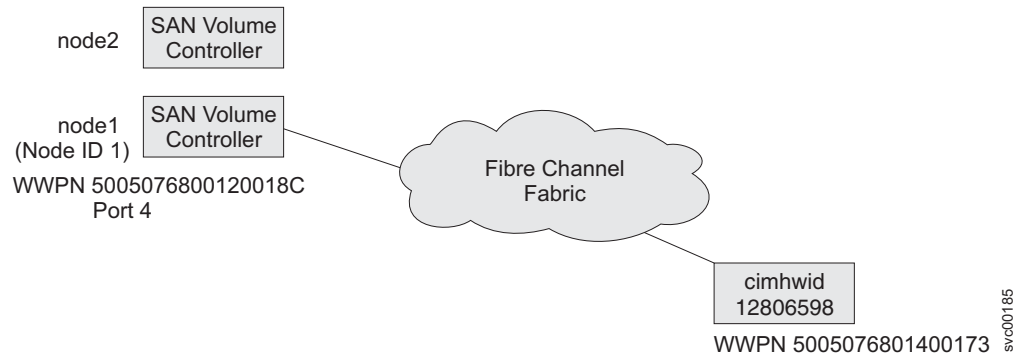
Table 1. Fibre-channel viewing definitions

Fields	Description
Name	This is the name of the device whose worldwide port name (WWPN) is listed in the remote WWPN field.
State	Indicates whether the device listed in the Name field is active or inactive.
Type	The type of the device that is listed in the Name field. The expected types are "controller" (storage controller), "node" (SAN Volume Controller), or "host" (system that is using this SAN Volume Controller). If the type of device cannot be determined, "unknown" is displayed.
Node ID	The ID of the node that is listed in the Node field.
Node	This is the node name (as displayed on the front panel of the SAN Volume Controller).
Cluster	When the Type field lists a "node," the cluster field displays the name of the cluster to which that node belongs.
Local WWPN	The WWPN of the SAN Volume Controller port that has a connection to the device listed in the Name field, using the WWPN that is listed in the Remote WWPN field.
Local Port	This is the physical port number on the back of the "node" listed in the Node field.

Table 1. Fibre-channel viewing definitions (continued)

Fields	Description
Local NPort ID	The NPort number of the Local Port listed in the Local Port field.
Remote WWPN	The WWPN of the device listed in the Name field.
Remote NPort ID	The NPort number of the device listed in the Name field.

The first line of Figure 5 on page 15 shows the following connection:



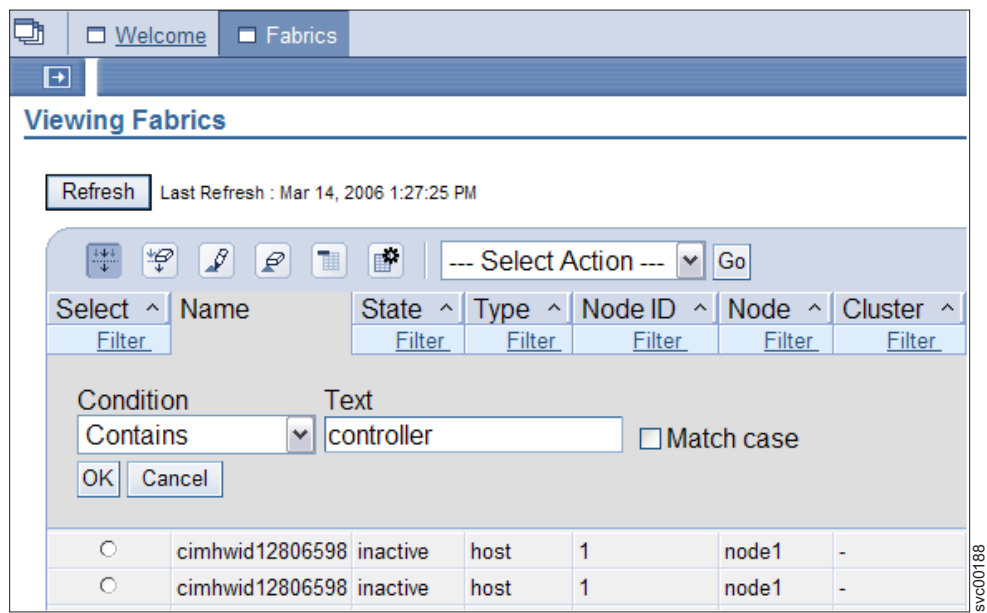
The fabric viewer provides comprehensive tools to let you display only the information that you need, and format the output in the most convenient form.

Note: The following examples provide different ways that you can display fabric connections. Not all scenarios are represented, and the examples are only intended to show you two potential methods of finding the information that you seek.

Displaying all controllers logged into a node

Perform the following steps to display all of the controllers that are logged into a node called "node1":

1. From the **Select Action** menu, select **Show Filter Row** and click **Go**.
2. Click the **Name** filter and type controller in the text box.



3. Click **OK**.
4. Click the **Node** filter and type node1 in the text box.
5. Click **OK**.

The display (in Figure 6) shows all controllers that are logged in to node1.

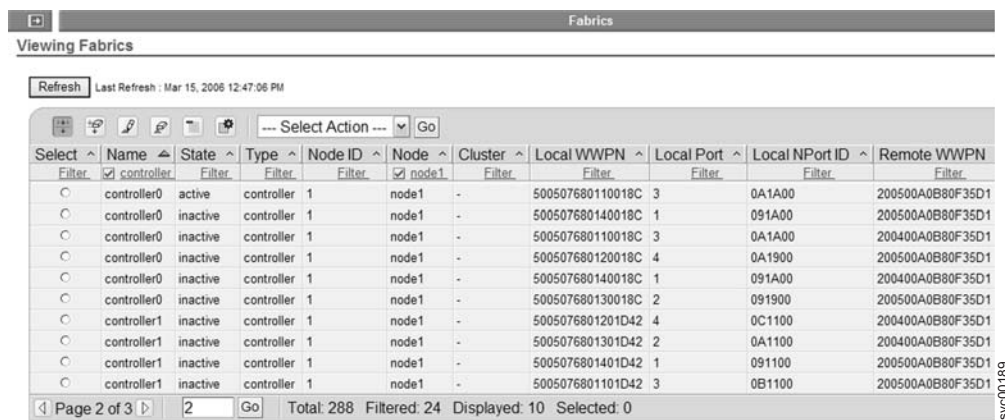


Figure 6. Example display of controllers logged in to node1

6. To restore the original display, select **Clear All Filters** from the **Select Action** menu and click **Go**.

Displaying all active devices

Perform the following steps to display all active devices that are logged in to port 2 of "node2":

1. From the **Select Action** menu, select **Show Filter Rows** and click **Go**.
2. Click the **State** filter and type active in the text box.
3. From the **Condition** menu, select **Matches** and click **OK**. See Figure 7 on page 18.

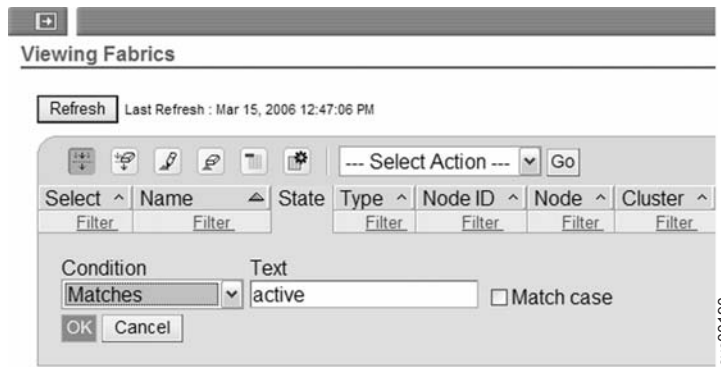


Figure 7. Displaying all active devices

4. Click the **Node** filter and type node2 in the text box and click **OK**.
 5. Click the **Local Port** filter and type 2 in the text box and click **OK**.
- The display shows all devices that are logged in to port 2 on node2. See Figure 8.

Select	Name	State	Type	Node ID	Node	Cluster	Local WWPN	Local Port	Local NPort ID	Remote WWPN
<input type="radio"/>	node1	active	node	2	node2	GreenC2	5005076801300173	2	0C1A00	500507680120018C
<input type="radio"/>	node1	active	node	2	node2	GreenC2	5005076801300173	2	0C1A00	500507680130018C
<input type="radio"/>	node1	active	node	2	node2	GreenC4	5005076801300173	2	0C1A00	5005076801400117
<input type="radio"/>	node1	active	node	2	node2	GreenC4	5005076801300173	2	0C1A00	5005076801100117
<input type="radio"/>	node1	active	node	2	node2	GreenC4	5005076801300173	2	0C1A00	5005076801300117

Figure 8. Example display of all active devices logged into port 2 of node2

Accessing the CLI from the master console

If you must enter and run command-line instructions, you can access the SAN Volume Controller command-line interface (CLI) from the master console.

Perform the following steps to access the CLI:

1. Start PuTTY by clicking **Start** → **Programs** → **PuTTY** → **PuTTY** or by going to the directory and double-clicking the putty.exe file. If the master console is configured to use PuTTY for command-line access, the session settings might be saved. Perform the following steps if the cluster you need to access is listed under Saved Sessions:
 - a. Select the menu item for the cluster.
 - b. Click **Load**.
 - c. Click **Open**.
 - d. Go to step 2 on page 19. If the cluster is not listed under Saved sessions, ask the customer to set up PuTTY for command-line access. See “Configuring the PuTTY session for the CLI” in the *IBM System Storage SAN Volume Controller: Software Installation and Configuration Guide*, and then restart this procedure.



2. Click **Yes** if the following PuTTY alert panel opens:



The command-line window for service is displayed.

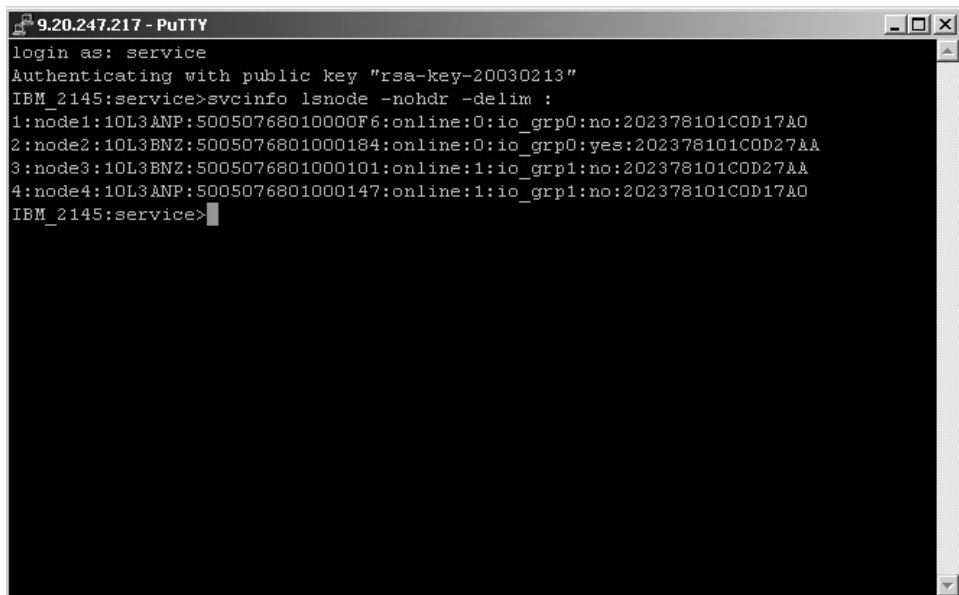


```
9.20.247.217 - PuTTY
login as: service
Authenticating with public key "rsa-key-20030213"
IBM_2145:service>
```

3. Type the user name `service` at the login prompt. When the service prompt is displayed, you can use the CLI to issue commands.
4. Issue a command following the service prompt to display information about the SAN Volume Controller. For example, issue the following command to view the current status of the nodes that are used by the SAN Volume Controller cluster:

```
svcinfolsnode -nohdr -delim :
```

The current status of the nodes used by the SAN Volume Controller cluster is displayed.



```
9.20.247.217 - PuTTY
login as: service
Authenticating with public key "rsa-key-20030213"
IBM_2145:service>svcinfolsnode -nohdr -delim :
1:node1:10L3ANP:50050768010000F6:online:0:io_grp0:no:202378101COD17A0
2:node2:10L3BNZ:5005076801000184:online:0:io_grp0:yes:202378101COD27AA
3:node3:10L3BNZ:5005076801000101:online:1:io_grp1:no:202378101COD27AA
4:node4:10L3ANP:5005076801000147:online:1:io_grp1:no:202378101COD17A0
IBM_2145:service>
```

5. Issue the following command:
`svcinfolcluster clustername`

where *clustername* represents the name of the cluster whose details you want to list.

You are set up to use the CLI from the master console.

Checking the status of the node using the CLI

You can use the command-line interface (CLI) to check the status of the node.

Issue the following CLI command to check the status of the node:

```
svcinfo lsnode -delim :
```

The following output shows what is displayed when you issue the `svcinfo lsnode -delim :` command:

```
1:node1:10L3ANP:5005076801000013:online:0:io_grp0:yes:202378101C0D17A0  
2:node2:10L3BNZ:5005076801000184:online:0:io_grp0:no:202378101C0D27AA
```

The characteristics for each node are listed on one line per node. In the example, you can see a node status of *online*. You might also see the following status: *offline*, *adding*, or *deleting*.

For more information about what commands you can use, see the *IBM System Storage SAN Volume Controller: Software Installation and Configuration Guide*.

Checking the status of the node ports using the CLI

You can use the command-line interface (CLI) to check the status of the node ports.

Issue the following CLI command to check the status of the node ports:

```
svcinfo lsnode -delim : nodename
```

where *nodename* is the name of the node whose ports you want to check.

The following output shows what is displayed when you issue the `svcinfo lsnode -delim : nodename` command:

```

id:1
name:node1
UPS_serial_number:10L3ANP
WWNN:5005676801000013
status:online
IO_group_id:0
IO_group_name:io_grp0
partner_node_id:2
partner_node_name:node2
config_node:yes
UPS_unique_id:202378101C0D17A0
port_id:5005676801100013
port_status:active
port_id:5005676801200013
port_status:active
port_id:5005676801300013
port_status:active
port_id:5005676801400013
port_status:active

```

The previous example shows information for the named node on line two. You can see the port ID and the status of the port in the last eight lines of the example. In this example, the last eight lines show a port status of *active*. You might also see the following statuses: not installed, failed, or inactive.

For more information about using the command-line interface, see *IBM System Storage SAN Volume Controller: Command-Line Interface User's Guide*.

Deleting a node from the cluster using the CLI

You can use the command-line interface (CLI) to delete a node from the cluster.

1. Issue the following CLI command to list the cluster nodes:

```
svcinfo lsnode
```

The following output is an example of what you might see when you issue the `svcinfo lsnode` command:

id	name	UPS_serial_number	WWNN	status	IO_group_id	IO_group_name	config_node	UPS_unique_id
1	node1	10L3ANP	50050768010000F6	online	0	io_grp0	yes	202378101C0D17A0
2	node2	10L3BNZ	5005076801000184	online	0	io_grp0	no	202378101C0D27AA
3	node3	10L3BNZ	0000000000000000	offline	1	io_grp1	no	202378101C0D27AA
4	node4	10L3ANP	5005076801000147	online	1	io_grp1	no	202378101C0D17A0
5	node5	10L3CNP	50050776020000F8	online	2	io_grp2	no	202278101C0D17AB
6	node6	10L3CNZ	5005076801000197	online	2	io_grp2	no	202378202C0D27AA
7	node7	10L3DNZ	0000000000000000	online	3	io_grp3	no	202379011C0D27AA
8	node8	10L3DNP	5005076801000258	online	3	io_grp3	no	202378101C0D16A0

Make a note of the name and the I/O group name of the offline node. In the example, node3 is offline and is assigned to `io_grp1`. You will need this information when you add a node back into the cluster.

Attention: If more than one node in this or in other clusters on the same storage area network (SAN) is offline, make a note of that now because you must take special precautions when you add the node back into the cluster.

2. Issue the following CLI command to remove the offline node from the cluster:

```
svcservicetask rmnode node
```

where `node` is the name of the offline node that you noted in step 1.

Related tasks

“Adding a node to the cluster using the CLI”

You can use the command-line interface (CLI) to add a node that has either been removed or rejected by a cluster, into the cluster.

Adding a node to the cluster using the CLI

You can use the command-line interface (CLI) to add a node that has either been removed or rejected by a cluster, into the cluster.

Attention: Before you add a node to a cluster, make sure that you configure the switch zoning such that the node being added is in the same zone as all other nodes in the cluster. If you are replacing a node and the switch is zoned by worldwide port name (WWPN) rather than by switch port, you must update the switch configuration.

Perform the following steps to add a node to a cluster:

1. Issue the following CLI command to list the node candidates:

```
svcinfolsnodecandidate
```

The following output is an example of what you might see after you issue the `svcinfolsnodecandidate` command:

id	panel_name	UPS_serial_number	UPS_unique_id
5005076801000101	000279	10L3BNZ	202378101C0D27AA

2. Issue the following CLI command to add the node:

```
svcservicetask addnode -panelname panel_name -name new_name_arg -iogrp iogroup_name
```

where *panel_name* is the name that is noted in step 1 (in this example the panel name is 000279). This is the number that is printed on the front panel of the node that you are adding back into the cluster; *new_name_arg* is the name of the node that is noted when the previous node was deleted from the cluster; *iogroup_name* is the I/O group that was noted when the previous node was deleted from the cluster.

The following example shows the command that you might issue:

```
svcservicetask addnode -panelname 000279 -name node3 -iogrp io_grp1
```

The following output is an example of what you might see:

```
Node, id [5005076801000101], successfully added
```

Attention: If more than one candidate node exists, ensure that the node that you add into an I/O group is the same node that was deleted from that I/O group. Failure to do so might result in data corruption. If you are uncertain about which candidate node belongs to the I/O group, shut down all host systems that access this cluster before you proceed. Reboot each system when you have added all the nodes back into the cluster.

3. Issue the following CLI command to ensure that the node was added successfully:

```
svcinfolsnode
```

The following output is an example of what you might see when you issue the `svcinfolsnode` command:

id	name	UPS_serial_number	WWNN	status	IO_group_id	IO_group_name	config_node	UPS_unique_id
1	node1	10L3ANP	50050768010000F6	online	0	io_grp0	yes	202378101C0D17A0
2	node2	10L3BNZ	5005076801000184	online	0	io_grp0	no	202378101C0D27AA
5	node3	10L3BNZ	5005076801000101	online	1	io_grp1	no	202378101C0D27AA
4	node4	10L3ANP	5005076801000147	online	1	io_grp1	no	202378101C0D17A0
5	node5	10L3CNP	50050776020000F8	online	2	io_grp2	no	202278101C0D17AB
6	node6	10L3CNZ	5005076801000197	online	2	io_grp2	no	202378202C0D27AA
7	node7	10L3DNZ	5005076801000458	online	3	io_grp3	no	202379011C0D27AA
8	node8	10L3DNP	5005076801000258	online	3	io_grp3	no	202378101C0D16A0

All nodes are now online.

Related tasks

“Deleting a node from the cluster using the CLI” on page 22

You can use the command-line interface (CLI) to delete a node from the cluster.

Listing MDisks using the CLI

You can use the command-line interface (CLI) to list the managed disks (MDisks).

Perform the following steps to list the name, status, and mode of an MDisk:

1. Issue the following CLI command:

```
svcinfolsmdisk -delim :
```

The following output is an example of what you might see when you issue the `svcinfolsmdisk -delim :` command:

```
id: name:      status: mode:      mdisk_grp_id:  mdisk_grp_name      capacity:ctrl_LUN_#:  controller_name:UID
0:  mdisk0:    online: unmanaged::  68.4GB:        0000000000000000:  controller0          *
1:  mdisk1:    online: unmanaged::  68.4GB:        0000000000000000:  controller1          +
2:  mdisk2:    online: unmanaged::  68.4GB:        0000000000000000:  controller2          ++
3:  mdisk3:    online: unmanaged::  68.4GB:        0000000000000000:  controller3          $
4:  mdisk4:    online: unmanaged::  68.4GB:        0000000000000000:  controller4          #
5:  mdisk5:    online: unmanaged::  68.4GB:        0000000000000000:  controller5          **

*600a0b80000f4c920000000b3ef6c3d00000000000000000000000000000000 (This number represents the controller_name:UID)
*0080e52122fa800000000000000000000000000000000000000000000000000 (This number represents the controller_name:UID)
**600a0b80000c5ae4000000093eca105c00000000000000000000000000000000 (This number represents the controller_name:UID)
$0080a0b80000f6432000000043ef6b4ff00000000000000000000000000000000 (This number represents the controller_name:UID)
#600a0b80000f4c920000000b3ef6c3d0000000000000000000000000000000000 (This number represents the controller_name:UID)
**600a0b80000f6c92000000d3er1a7d000000000000000000000000000000000000 (This number represents the controller_name:UID)
```

2. View the status column to determine the status of the MDisk. In this example, all the MDisks have a status of online. The following list shows the possible status of an MDisk:

- Online
- Offline
- Excluded
- Degraded

3. View the mode column to determine the mode of the disk. In this example, the mode is unmanaged. The following list shows possible modes for an MDisk:

- Managed
- Unmanaged
- Image

4. You can also list more detailed information about an MDisk. For example, issue the `svcinfolsmdisk -delim : 3` command to see detailed information about the MDisk with an ID of 3. The following output is an example of what you might see:

```
id:3
name:mdisk3
status:online
mode:managed mdisk_grp_id:0
mdisk_grp_name:mdiskgrp0
capacity:68.4GB
quorum_index:
block_size:512
controller_name:controller3
ctrl_type:4
ctrl_WWNN:20000004CF1FD7A0
controller_id:3
path_count:1 max_path_count:1
ctrl_LUN #:0000000000000000
UID:600a0b80000f643200000043ef6b4ff00000000000000000000000000000000
```

Including MDisks using the CLI

You can use the command-line interface (CLI) to include an excluded or degraded managed disk (MDisk).

1. Issue the following CLI command to determine which MDisk has been excluded:

```
svcinfolsmdisk -nohdr -delim :
```

The following output is an example of what you might see:

```
0:mdisk0:online:managed:0:Group0:67.8GB:0000000000000000:controller0*
1:mdisk1:excluded:managed:0:Group0:205.0GB:0000000000000000:controller1+
2:mdisk2:online:managed:0:Group0:273.3GB:0000000000000000:controller1#
3:mdisk3:online:managed:0:Group0:546.6GB:0000000000000000:controller1$

* 0080e52122fa800000000000000000000000000000000000000000000000000 is appended to this line.
* 600a0b80000c5ae4000000093eca105c00000000000000000000000000000000 is appended to this line.
# 600a0b80000f643200000043ef6b4ff00000000000000000000000000000000 is appended to this line.
$ 600a0b80000f4c92000000b3ef6c3d00000000000000000000000000000000 is appended to this line.
```

Line number two shows the number of the excluded disk.

2. Issue the following CLI command to include the excluded or degraded MDisk:

```
svcservicetask includemdisk mdisk_number
```

where *mdisk_number* is the number of the MDisk that you want to include.

Note: If you are using a software version lower than 2.1.0, issue the following command:

```
svctask includemdisk mdisk_number
```

Discovering MDisks using the CLI

You can use the command-line interface (CLI) to discover managed disks (MDisks).

When back-end controllers are added to the fibre-channel SAN and are included in the same switch zone as a SAN Volume Controller cluster, the cluster automatically discovers the back-end controller and integrates the controller to determine the storage that is presented to the SAN Volume Controller nodes. The SCSI logical units (LUs) that are presented by the back-end controller are displayed as unmanaged MDisks. However, if the configuration of the back-end controller is modified after this has occurred, the SAN Volume Controller cluster might be unaware of these configuration changes. You can request that the SAN Volume Controller cluster rescans the fibre-channel SAN to update the list of unmanaged MDisks.

Note: The automatic discovery that is performed by SAN Volume Controller cluster does not write anything to an unmanaged MDisk. You must instruct the SAN Volume Controller cluster to add an MDisk to an MDisk group or use an MDisk to create an image mode virtual disk (VDisk).

Note: When you are adding MDisks to an MDisk group using the command `svctask addmdisk` or when you are creating an MDisk group using the command `svctask mkmdiskgrp -mdisk`, the SAN Volume Controller performs tests on the MDisks in the list before the MDisks are allowed to become part of an MDisk group. These tests include checks of the MDisk identity, capacity, status, and the ability to perform both read and write operations. If these tests fail, or exceed the time allowed, the MDisks are not added to the group. However, with the command `svctask mkmdiskgrp -mdisk`, the MDisk group is still created even if the tests fail, but it does not contain any MDisks. If tests fail, confirm that the MDisks are in the correct state and that they have been correctly discovered.

The following reasons contribute to a typical MDisk test failure:

- The MDisk is not visible to all SAN Volume Controller nodes in the cluster.
- The MDisk identity has changed from a previous discovery operation.
- The MDisk cannot perform read or write operations.
- The status of the MDisk is degraded, excluded, or offline.
- The Mdisk does not exist.

The following reasons contribute to a typical MDisk test timeout:

- The disk controller subsystem on which the MDisk resides is failing.
- A SAN fabric or cable fault condition exists that is preventing reliable communication with the MDisk.

Perform the following steps to discover and then view a list of MDisks:

1. Issue the `svctask detectmdisk` CLI command to manually scan the fibre-channel network. The scan discovers any new MDisks that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

Notes:

- a. Only issue the `svctask detectmdisk` command when you are sure that all of the disk controller ports are working and correctly configured in the controller and the SAN zoning. Failure to do this can result in errors that are not reported.

- b. Although it might appear that the **detectmdisk** command has completed, extra time might be required for it to run. The **detectmdisk** is asynchronous and returns a prompt while the command continues to run in the background. You can use the **lsdiscoverystatus** command to list the discovery status.
2. When the detection is complete, issue the **svcinfolismdiskcandidate** CLI command to show the unmanaged MDisks. These MDisks have not been assigned to an MDisk group.
3. Issue the **svcinfolismdisk** CLI command to view all of the MDisks.

You have now seen that the back-end controllers and switches have been set up correctly and that the SAN Volume Controller cluster recognizes the storage that is presented by the back-end controller.

The following example describes a scenario where a single back-end controller is presenting eight SCSI LUs to the SAN Volume Controller cluster:

1. Issue `svctask detectmdisk`.
2. Issue `svcinfolismdiskcandidate`.

The following output is displayed:

```
id
0
1
2
3
4
5
6
7
```

3. Issue `svcinfolismdisk -delim : -filtervalue mode=unmanaged`

The following output is displayed:

```
id:name:status:mode:mdisk_grp_id:mdisk_grp_name:
capacity:ctrl_LUN_#:controller_name
0:mdisk0:online:unmanaged:::273.3GB:0000000000000000:controller0
1:mdisk1:online:unmanaged:::273.3GB:0000000000000001:controller0
2:mdisk2:online:unmanaged:::273.3GB:0000000000000002:controller0
3:mdisk3:online:unmanaged:::273.3GB:0000000000000003:controller0
4:mdisk4:online:unmanaged:::136.7GB:0000000000000004:controller0
5:mdisk5:online:unmanaged:::136.7GB:0000000000000005:controller0
6:mdisk6:online:unmanaged:::136.7GB:0000000000000006:controller0
7:mdisk7:online:unmanaged:::136.7GB:0000000000000007:controller0
```

Related tasks

“Discovering MDisks” on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

“Accessing the CLI from the master console” on page 18

If you must enter and run command-line instructions, you can access the SAN Volume Controller command-line interface (CLI) from the master console.

Checking MDisk group status using the CLI

You can use the command-line interface (CLI) to check the status of a managed disk (MDisk) group.

Issue the following CLI command to display the status of MDisk groups:

```
svcinfolsmdiskgrp -nohdr -delim :
```

The following output is an example of what you might see:

```
0:Group0:online:4:4:2.1GB:16:1.9GB
```

The characteristics for each MDisk group is listed one line per group. The status of the MDisk group is shown by the third item. In the previous example, Group0 status is online. MDisk group status can be offline, online, or degraded.

Checking disk controller status using the CLI

You can use the command-line interface (CLI) to check the status of the disk controllers.

Issue the `svcinfolsccontroller -delim :` command to display the example output:

```
id:controller_name:ctrl_s/n:vendor_id:product_id_low:product_id_high
7:controller7:3EK0J5Y8:SEAGATE :ST373405:FC
8:controller8:3EK0J6CR:SEAGATE :ST373405:FC
9:controller9:3EK0J4YN:SEAGATE :ST373405:FC
10:controller10:3EK0GKGH:SEAGATE :ST373405:FC
11:controller11:3EK0J85C:SEAGATE :ST373405:FC
12:controller12:3EK0JBR2:SEAGATE :ST373405:FC
13:controller13:3EKYNJF8:SEAGATE :ST373405:FC
14:controller14:3EK0HVTM:SEAGATE :ST373405:FC
```

You can also check the status of a specific disk controller. Issue the following command to check the status of a specific disk controller:

```
svcinfolsccontroller -delim = controller_id
```

where *controller_id* is the ID of the controller whose status you want to check.

```
id=7
controller_name=controller7
WWNN=20000004CF2412AC
mdisk_link_count=1
max_mdisk_link_count=1
degraded=no
vendor_id=SEAGATE
product_id_low=ST373405
product_id_high=FC
product_revision=0003
ctrl_s/n=3EK0J5Y8
WWPN=22000004CF2412AC
path_count=1
max_path_count=1
WWPN=21000004CF2412AC
path_count=0
max_path_count=0
```

You can see the status of a specific disk controller (id=7) in the sixth line of the previous example. The value of degraded is defined below:

- no** Specifies that the status is good
- yes** Specifies that the status is undesirable

Determining the failing enclosure or disk controller using the CLI

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

Issue the following command to list all the managed disks (MDisks):

```
svcinfolsmdisk -nohdr -delim :
```

The following output is an example of what you might see after you issue the `svcinfolsmdisk -nohdr -delim :` command:

```
0:mdisk0:online:managed:0:mdiskgrp0:273.3GB:0000000000000001:controller0:*
1:mdisk1:excluded:managed:0:mdiskgrp0:546.6GB:0000000000000002:controller0:*
* 600a0b80000c5ae4000000093eca105c00000000000000000000000000000000 is appended to this line.
* 600a0b80000f6432000000043ef6b4ff00000000000000000000000000000000 is appended to this line.
```

The MDisk are listed in the object ID order. The first item is the object ID, the third item is the status, and the ninth item is the disk or controller name. In the previous example, mdisk1 has an object ID of 1, is failing with the status excluded, and is part of a disk controller named controller0.

Issue the following command to obtain the detailed data for the named enclosure or disk controller:

```
svcinfolcontroller -delim : name
```

where *name* is the enclosure disk controller name.

The following output is an example of what you might see after you issue the `svcinfolcontroller -delim : name` command:

```

id:0
controller_name:controller0
WWNN:200200A0B80F5E2C
mdisk_link_count:30
max_mdisk_link_count:30
degraded:no
vendor_id:IBM
product_id_low:1722-600
product_id_high:
product_revision:0520
ctrl_s/n:
WWPN:200200A0B80F5E2D
path_count:30
max_path_count:30
WWPN:200300A0B80F5E2D
path_count:30
max_path_count:30

```

SAN Volume Controller controls and indicators

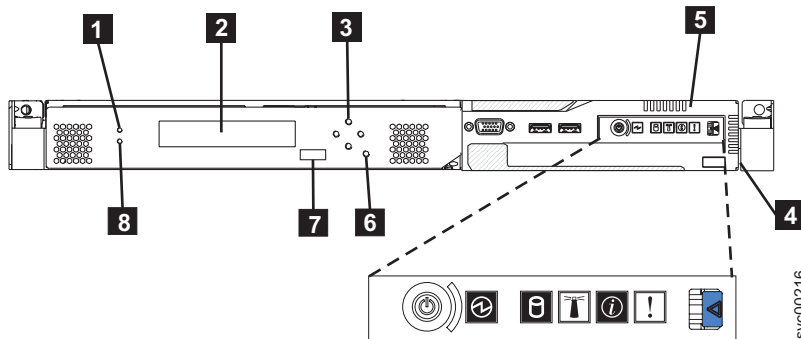
The controls and indicators are located on the front panel of the SAN Volume Controller.

Related reference

“SAN Volume Controller 2145-8G4 operator information panel” on page 33
The operator information panel contains indicators and buttons for the SAN Volume Controller 2145-8G4.

SAN Volume Controller 2145-8G4 controls and indicators

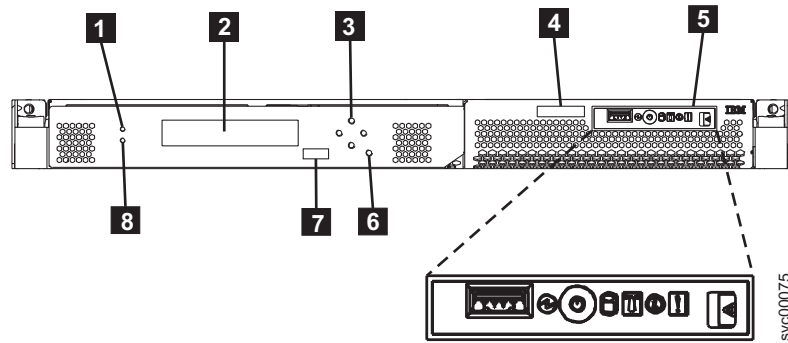
The following figure shows the controls and indicators on the front panel of the SAN Volume Controller 2145-8G4.



- 1** Cache LED
- 2** Front panel display
- 3** Navigation buttons
- 4** Serial number label
- 5** Operator information panel (see the operator information panel topic)
- 6** Select button
- 7** Node identification label
- 8** Error LED

SAN Volume Controller 2145-8F4 and SAN Volume Controller 2145-8F2 controls and indicators

The following figure shows the controls and indicators on the front panel of the SAN Volume Controller 2145-8F4 and SAN Volume Controller 2145-8F2.

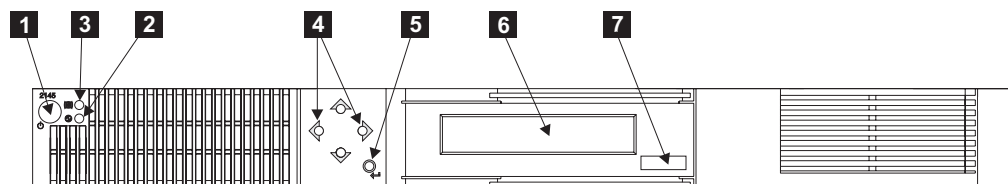


- 1** Cache LED
- 2** Front panel display
- 3** Navigation buttons
- 4** Serial number label
- 5** Operator information panel (see the operator information panel topic)
- 6** Select button
- 7** Node identification label
- 8** Error LED

SAN Volume Controller 2145-4F2 controls and indicators

All controls and indicators are located on the front panel of the SAN Volume Controller 2145-4F2.

SAN Volume Controller 2145-4F2 controls and indicators



- 1** Power button
- 2** Power LED
- 3** Check LED
- 4** Navigation buttons
- 5** Select button
- 6** Front panel display
- 7** Node identification label

Cache LED

System activity is indicated through the green, cache LED.

Table 2 describes the system activity indicators.

Table 2. Cache LED settings

Cache LED status	Result
Off	The system has not yet started processing.
On	The system is functionally active, has joined a working cluster, and is processing data.
Flashing	The node is dumping cache and state data to the local disk in anticipation of a system reboot (from a pending power-off action or other controlled restart sequence). Do not remove the power cable or force a power-off action while this LED is flashing.

Front panel display

The front panel display shows service, configuration, and navigation information.

Information on the front panel display is available in several languages. The display can show both alphanumeric information and graphical information (progress bars).

The front panel displays configuration and service information about the SAN Volume Controller and the SAN Volume Controller cluster, including the following items:

- Boot progress indicator
- Boot failed
- Charging
- Hardware boot
- Node rescue request
- Power failure
- Powering off
- Recovering
- Restarting
- Shutting down
- Error codes

Related reference

Chapter 6, "Using the front panel of the SAN Volume Controller," on page 101
The front panel of the SAN Volume Controller displays indicators and switches that are useful when servicing your SAN Volume Controller.

Navigation buttons

You can use the navigation buttons to move through menus.

There are four navigational buttons that you can use to move throughout a menu: up, down, right and left.

Each button corresponds to the direction that you can move in a menu. For example, to move right in a menu, press the navigation button that is located on the right side. If you want to move down in a menu, press the navigation button that is located on the bottom.

Note: The select button is used in tandem with the navigation buttons.

Product serial number

The node contains a SAN Volume Controller product serial number that is imbedded on the system board hardware.

This number is used for warranty and service entitlement checking and is included in the data sent with error reports. It is essential that this number is *not* changed during the life of the product. If the system board is replaced, you must follow the system board replacement instructions carefully and rewrite the serial number on the system board.

SAN Volume Controller operator information panel

The operator information panel contains indicators and buttons for the SAN Volume Controller.

Related tasks

“Removing the operator information panel assembly” on page 436

You might be prompted to remove the SAN Volume Controller operator information panel.

“Replacing the operator information panel assembly” on page 443

You might be prompted to replace the SAN Volume Controller operator information panel assembly.

SAN Volume Controller 2145-8G4 operator information panel

The operator information panel contains indicators and buttons for the SAN Volume Controller 2145-8G4.

Figure 9 shows the operator information panel for the SAN Volume Controller 2145-8G4.

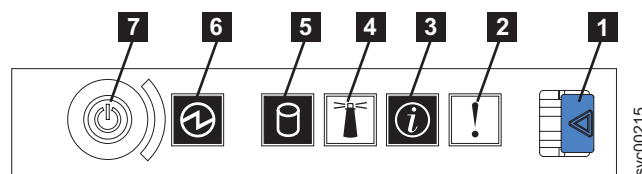


Figure 9. SAN Volume Controller 2145-8G4 operator information panel

- 1** Release latch for light path diagnostics panel
- 2** System-error LED (amber)
- 3** System-information LED (amber)
- 4** Location LED (blue)
- 5** Hard disk drive activity LED (green)
- 6** Power LED (green)
- 7** Power-control button

SAN Volume Controller 2145-8F4 and SAN Volume Controller 2145-8F2 operator information panel

The operator information panel contains indicators and buttons for the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2.

Figure 10 shows the operator panel used by the SAN Volume Controller 2145-8F4 and the SAN Volume Controller 2145-8F2 models.

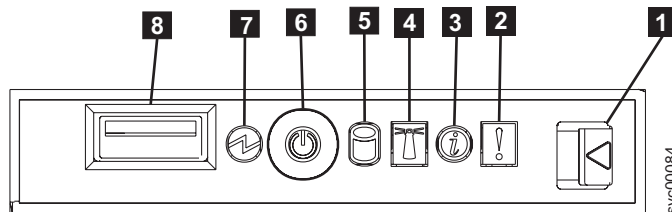


Figure 10. SAN Volume Controller 2145-8F4 and SAN Volume Controller 2145-8F2 operator information panel

- 1** Release latch for light path diagnostics panel
- 2** System-error LED (amber)
- 3** Information LED (amber)
- 4** Location LED (blue)
- 5** Hard disk drive activity LED (green)
- 6** Power control button
- 7** Power LED (green)
- 8** USB connector

Release latch

The release latch gives you access to the light path diagnostics panel, which provides a preliminary method of determining the location of a problem.

After pressing the release latch on the information panel, you can slide the light path diagnostics panel out to view the lit LEDs. The LEDs indicate the type of error that has occurred. See “MAP 5800: Light path” in the *IBM System Storage SAN Volume Controller: Service Guide* for more detail.

To retract the panel, push it back into the node and snap it into place.

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

System-error LED

When it is lit, the system-error LED indicates that a system-board error has occurred.

This amber LED lights up if the SAN Volume Controller hardware detects a fatal error that requires a new field replaceable unit (FRU).

Note: See “MAP 5800: Light path” in the *IBM System Storage SAN Volume Controller: Service Guide* to help you to isolate the faulty FRU.

A system-led error LED is also on the rear of the SAN Volume Controller.

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

Related reference

“Release latch” on page 34

The release latch gives you access to the light path diagnostics panel, which provides a preliminary method of determining the location of a problem.

Information-Error LED

When the information-error LED is lit, a non-critical event has occurred.

Check the light path diagnostics panel and the error log. Light path diagnostics are described in more detail in the light path maintenance analysis procedure (MAP).

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

Location LED

The SAN Volume Controller does not use the location LED.

Hard disk drive activity LED

When it is lit, the green hard disk drive activity LED indicates that the hard disk drive is in use.

Power LED

The green power LED indicates the power status of the SAN Volume Controller.

The properties of the green power LED are as follows:

- Off** One or more of the following are true:
- No power is present at the power supply input
 - The power supply has failed
 - The LED has failed
- On** The SAN Volume Controller is powered on.

Flashing

The SAN Volume Controller is turned off but is still connected to a power source.

Note: A power LED is also on the rear of the server.

Power control button

The power control button switches on or switches off the main power to the SAN Volume Controller.

To turn on the power, press and release the power control button.

To turn off the power, press and release the power control button. For more information about how to power off the SAN Volume Controller node, see “MAP 5350: Powering off a SAN Volume Controller node” in the *IBM System Storage SAN Volume Controller: Service Guide*.

Note: When the node is operational and the power control button is pressed, the SAN Volume Controller indicates on its front panel that it is powering off and writes its control data to its internal disk. This can take up to five minutes. If the power control button is pressed and not released, an immediate power off is performed without writing the SAN Volume Controller control data to disk. Service actions are then required to make the SAN Volume Controller operational again. Therefore, when powering off, you should not press and hold the power control button for more than two seconds.

Note: The 2145 uninterruptible power supply-1U (2145 UPS-1U) does not power off when the SAN Volume Controller is shut down from the power control button.

Select button

You can use the select button to select an item from a menu.

The select button and navigation buttons help you to navigate and select menu and boot options, and start a service panel test.

The select button is located on the front panel of the SAN Volume Controller, near the navigation buttons.

Node identification label

The node identification label on the front panel displays a six-digit node identification number.

The node identification label is the same as the six-digit number that is used in the `svctask addnode` command. It is readable by system software and is used by configuration and service software as a node identifier. The node identifier can also be displayed on the front panel display when node is selected from the menu.

If the service controller assembly front panel is replaced, the configuration and service software displays the number that is printed on the front of the replacement panel. Future error reports contain the new number. No cluster reconfiguration is necessary when the front panel is replaced.

Error LED

Critical faults on the service controller are indicated through the amber, error LED.

The error LED has the following two states:

- OFF** The service controller is functioning correctly.
- ON** A critical service controller failure was detected and you must replace the service controller.

Power button

The power button switches on or off, the main power to the SAN Volume Controller 2145-4F2.

To turn on the power, press and release the power button.

To turn off the power, press and release the power button. For a preferred method of powering off, see the “Powering off a SAN Volume Controller node” topic in the *IBM System Storage SAN Volume Controller: Service Guide*.

Note: When the SAN Volume Controller is operational and the power control button is pressed, the SAN Volume Controller indicates on its front panel that it is powering off and writes its control data to its internal disk. This can take up to five minutes. If the power control button is pressed and not released, an immediate power off is performed without writing the SAN Volume Controller control data to disk. Service actions are then required to make the SAN Volume Controller operational again. Therefore, when powering off, you should not press and hold the power button for more than two seconds.

Attention: If a SAN Volume Controller is powered off for more than five minutes and it is the only SAN Volume Controller that is connected to an 2145 uninterruptible power supply (2145 UPS), the 2145 UPS also powers off. To power on the SAN Volume Controller, you must first power on the 2145 UPS to which it is connected.

Note: The 2145 uninterruptible power supply-1U (2145 UPS-1U) does not power off when the SAN Volume Controller is shut down from the power button.

Check LED

The amber check LED is used to indicate critical failures on the service controller.

If the check LED is off and the power LED is on, the service controller is working correctly.

If the check LED is on, a critical service controller failure was detected.

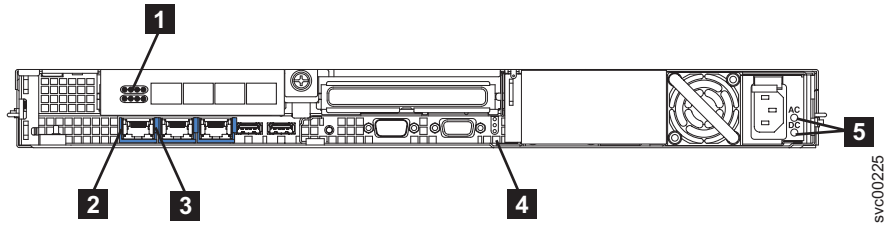
The check LED is also on while the service controller code is being reprogrammed. For example, when the SAN Volume Controller cluster code is being upgraded, the **check LED** is on. It is normal for the power LED to be on at this time.

SAN Volume Controller rear panel indicators

The rear panel indicators for the SAN Volume Controller are contained on the back panel assembly.

SAN Volume Controller 2145-8G4 rear panel indicators

The following figure shows the rear panel indicators on the SAN Volume Controller 2145-8G4 back panel assembly.



- 1** Fibre-channel LEDs
- 2** Ethernet activity LED
- 3** Ethernet link LED
- 4** Power, location, and system error LEDs
- 5** Ac and dc LEDs

Related reference

“Fibre-channel LEDs” on page 39

The fibre-channel LEDs indicate the status of the fibre-channel ports.

“Ethernet link LED” on page 41

The Ethernet link LED indicates that there is an active connection on the Ethernet port.

“Power, location, and system error LEDs” on page 41

The power, location, and system error LEDs are housed together on the rear of the SAN Volume Controller.

“Ac and dc LEDs” on page 42

The ac and dc LEDs indicate whether the node is receiving electrical current.

“System board power LED” on page 43

The system board power LED indicates the power supply status that is detected by the system board.

“System board fault LED” on page 44

The amber system board fault LED indicates that the system board has detected a critical failure.

“Lower Ethernet link LED” on page 44

The lower Ethernet link LED indicates the operational status of Ethernet port 1. This LED is illuminated when a good Ethernet connection exists between the SAN Volume Controller 2145-4F2 and the Ethernet network.

“Upper Ethernet link LED” on page 44

The upper Ethernet link LED indicates the operational status of Ethernet port 2. This LED is illuminated when a good Ethernet connection exists between the SAN Volume Controller 2145-4F2 and the Ethernet network.

“Monitor LED” on page 44

The green monitor LED is not used on the SAN Volume Controller.

SAN Volume Controller 2145-8F4 rear panel indicators

The following figure shows the rear panel indicators on the SAN Volume Controller 2145-8F4 back panel assembly.

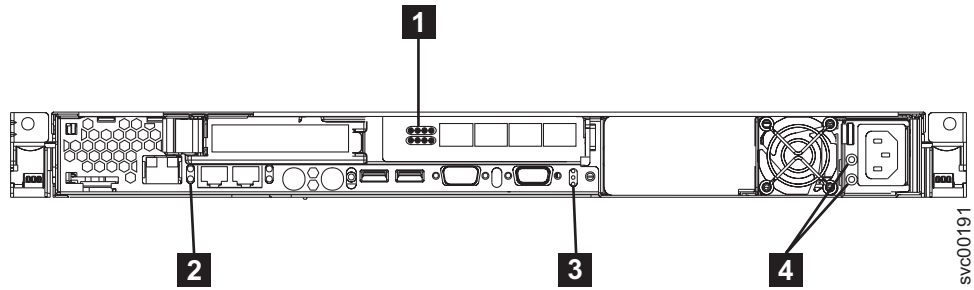


Figure 11. SAN Volume Controller 2145-8F4 rear panel

- 1** Fibre-channel LEDs
- 2** Ethernet link LED
- 3** Power, location, and system error LEDs
- 4** Ac and dc LEDs

SAN Volume Controller 2145-8F2 rear panel indicators

The following figure shows the rear panel indicators on the SAN Volume Controller 2145-8F2 back panel assembly.

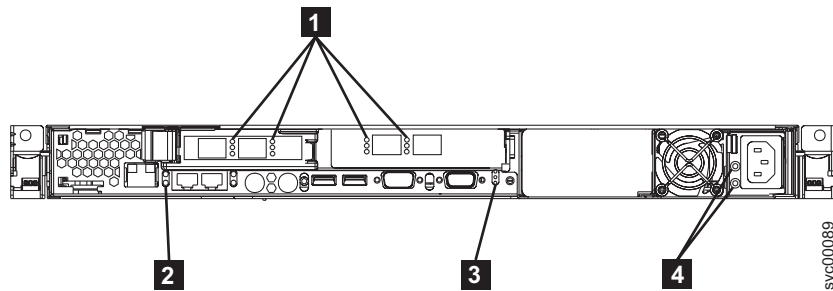


Figure 12. SAN Volume Controller 2145-8F2 rear panel

- 1** Fibre-channel LEDs
- 2** Ethernet link LED
- 3** Power, location, and system error LEDs
- 4** Ac and dc LEDs

Fibre-channel LEDs

The fibre-channel LEDs indicate the status of the fibre-channel ports.

The SAN Volume Controller 2145-8G4 and SAN Volume Controller 2145-8F4 use two fibre-channel LEDs per fibre-channel port, arranged one above the other. The LEDs are arranged in the same order as the ports.

Table 3 describes the status of the link LEDs.

Table 3. Settings for the SAN Volume Controller 2145-8G4 and SAN Volume Controller 2145-8F4 fibre-channel LEDs

Top LED (link speed)	Bottom LED (link activity)	Link Status
Off	Off	Inactive
Off	On/blinking	Active 1 Gbps
Blinking	On/blinking	Active 2 Gbps
On	On/blinking	Active 4 Gbps

Related reference

“Fibre-channel port numbers and worldwide port names” on page 8
 Fibre-channel ports are identified by their physical port number and by a worldwide port name (WWPN).

Fibre-channel LEDs on the SAN Volume Controller 2145-8G4

The fibre-channel LEDs on the SAN Volume Controller 2145-8G4 indicate the status of the fibre-channel ports.

Figure 13 shows the fibre-channel LEDs on the SAN Volume Controller 2145-8G4.

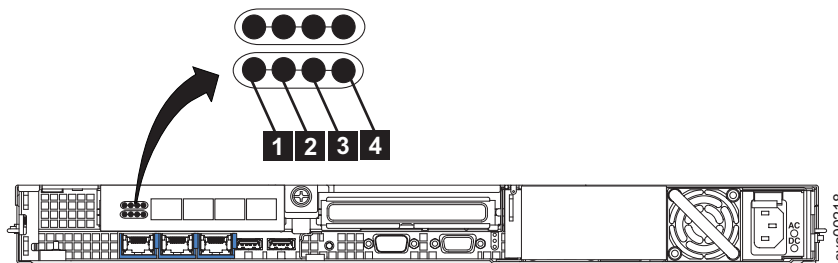


Figure 13. SAN Volume Controller 2145-8G4 fibre-channel LEDs

Fibre-channel LEDs on the SAN Volume Controller 2145-8F4

The fibre-channel LEDs on the SAN Volume Controller 2145-8F4 indicate the status of the fibre-channel ports.

Figure 14 on page 41 shows the fibre-channel LEDs on the SAN Volume Controller 2145-8F4.

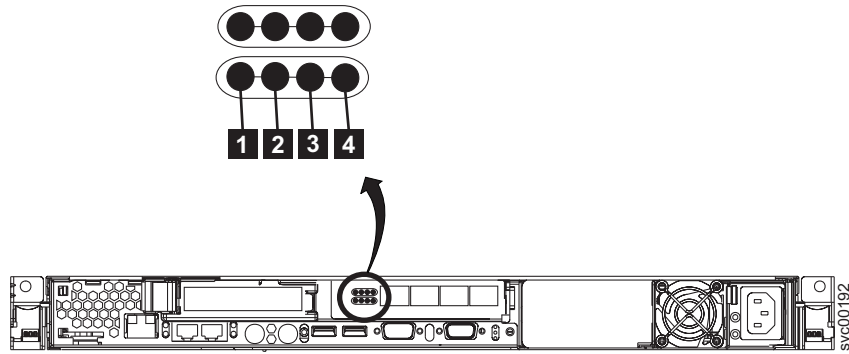


Figure 14. SAN Volume Controller 2145-8F4 fibre-channel LEDs

The fibre-channel LEDs are not used by the SAN Volume Controller 2145-8F2.

Ethernet activity LED

The Ethernet activity LED indicates that the SAN Volume Controller 2145-8G4 is communicating with the Ethernet network that is connected to the Ethernet port.

The Ethernet activity LED is located on each Ethernet port; Ethernet port 2 is used only during Ethernet troubleshooting.

Ethernet link LED

The Ethernet link LED indicates that there is an active connection on the Ethernet port.

The Ethernet link LED is located on each Ethernet port; however, only Ethernet port 1 is used during normal operation.

Power, location, and system error LEDs

The power, location, and system error LEDs are housed together on the rear of the SAN Volume Controller.

The following terms describe the power, location, and system error LEDs:

Power LED

This is the top of the three LEDs and indicates the following:

- Off** One or more of the following are true:
- No power is present at the power supply input
 - The power supply has failed
 - The LED has failed

On The SAN Volume Controller is powered on.

Flashing

The SAN Volume Controller is turned off but is still connected to a power source.

Location LED

This is the middle of the three LEDs and is not used by the SAN Volume Controller.

System-error LED

This is the bottom of the three LEDs that indicates that a system board error has occurred. The light path diagnostics provide more information.

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

Ac and dc LEDs

The ac and dc LEDs indicate whether the node is receiving electrical current.

Ac LED

The upper LED **1** next to the power supply, indicates that ac current is present on the node.

Dc LED

The lower LED **2** next to the power supply, indicates that dc current is present on the node.

Ac and dc LEDs on the SAN Volume Controller 2145-8G4

The ac LED and dc LED are located on the rear of the SAN Volume Controller 2145-8G4.

Figure 15 shows the location of the ac and dc LEDs.

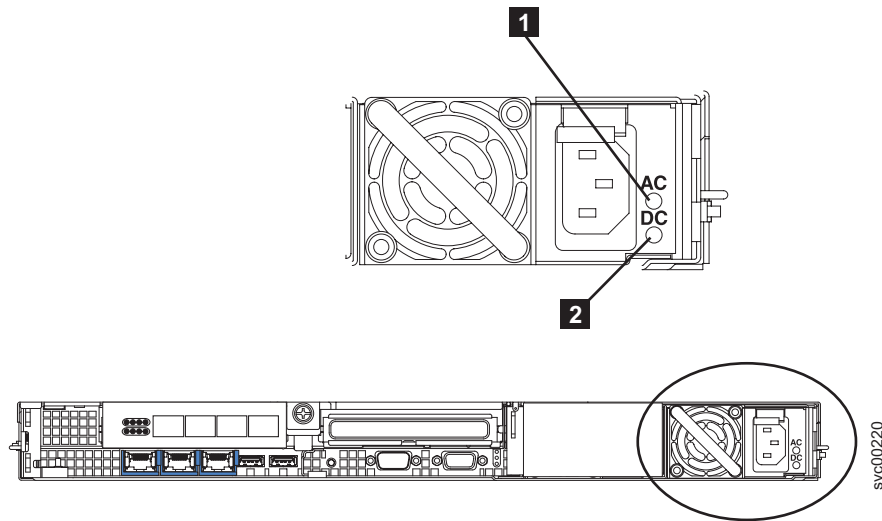


Figure 15. SAN Volume Controller 2145-8G4 ac and dc LEDs

Ac and dc LEDs on the SAN Volume Controller 2145-8F4 and the SAN Volume Controller 2145-8F2

The ac LED and dc LED are located on the rear of the SAN Volume Controller 2145-8F4 and the SAN Volume Controller 2145-8F2.

Figure 16 on page 43 shows the location of the ac and dc LEDs.

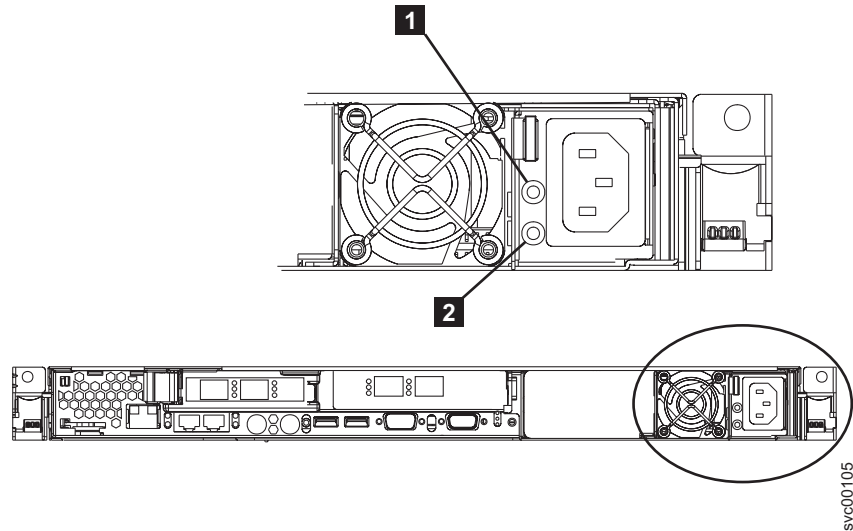
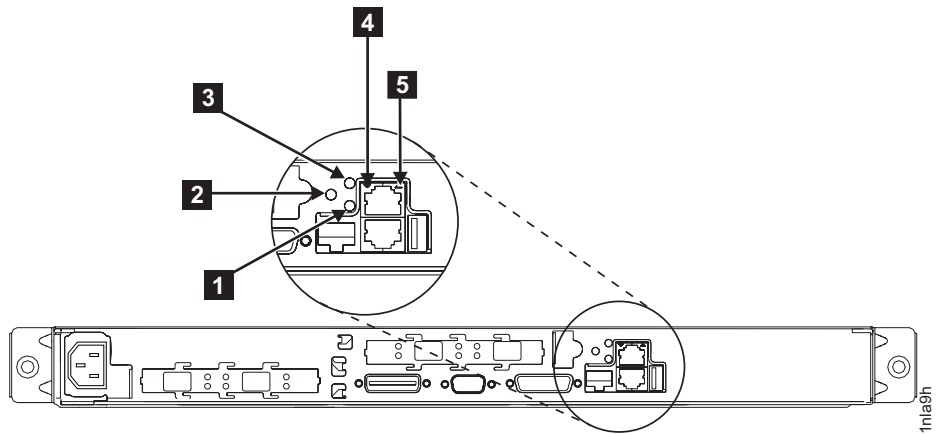


Figure 16. SAN Volume Controller 2145-8F4 and SAN Volume Controller 2145-8F2 ac and dc LEDs

SAN Volume Controller 2145-4F2 rear panel indicators

The following figure shows the rear panel indicators on the SAN Volume Controller 2145-4F2 back panel assembly.



- 1** System board power LED
- 2** System board fault LED
- 3** Monitor LED (not used)
- 4** Lower Ethernet link LED
- 5** Upper Ethernet link LED

System board power LED

The system board power LED indicates the power supply status that is detected by the system board.

System board fault LED

The amber system board fault LED indicates that the system board has detected a critical failure.

You can view the system board fault LED in the documentation on the rear panel indicators.

Monitor LED

The green monitor LED is not used on the SAN Volume Controller.

You can view the monitor LED in the documentation concerning the rear panel indicators.

Lower Ethernet link LED

The lower Ethernet link LED indicates the operational status of Ethernet port 1. This LED is illuminated when a good Ethernet connection exists between the SAN Volume Controller 2145-4F2 and the Ethernet network.

Upper Ethernet link LED

The upper Ethernet link LED indicates the operational status of Ethernet port 2. This LED is illuminated when a good Ethernet connection exists between the SAN Volume Controller 2145-4F2 and the Ethernet network.

Ethernet port 2 is not used on the SAN Volume Controller.

Physical characteristics of the SAN Volume Controller

The following topics provide detailed information about the physical characteristics of the SAN Volume Controller.

SAN Volume Controller 2145-8G4 hardware

It is good to familiarize yourself with the SAN Volume Controller 2145-8G4 hardware.

Figure 17 on page 45 provides a breakout view of the parts to the SAN Volume Controller 2145-8G4. Use the reference keys after the figure to identify each hardware component.

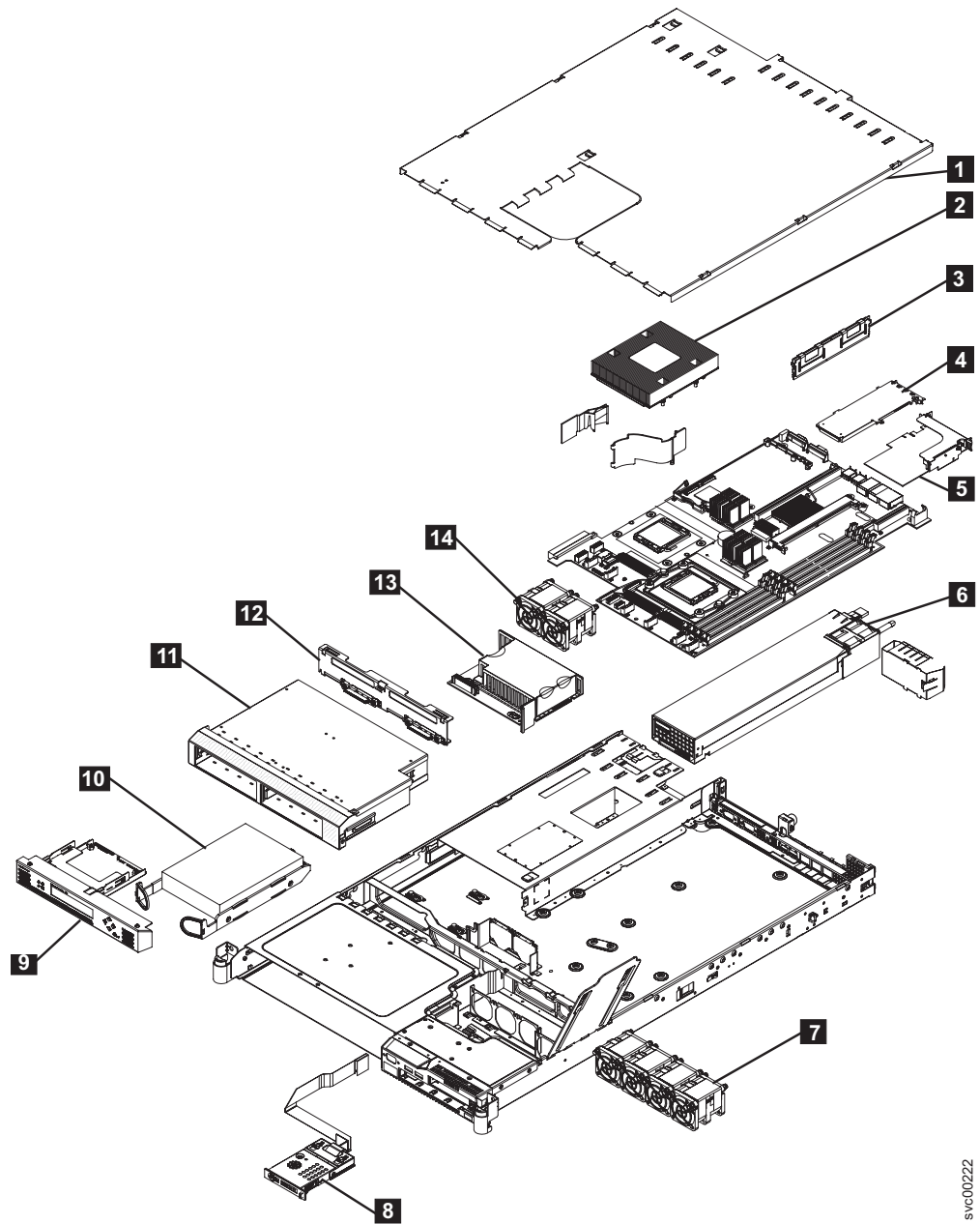


Figure 17. Exploded view of the hardware for the SAN Volume Controller 2145-8G4

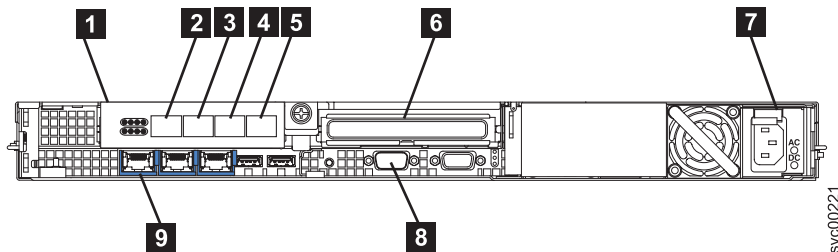
- 1** Top cover
- 2** Microprocessor with heat sink
- 3** Memory
- 4** 4-port fibre-channel host bus adapter
- 5** PCI Express riser card
- 6** Power supply
- 7** Fan assembly (3 - 6)
- 8** Operator information panel
- 9** Service controller

svc00222

- 10** 3.5-inch SATA disk drive
- 11** 3.5-inch SATA disk drive cage
- 12** SATA cable assembly, with backplate
- 13** Power backplane
- 14** Fan assembly (1, 2)

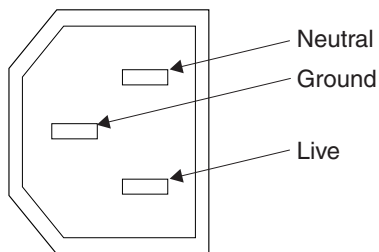
SAN Volume Controller 2145-8G4 connectors

The external connectors for the SAN Volume Controller 2145-8G4 can be easily located.



- 1** PCI slot 1
- 2** Fibre-channel port 1
- 3** Fibre-channel port 2
- 4** Fibre-channel port 3
- 5** Fibre-channel port 4
- 6** PCI slot 2
- 7** Power supply
- 8** Serial connection
- 9** Ethernet port 1

The following figure shows the type of connector that is located on the power supply assembly. The connector enables you to connect the SAN Volume Controller 2145-8G4 to the power source from the uninterruptible power supply.



SAN Volume Controller 2145-8G4 ports used during service procedures

The SAN Volume Controller 2145-8G4 contains a number of ports that are only used during service procedures. These ports are shown in Figure 18.

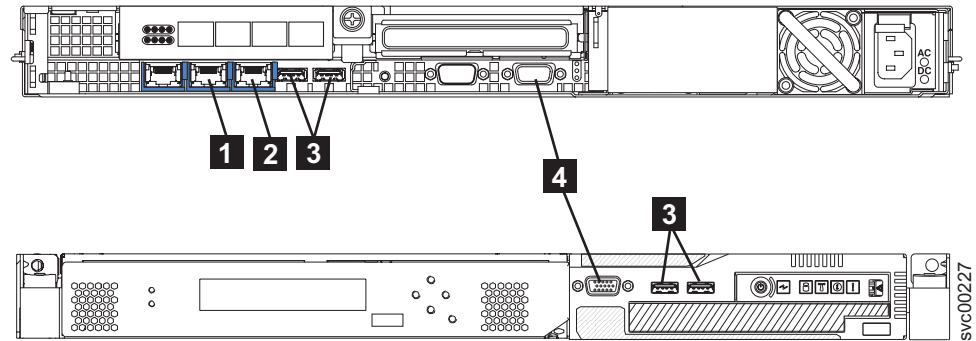


Figure 18. Service ports of the SAN Volume Controller 2145-8G4

- 1** Ethernet port 2
- 2** System management port
- 3** Four USB ports, two on the front and two on the rear
- 4** Two monitor ports, one on the front and one on the rear

During normal operation, none of these ports are used. You should only connect a device to any of these ports if directed to do so by a service procedure or by your IBM service representative.

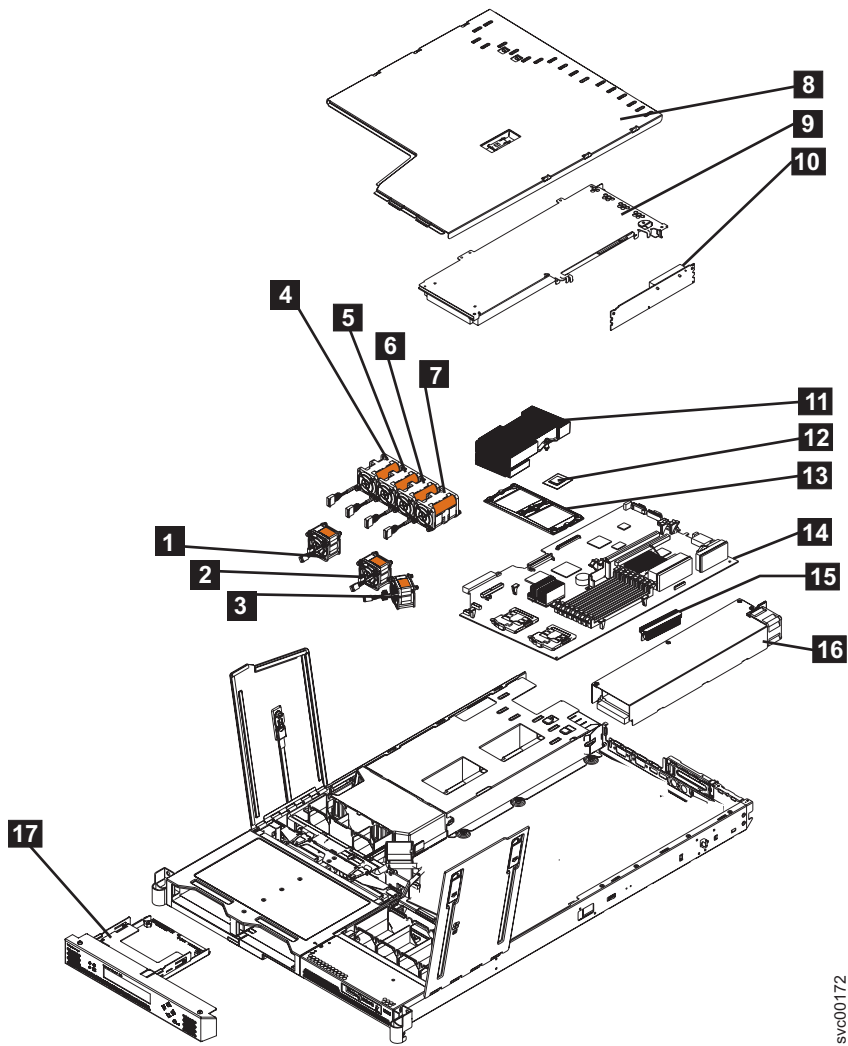
SAN Volume Controller 2145-8G4 ports not used

The SAN Volume Controller 2145-8G4 has no unused ports.

SAN Volume Controller 2145-8F4 hardware

It is good to familiarize yourself with the SAN Volume Controller 2145-8F4 hardware.

Figure 19 on page 48 provides a breakout view of the parts to the SAN Volume Controller 2145-8F4. Use the reference keys after the figure to identify each hardware component.



svc00172

Figure 19. Exploded view of the hardware for the SAN Volume Controller 2145-8F4

- 1** Fan 1
- 2** Fan 2
- 3** Fan 3
- 4** Fan 4
- 5** Fan 5
- 6** Fan 6
- 7** Fan 7
- 8** Top cover
- 9** 4-port fibre-channel host bus adapter
- 10** PCI Express riser card
- 11** Microprocessor heat sink
- 12** Microprocessor
- 13** Heat sink retainer
- 14** System board

- 15** Voltage regulator module
- 16** Power supply
- 17** Service controller

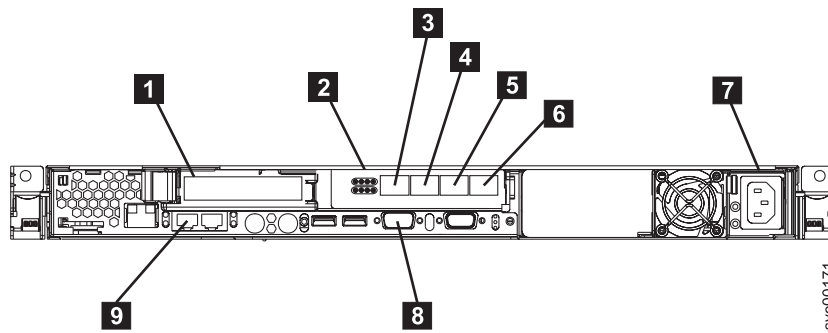
Related reference

“Hardware for the 2145 UPS-1U” on page 80

The 2145 uninterruptible power supply-1U (2145 UPS-1U) hardware is shown in the following graphics.

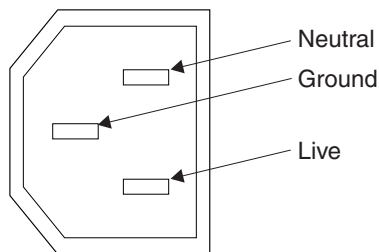
SAN Volume Controller 2145-8F4 connectors

The external connectors for the SAN Volume Controller 2145-8F4 can be easily located.



- 1** PCI slot 1
- 2** PCI slot 2
- 3** Fibre-channel port 1
- 4** Fibre-channel port 2
- 5** Fibre-channel port 3
- 6** Fibre-channel port 4
- 7** Power supply
- 8** Serial connection
- 9** Ethernet port 1

The following figure shows the type of connector that is located on the power supply assembly. The connector enables you to connect the SAN Volume Controller 2145-8F4 to the power source from the uninterruptible power supply.



SAN Volume Controller 2145-8F4 ports used during service procedures

The SAN Volume Controller 2145-8F4 contains three service ports: Ethernet port 2, the keyboard port, and the monitor port. These ports are currently not in use. Figure 20 provides the locations of the service ports.

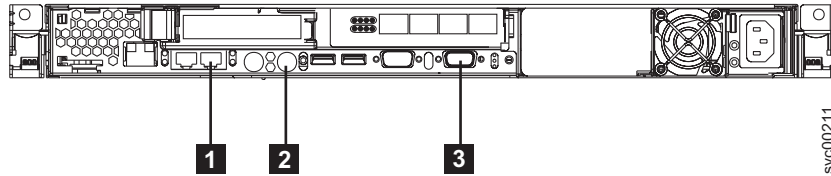


Figure 20. Service ports of the SAN Volume Controller 2145-8F4

- 1** Ethernet port 2
- 2** Keyboard port
- 3** Monitor port

SAN Volume Controller 2145-8F4 ports not used during normal operation

The SAN Volume Controller 2145-8F4 is equipped with several ports that are not used by the SAN Volume Controller during normal operation and that have not been tested. Use of these ports in conjunction with the SAN Volume Controller 2145-8F4, or any other application that might be run on this hardware, is not supported. See Figure 21 and Figure 21 for those ports that are not used.

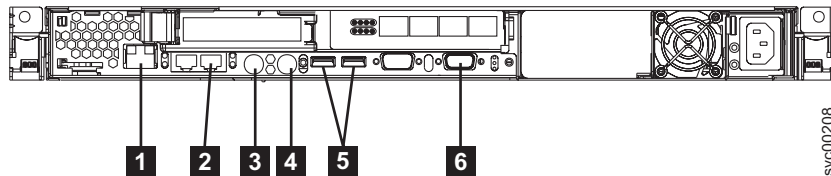


Figure 21. Ports not used by the SAN Volume Controller 2145-8F4

- 1** System management port
- 2** Ethernet port 2
- 3** Mouse port
- 4** Keyboard port
- 5** USB ports
- 6** Monitor port

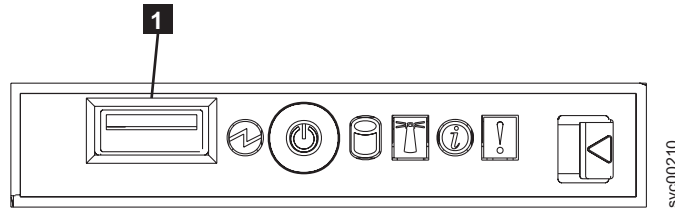


Figure 22. Ports not used on the front panel of the SAN Volume Controller 2145-8F4

1 USB port

SAN Volume Controller 2145-8F2 hardware

It is good to familiarize yourself with the SAN Volume Controller 2145-8F2 hardware.

Figure 23 provides a breakout view of the parts to the SAN Volume Controller 2145-8F2. Use the reference keys after the figure to identify each hardware component.

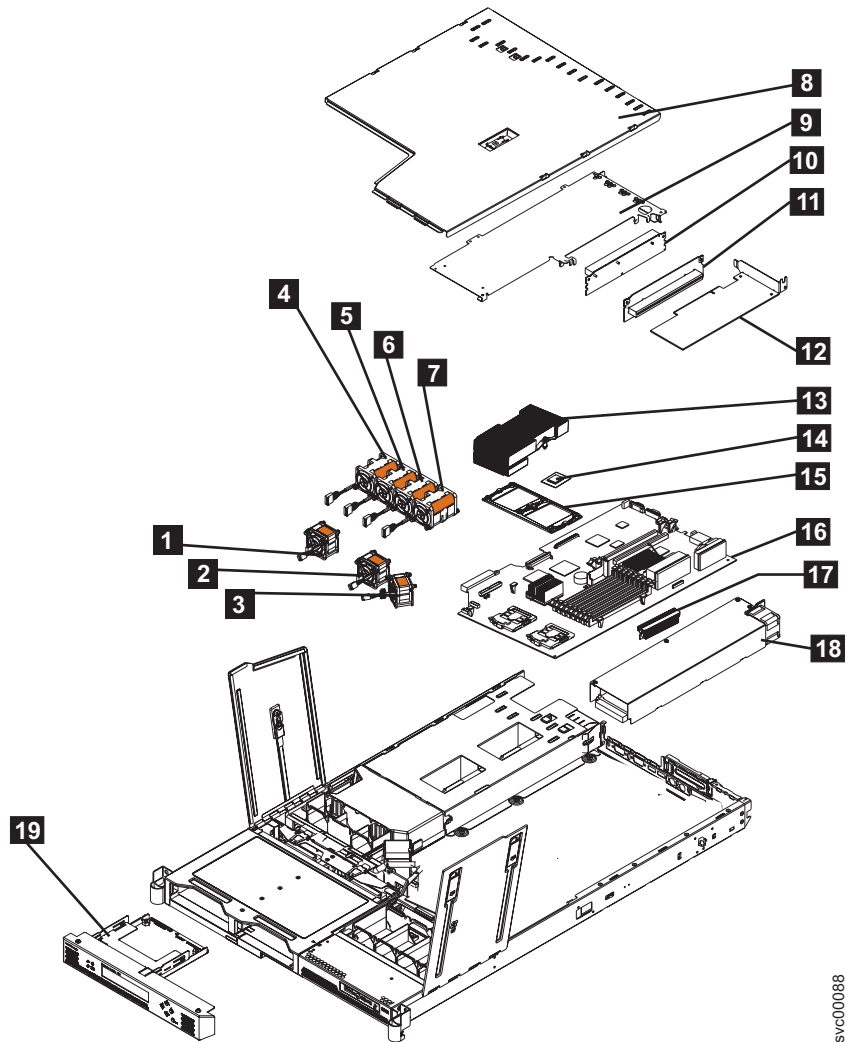
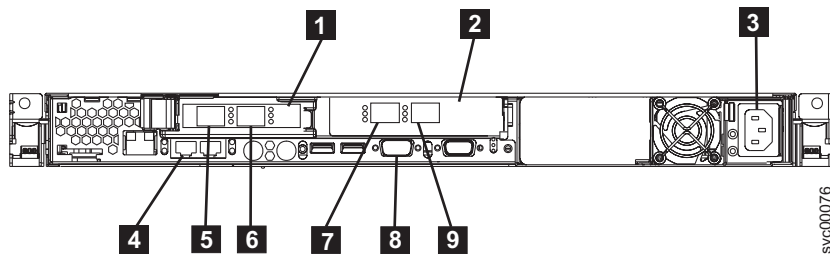


Figure 23. Exploded view of the hardware for the SAN Volume Controller 2145-8F2

- 1** Fan 1
- 2** Fan 2
- 3** Fan 3
- 4** Fan 4
- 5** Fan 5
- 6** Fan 6
- 7** Fan 7
- 8** Top cover
- 9** Dual port fibre-channel host bus adapter (full height)
- 10** Full height riser card
- 11** Low profile riser card
- 12** Dual port fibre-channel host bus adapter (low profile)
- 13** Microprocessor heat sink
- 14** Microprocessor
- 15** Heat sink retainer
- 16** System board
- 17** Voltage regulator module (VRM)
- 18** Power supply
- 19** Service controller

SAN Volume Controller 2145-8F2 connectors

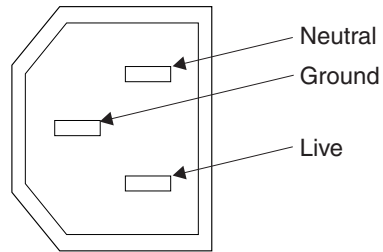
The external connectors for the SAN Volume Controller 2145-8F2 can be easily located.



- 1** PCI slot 1
- 2** PCI slot 2
- 3** Power supply
- 4** Ethernet port 1
- 5** Fibre-channel port 1
- 6** Fibre-channel port 2
- 7** Fibre-channel port 3
- 8** Serial connection

9 Fibre-channel port 4

The following figure shows the type of connector located on the power supply assembly. The connector enables you to connect the SAN Volume Controller 2145-8F2 to the power source from the uninterruptible power supply.



SAN Volume Controller 2145-4F2 hardware

It is good to familiarize yourself with the SAN Volume Controller 2145-4F2 hardware.

Figure 24 on page 54 provides a breakout view of the parts to the SAN Volume Controller. Use the reference keys after the figure to identify each hardware component.

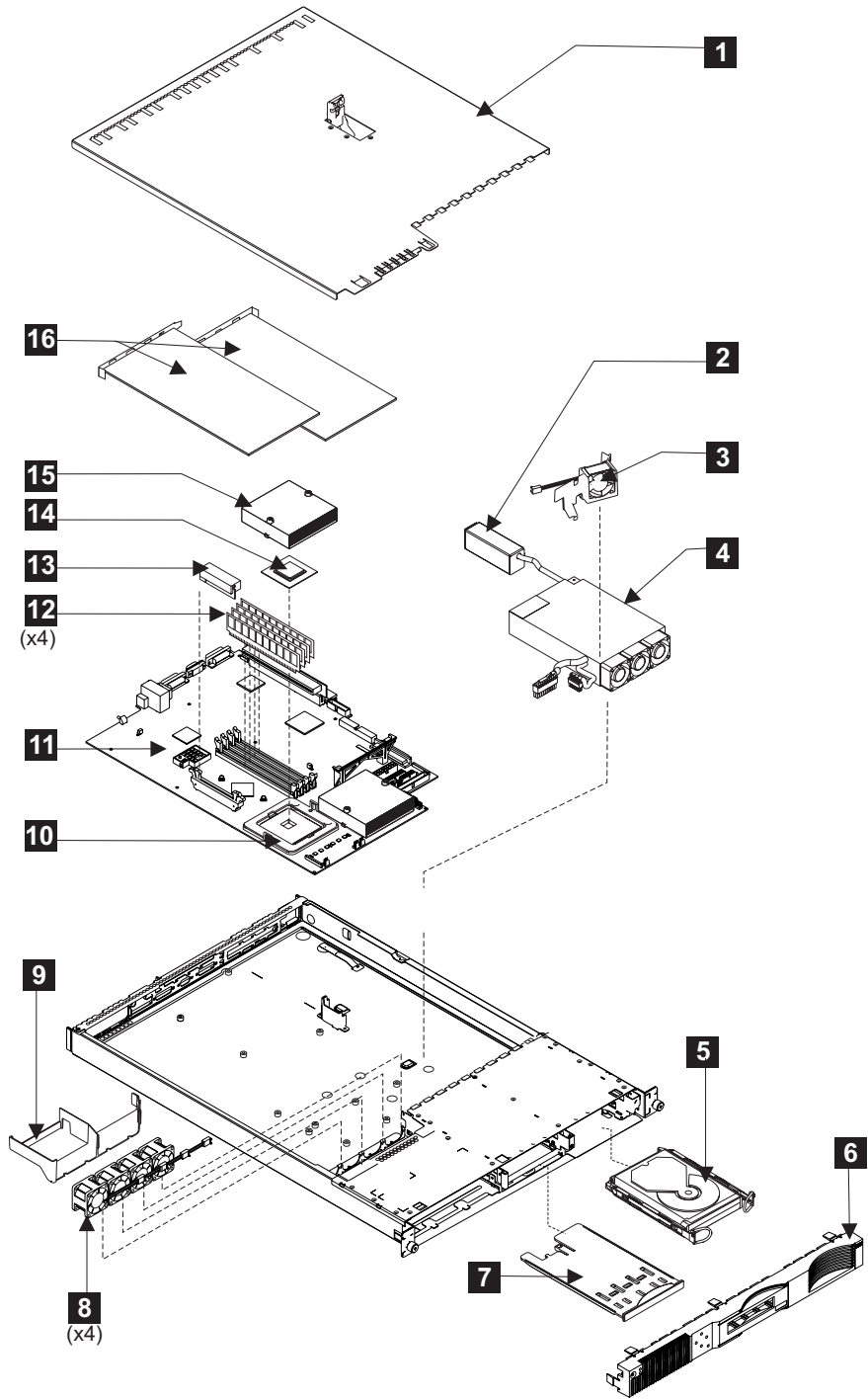


Figure 24. Exploded view of the hardware for the SAN Volume Controller 2145-4F2

- 1** Top cover
- 2** Power supply connector
- 3** Fan with baffle
- 4** Power supply assembly
- 5** Hard disk drive
- 6** Front panel

- 7** Service controller card
- 8** Fan assembly (4)
- 9** Air baffle
- 10** Microprocessor heat sink retention module
- 11** System board
- 12** DIMM modules (4)
- 13** Microprocessor Voltage Regulator
- 14** Microprocessor
- 15** Microprocessor heat sink
- 16** Fibre-channel adapters (2)

SAN Volume Controller 2145-4F2 connectors

The external connectors for the SAN Volume Controller can be located easily.

Context

Figure 25 provides the locations of the external connectors.

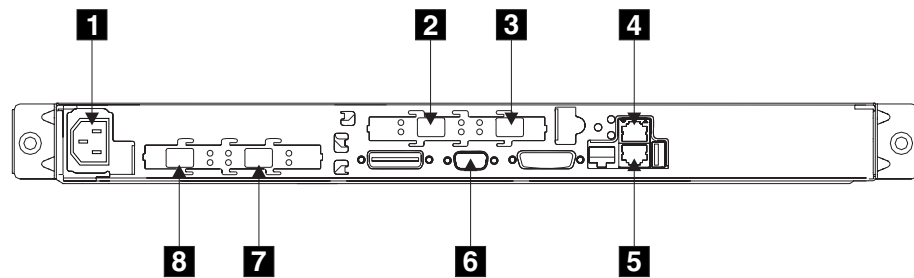
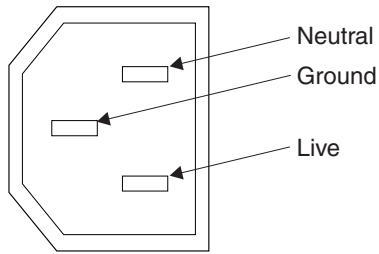


Figure 25. SAN Volume Controller 2145-4F2 connector locations

- 1** Power connector
- 2** fibre-channel port 3
- 3** fibre-channel port 4
- 4** Ethernet port 2 (*not used on the SAN Volume Controller 2145-4F2*)
- 5** Ethernet port 1
- 6** Serial connector
- 7** fibre-channel port 2
- 8** fibre-channel port 1

The following figure shows an illustration of the type of connector located on the power supply assembly. The connector allows you to connect the SAN Volume Controller 2145-4F2 to the power source from the uninterruptible power supply.



Preparing your SAN Volume Controller 2145-8G4 environment

Before installing the SAN Volume Controller 2145-8G4, you must prepare the physical environment.

Input-voltage requirements

Ensure that the following requirements for each SAN Volume Controller 2145-8G4 node are met.

Voltage	Frequency
200 to 240 V single phase ac	50 or 60 Hz

Power requirements for each node

Ensure that the following power is available for each SAN Volume Controller 2145-8G4 node. The power that is required depends on the node type, the uninterruptible power supply (UPS) type, and whether the redundant ac power feature is used.

Components	Power requirements
SAN Volume Controller 2145-8G4 + 2145 UPS-1U	470 W

For each redundant ac power switch, add 20 W to the power requirements.

Circuit breaker requirements

The 2145 UPS-1U has an integrated circuit breaker and does not require additional protection.

Environment requirements without redundant ac power

Environment	Temperature	Altitude	Relative humidity	Maximum wet bulb temperature
Operating in lower altitudes	10°C to 35°C (50°F to 95°F)	0 to 914 m (0 to 2998 ft)	8% to 80% noncondensing	23°C (74°F)
Operating in higher altitudes	10°C to 32°C (50°F to 88°F)	914 to 2133 m (2998 to 6988 ft)	8% to 80% noncondensing	23°C (74°F)
Powered off	10°C to 43°C (50°F to 110°F)	0 to 2133 m (2998 to 6988 ft)	8% to 80% noncondensing	27°C (81°F)

Environment	Temperature	Altitude	Relative humidity	Maximum wet bulb temperature
Storing	1°C to 60°C (34°F to 140°F)	0 to 2133 m (0 to 6988 ft)	5% to 80% noncondensing	29°C (84°F)
Shipping	-20°C to 60°C (-4°F to 140°F)	0 to 10668 m (0 to 34991 ft)	5% to 100% condensing, but no precipitation	29°C (84°F)

Environment requirements with redundant ac power

Environment	Temperature	Altitude	Relative humidity	Maximum wet bulb temperature
Operating in lower altitudes	15°C to 32°C (59°F to 89°F)	0 to 914 m (0 to 2998 ft)	20% to 80% noncondensing	23°C (74°F)
Operating in higher altitudes	15°C to 32°C (50°F to 88°F)	914 to 2133 m (2998 to 6988 ft)	20% to 80% noncondensing	23°C (74°F)
Powered off	10°C to 43°C (50°F to 110°F)	0 to 2133m (0 to 6988 ft)	20% to 80% noncondensing	27°C (81°F)
Storing	1°C to 60°C (34°F to 140°F)	0 to 2133 m (0 to 6988 ft)	5% to 80% noncondensing	29°C (84°F)
Shipping	-20°C to 60°C (-4°F to 140°F)	0 to 10668 m (0 to 34991 ft)	5% to 100% condensing, but no precipitation	29°C (84°F)

Preparing your environment

The following three tables list the physical dimensions and weight of the node, the additional space requirements around a node, and the maximum heat dissipated by a node that you must consider before you install your SAN Volume Controller 2145-8G4:

Dimensions and weight

Height	Width	Depth	Maximum weight
43 mm (1.69 in.)	440 mm (17.32 in.)	686 mm (27 in.)	12.7 kg (28 lb)

Additional space requirements

Location	Additional space requirements	Reason
Left and right sides	50 mm (2 in.)	Cooling air flow
Back	Minimum: 100 mm (4 in.)	Cable exit

Heat output of each SAN Volume Controller 2145-8G4 node

Model	Heat output per node
SAN Volume Controller 2145-8G4	400 W (1350 Btu per hour)

Related reference

“Preparing your UPS environment” on page 86

Ensure that your physical site meets the installation requirements for the uninterruptible power supply (UPS).

“Preparing your SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 environment”

Before installing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2, you must prepare the physical environment.

“Preparing your SAN Volume Controller 2145-4F2 environment” on page 60

Before installing the SAN Volume Controller 2145-4F2, you must prepare the physical environment.

Preparing your SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 environment

Before installing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2, you must prepare the physical environment.

Input-voltage requirements

Ensure that the following requirements for each SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 node are met:

Voltage	Frequency
200 to 240 V single phase ac	50 or 60 Hz

Power requirements for each node

Ensure that the following power is available for each SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 node. The power that is required depends on the node type, the uninterruptible power supply (UPS) type, and whether the redundant ac power feature is used.

Components	Power requirements
SAN Volume Controller 2145-8F4 + 2145 UPS-1U	520 W
SAN Volume Controller 2145-8F2 + 2145 UPS-1U	520 W
SAN Volume Controller 2145-4F2 + 2145 UPS-1U	420 W
One SAN Volume Controller 2145-4F2 + one 2145 UPS	760 W
Two SAN Volume Controller 2145-4F2 nodes + one 2145 UPS	1120 W

For each redundant ac power switch, add 20 W to the power requirements.

Circuit breaker requirements

The 2145 UPS-1U has an integrated circuit breaker and does not require additional protection.

Environment requirements without redundant ac power

Environment	Temperature	Altitude	Relative humidity	Maximum wet bulb temperature
Operating in lower altitudes	10°C to 35°C (50°F to 95°F)	0 to 914 m (0 to 2998 ft)	8% to 80% noncondensing	23°C (74°F)
Operating in higher altitudes	10°C to 32°C (50°F to 88°F)	914 to 2133 m (2998 to 6988 ft)	8% to 80% noncondensing	23°C (74°F)
Powered off	10°C to 43°C (50°F to 110°F)	0 to 2133 m (2998 to 6988 ft)	8% to 80% noncondensing	27°C (81°F)
Storing	1°C to 60°C (34°F to 140°F)	0 to 2133 m (0 to 6988 ft)	5% to 80% noncondensing	29°C (84°F)
Shipping	-20°C to 60°C (-4°F to 140°F)	0 to 10668 m (0 to 34991 ft)	5% to 100% condensing, but no precipitation	29°C (84°F)

Environment requirements with redundant ac power

Environment	Temperature	Altitude	Relative humidity	Maximum wet bulb temperature
Operating in lower altitudes	15°C to 32°C (59°F to 89°F)	0 to 914 m (0 to 2998 ft)	20% to 80% noncondensing	23°C (74°F)
Operating in higher altitudes	15°C to 32°C (50°F to 88°F)	914 to 2133 m (2998 to 6988 ft)	20% to 80% noncondensing	23°C (74°F)
Powered off	10°C to 43°C (50°F to 110°F)	0 to 2133m (0 to 6988 ft)	20% to 80% noncondensing	27°C (81°F)
Storing	1°C to 60°C (34°F to 140°F)	0 to 2133 m (0 to 6988 ft)	5% to 80% noncondensing	29°C (84°F)
Shipping	-20°C to 60°C (-4°F to 140°F)	0 to 10668 m (0 to 34991 ft)	5% to 100% condensing, but no precipitation	29°C (84°F)

Preparing your environment

The following three tables list the physical dimensions and weight of the node, the additional space requirements around a node, and the maximum heat dissipated by a node that you must consider before you install your SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4:

Dimensions and weight

Height	Width	Depth	Maximum weight
43 mm (1.69 in.)	440 mm (17.32 in.)	686 mm (27 in.)	12.7 kg (28 lb)

Additional space requirements

Location	Additional space requirements	Reason
Left and right sides	50 mm (2 in.)	Cooling air flow
Back	Minimum: 100 mm (4 in.)	Cable exit

Heat output of each SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 node

Model	Heat output per node
SAN Volume Controller 2145-8F4	450 W (1540 Btu per hour)
SAN Volume Controller 2145-8F2	450 W (1540 Btu per hour)

Preparing your SAN Volume Controller 2145-4F2 environment

Before installing the SAN Volume Controller 2145-4F2, you must prepare the physical environment.

Input-voltage requirements

Ensure that the following requirements for each SAN Volume Controller 2145-4F2 node are met:

Voltage	Frequency
200 to 240 V single phase ac	50 or 60 Hz

Power requirements for each node

Ensure that the following power is available for each SAN Volume Controller 2145-4F2 node. The power that is required depends on the node type, the uninterruptible power supply (UPS) type, and whether the redundant ac power feature is used.

Components	Power requirements
SAN Volume Controller 2145-4F2 + 2145 UPS-1U	420 W
One SAN Volume Controller 2145-4F2 + one 2145 UPS	760 W
Two SAN Volume Controller 2145-4F2 nodes + one 2145 UPS	1120 W

For each redundant ac power switch, add 20 W to the power requirements.

Circuit breaker requirements

Ensure that the following circuit breaker requirements are met:

- The 2145 UPS-1U has an integrated circuit breaker and does not require additional protection.
- Each 2145 UPS is connected to a separate branch circuit, which includes a UL-listed 15 A circuit breaker.

Environment requirements without redundant ac power

Environment	Temperature	Altitude	Relative humidity	Maximum wet bulb temperature
Operating in lower altitudes	10°C to 35°C (50°F to 95°F)	0 to 914 m (0 to 2998 ft)	8% to 80% noncondensing	23°C (74°F)
Operating in higher altitudes	10°C to 32°C (50°F to 88°F)	914 to 2133 m (2998 to 6988 ft)	8% to 80% noncondensing	23°C (74°F)
Powered off	10°C to 43°C (50°F to 110°F)	0 to 2133 m (2998 to 6988 ft)	8% to 80% noncondensing	27°C (81°F)
Storing	1°C to 60°C (34°F to 140°F)	0 to 2133 m (0 to 6988 ft)	5% to 80% noncondensing	29°C (84°F)
Shipping	-20°C to 60°C (-4°F to 140°F)	0 to 10668 m (0 to 34991 ft)	5% to 100% condensing, but no precipitation	29°C (84°F)

Environment requirements with redundant ac power

Environment	Temperature	Altitude	Relative humidity	Maximum wet bulb temperature
Operating in lower altitudes	15°C to 32°C (59°F to 89°F)	0 to 914 m (0 to 2998 ft)	20% to 80% noncondensing	23°C (74°F)
Operating in higher altitudes	15°C to 32°C (50°F to 88°F)	914 to 2133 m (2998 to 6988 ft)	20% to 80% noncondensing	23°C (74°F)
Powered off	10°C to 43°C (50°F to 110°F)	0 to 2133m (0 to 6988 ft)	20% to 80% noncondensing	27°C (81°F)
Storing	1°C to 60°C (34°F to 140°F)	0 to 2133 m (0 to 6988 ft)	5% to 80% noncondensing	29°C (84°F)
Shipping	-20°C to 60°C (-4°F to 140°F)	0 to 10668 m (0 to 34991 ft)	5% to 100% condensing, but no precipitation	29°C (84°F)

Preparing your environment

The following three tables list the physical dimensions and weight of the node, the additional space requirements around a node, and the maximum heat dissipated by a node that you must consider before you install your SAN Volume Controller 2145-4F2:

Dimensions and weight

Height	Width	Depth	Maximum weight
43 mm (1.69 in.)	440 mm (17.32 in.)	686 mm (27 in.)	12.7 kg (28 lb)

Additional space requirements

Location	Additional space requirements	Reason
Left and right sides	50 mm (2 in.)	Cooling air flow
Back	Minimum: 100 mm (4 in.)	Cable exit

Heat output of each SAN Volume Controller 2145-4F2 node

Model	Heat output per node
SAN Volume Controller 2145-4F2	350 W (1200 Btu per hour)

Using the power control for the SAN Volume Controller

SAN Volume Controllers are powered by an uninterruptible power supply (UPS) located in the same rack as the SAN Volume Controller.

The power state of the SAN Volume Controller is displayed by a power indicator on the front panel. If the UPS battery is not sufficiently charged to enable the SAN Volume Controller to become fully operational, its charge state is displayed on the front panel display of the SAN Volume Controller.

The power to a SAN Volume Controller is controlled by the power button on the front panel of the SAN Volume Controller or by commands sent by the Ethernet interface. *Never* turn off the SAN Volume Controller by removing the power cable. You might lose data. For more information about how to power off the SAN Volume Controller, see “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

If the SAN Volume Controller software is running and you request it to power off from the SAN Volume Controller Console, CLI, or power button, the SAN Volume Controller starts its power off processing. During this time, it indicates the progress of the power-off operation on the SAN Volume Controller front panel display. After the power-off processing is complete, the front panel becomes blank and the front panel power light flashes. It is safe for you to remove the power cable from the rear of the SAN Volume Controller. If the power button on the front panel is pressed during power-off processing, the front panel display changes to indicate that the SAN Volume Controller is being restarted, but the power-off process completes before the restart is performed.

If the SAN Volume Controller software is not running when the front panel power button is pressed, the SAN Volume Controller immediately powers off.

If the SAN Volume Controller is powered off and it is the only SAN Volume Controller that is connected to the 2145 UPS, the 2145 UPS powers off within five minutes. You must press the power-on button on the 2145 UPS before the SAN Volume Controller can be powered on.

Note: The 2145 UPS-1U does not power off when the SAN Volume Controller is shut down from the power button.

If you turn off a SAN Volume Controller using the power button or by a command, the SAN Volume Controller is put into a power-off state. The SAN Volume Controller remains in this state until the power cable is connected to the rear of the SAN Volume Controller and the power button is pressed.

During the SAN Volume Controller startup sequence, the SAN Volume Controller tries to detect the status of the UPS through the UPS signal cable. If a UPS is not detected, the SAN Volume Controller pauses and an error is shown on the front panel display. If the UPS is detected, the software monitors the operational state of the UPS. If no UPS errors are reported and the UPS battery is sufficiently charged, the SAN Volume Controller becomes operational. If the UPS battery is not sufficiently charged, the charge state is indicated by a progress bar on the front panel display. When a UPS is first turned on, it might take up to three hours before the battery is sufficiently charged for the SAN Volume Controller to become operational.

If input power to the UPS is lost, the SAN Volume Controller immediately stops all I/O operations and saves the contents of its dynamic random access memory (DRAM) to the internal disk drive. While data is being saved to the disk drive, a Power Failure message is shown on the front panel and is accompanied by a descending progress bar that indicates the quantity of data that remains to be saved. After all the data is saved, the SAN Volume Controller is turned off and the power light on the front panel turns off.

Note: The SAN Volume Controller is now in standby state. If the input power to the UPS unit is restored, the SAN Volume Controller restarts. If the UPS battery was fully discharged, Charging is displayed and the boot process waits for the battery to charge. When the battery is sufficiently charged, Booting is displayed, the node is tested, and the software is loaded. When the boot process is complete, Recovering is displayed while the UPS finalizes its charge. While Recovering is displayed, the cluster can function normally. However, when the power is restored after a second power failure, there is a delay (with Charging displayed) before the node can complete its boot process.

Related concepts

“Powering off” on page 103

The progress bar on the display shows the progress of the power-off operation.

Using directed maintenance procedures

You can use directed maintenance procedures (DMP) to diagnose and resolve problems with the SAN Volume Controller.

For example, to repair a SAN Volume Controller cluster, you might perform the following tasks:

- Analyze the error log
- Replace failed components
- Verify the status of a repaired device
- Restore a device to an operational state in the cluster
- Mark the error as fixed in the error log

Directed maintenance simplifies these procedures by automating as many of the tasks as possible.

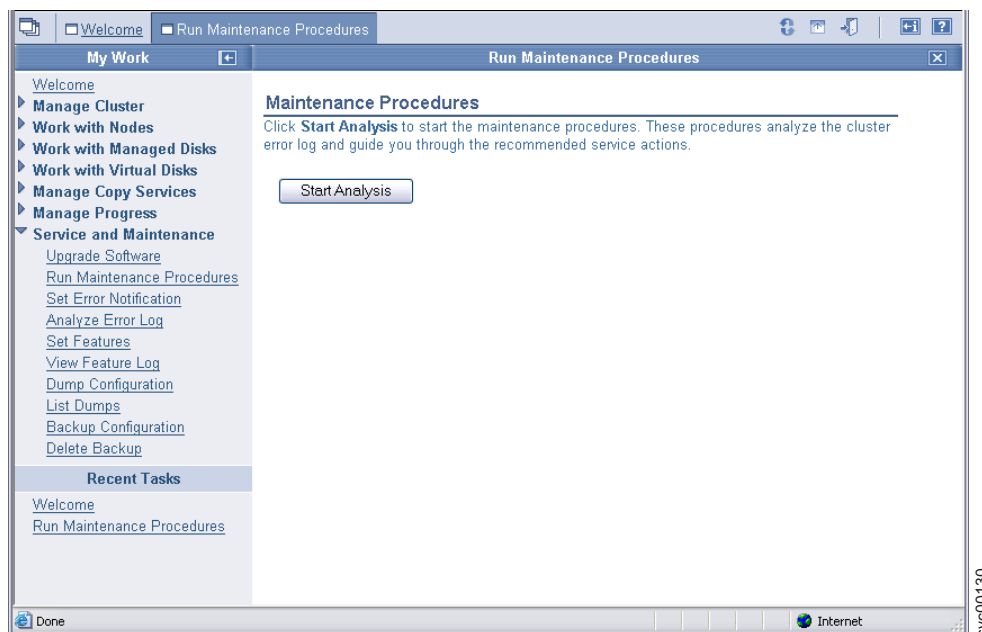
To start the DMP to repair a SAN Volume Controller cluster, see “MAP 5000: Start” on page 270.

The following procedures and panels show examples of what you might see when you use the DMPs. The specific DMPs and panels that you see depend on the procedure that you select.

Note: The following procedures and graphics are examples of what you might see when you use the DMPs. The DMPs and graphics that you see depend on the procedure that you select. This task assumes that you have already launched the SAN Volume Controller Console.

Our example uses the SAN Volume Controller Console to repair a SAN Volume Controller cluster. Perform the following steps to start the DMP:

1. Click **Start Analysis** from the Run Maintenance Procedures panel.



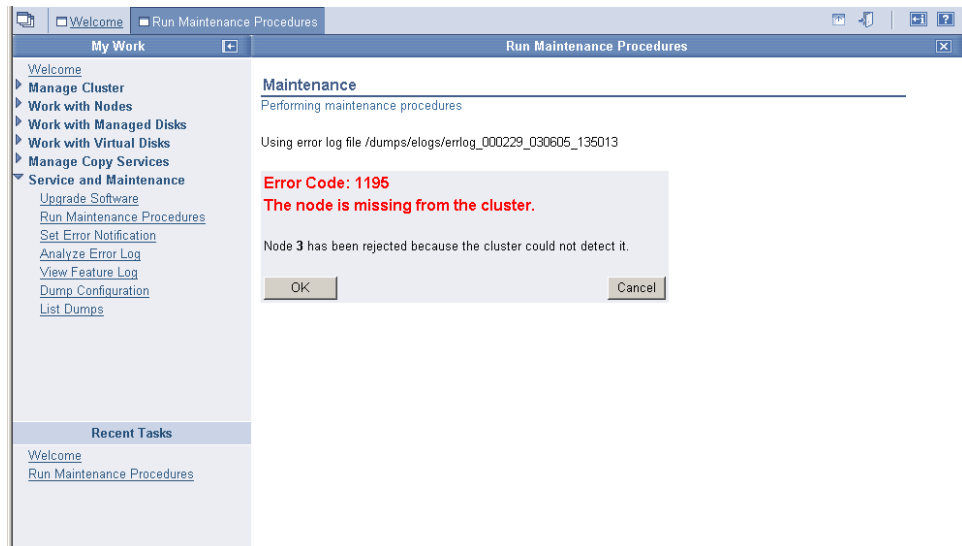
The list might contain any number of errors that must be repaired. If there is more than one error on the list, the error at the top of the list has the highest priority and must always be fixed first. If you do not fix the higher priority errors first, you might not be able to fix the lower priority errors.

2. Click on the number for the error code.

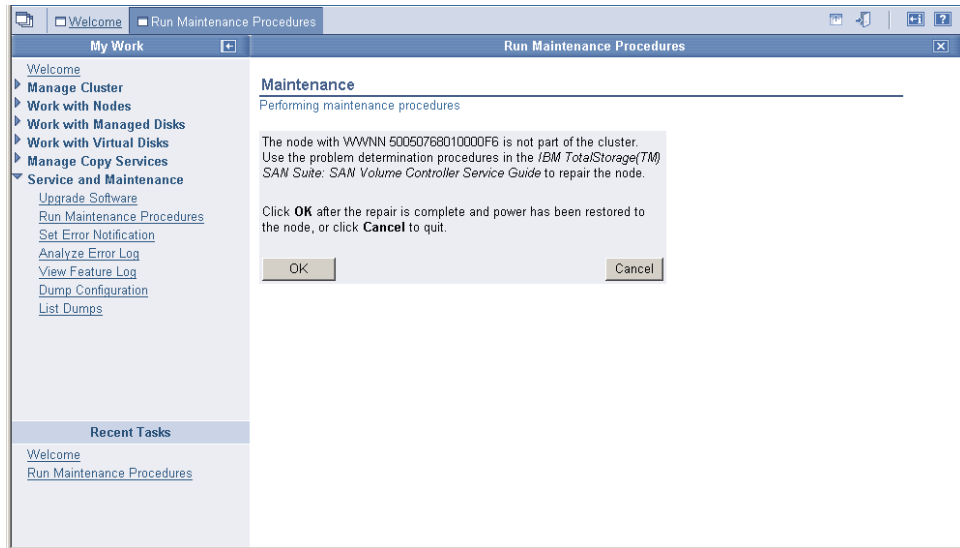


The panel displays the error code and provides a description of the error condition.

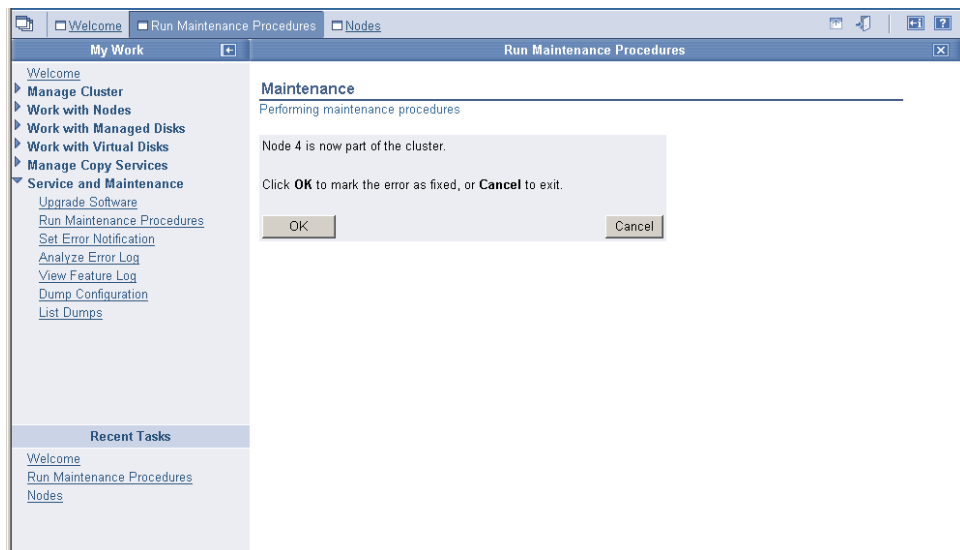
3. Click **OK**.



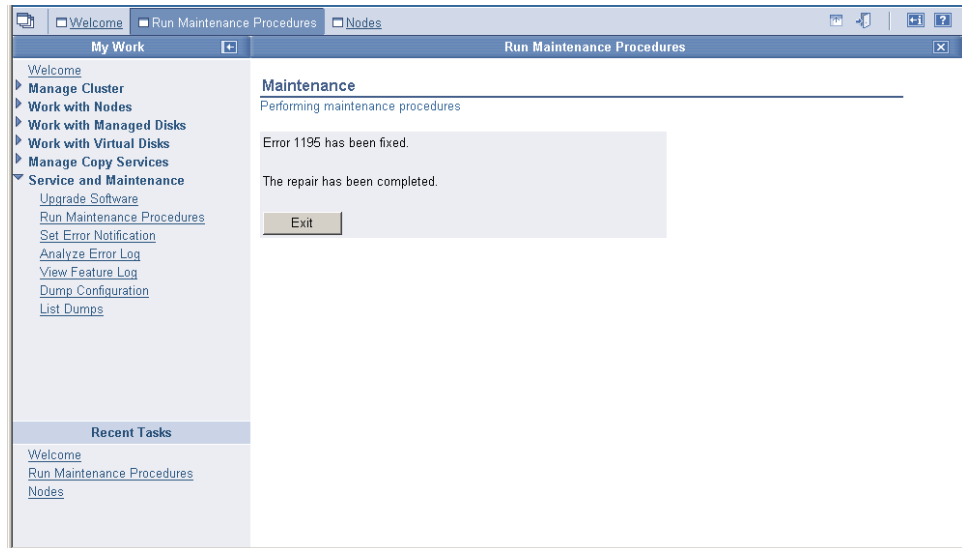
4. One or more panels might be displayed with instructions for you to replace parts or perform other repair activity. If you are not able to complete the actions at this time, click **Cancel**. When you return to the DMPs, the repair can be restarted from step 1 on page 64. When the actions that you are instructed to perform are complete, click **OK**. When the last repair action is completed, the DMPs might attempt to restore failed devices to the cluster.



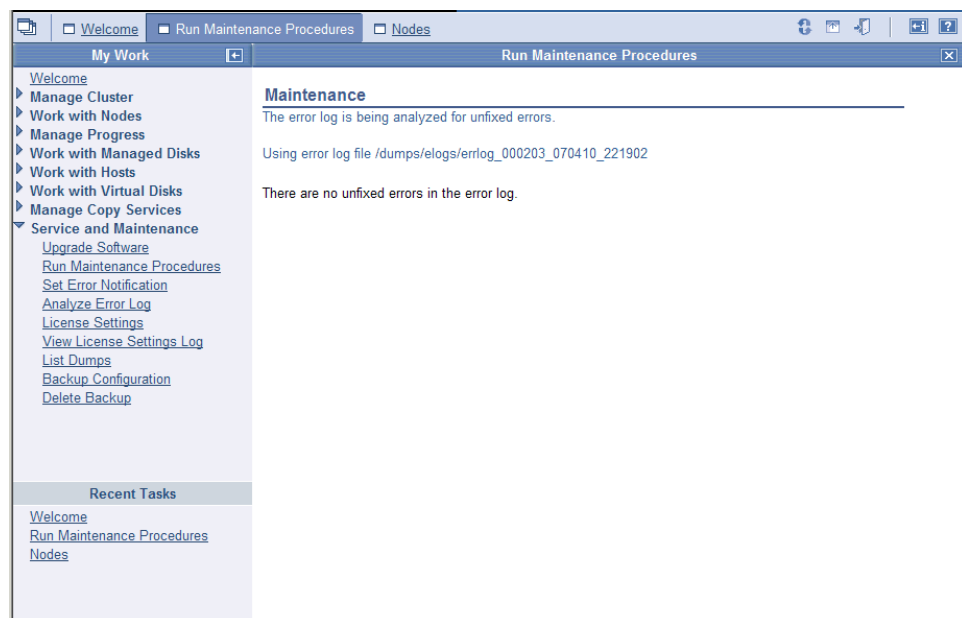
5. Click **OK** to mark the error as fixed in the error log, to prevent this instance of the error from being listed again.



6. Click **Exit**. If other errors need to be fixed, those errors are displayed and the DMPs continue.



If no errors remain, the following panel is displayed:



svc00314

This panel indicates that no further repair procedures are necessary. Verify the repair using repair verification MAP.

Related tasks

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Power-on self-test

When you turn on the SAN Volume Controller, the system board performs self-tests. During the initial tests, the hardware boot symbol is displayed.

SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or SAN Volume Controller 2145-8F2

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 performs a series of tests to check the operation of components and some of the options that have been installed when the units are first turned on. This series of tests is called the power-on self-test (POST).

If a critical failure is detected during the POST, the SAN Volume Controller software is not loaded and the system error LED on the operator information panel is illuminated. If this occurs, use “MAP 5000: Start” on page 270 to help isolate the cause of the failure.

When the SAN Volume Controller software is loaded, additional testing takes place, which ensures that all of the required hardware and software components are installed and functioning correctly. During the additional testing, the word `Booting` is displayed on the front panel along with a boot progress code and a progress bar.

If a test failure occurs, the word `Failed` is displayed on the front panel along with a boot progress code. Some parts of the boot process take several minutes to complete. If the progress bar fails to move and the boot code number does not change for several minutes, see the boot progress code section to understand the situation.

The service controller performs internal checks and is vital to the operation of the SAN Volume Controller. If the error (check) LED is illuminated on the service controller front panel, the front panel display might not be functioning correctly and you can ignore any message displayed.

The uninterruptible power supply (UPS) also performs internal tests. If the UPS is capable of reporting the failure condition, the SAN Volume Controller displays critical failure information on the front panel display or sends noncritical failure information to the cluster error log. If the SAN Volume Controller cannot communicate with the UPS, it displays a boot failure error message on the front panel display. Further problem determination information might also be displayed on the front panel of the UPS.

SAN Volume Controller 2145-4F2

If a critical failure is detected during the tests, the SAN Volume Controller 2145-4F2 software is not loaded and no additional fault information is provided. When the SAN Volume Controller 2145-4F2 software is loaded, additional testing is performed. This testing ensures that all the required hardware and software components are installed and functioning correctly. During this portion of the testing, the word `Booting` displays on the front panel along with a boot progress code and a progress bar.

If a test fails, the word `Failed` displays on the front panel. You can use the progress code to isolate the cause of the problem. If the booting progress bar fails to move to the right for two minutes, the test process is hung. Use the boot progress code to isolate the failure.

The service controller performs internal checks and is vital to the operation of the SAN Volume Controller 2145-4F2. When an internal check fails, the SAN Volume Controller 2145-4F2 does not operate. Ignore other front panel indicators when you see that the check LED is illuminated.

The UPS also performs internal tests. If the UPS is capable of reporting the failure condition, the SAN Volume Controller 2145-4F2 displays critical failure information on the front panel display or sends noncritical failure information to the SAN Volume Controller 2145-4F2 cluster error log. If the SAN Volume Controller 2145-4F2 cannot communicate with the UPS, it displays a boot failure error message on the front panel display. Additional problem determination information might also be displayed on the front panel of the UPS.

Shutting down the cluster in the SAN Volume Controller

If all input power to a SAN Volume Controller cluster must be removed, you must shut down the cluster before the power is removed. If you do not shut down the cluster before turning off input power to the uninterruptible power supply (UPS), the SAN Volume Controller detects the loss of power and continues to run on battery power until all data held in memory is saved to the internal disk drive. This increases the time that is required to make the cluster operational when input power is restored and severely increases the time that is required to recover from an unexpected loss of power that might occur before the UPS batteries can fully recharge.

Shut down a cluster by using either the SAN Volume Controller Console or the CLI.

When input power is restored, you must press the power button on the UPS units before you press the power buttons on the SAN Volume Controller.

Fibre-channel network speed

You can change the speed of the fibre-channel ports on a SAN Volume Controller through the front panel on the SAN Volume Controller node or by a command sent to a SAN Volume Controller cluster using the Ethernet interface.

If you use the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8G4, the speed of the fibre-channel ports is governed by the maximum speed of the fibre channel switch to which the ports are connected, up to a maximum of 4 Gbps. The ports operate at the highest speed at which a reliable connection can be established. Different ports and nodes on the SAN Volume Controller might operate at different speeds.

Note: Although you can change the speed of the fibre-channel ports on a SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8G4 through the front panel or by a command, any speed changes that are selected through the front panel or by command have no effect on the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8G4.

All SAN Volume Controller 2145-8F2 and SAN Volume Controller 2145-4F2 fibre-channel ports and nodes on a SAN Volume Controller must operate at the same speed. The default for the port speed is 2 Gbps. If the fibre-channel fabric is using fibre-channel switches that are unable to operate at 2 Gbps, set the SAN Volume Controller fibre-channel port speed to 1 Gbps during the installation procedure. If you must replace a 2 Gbps fibre-channel switch with a 1 Gbps fibre-channel switch, you must manually switch the SAN Volume Controller fibre-channel port speed before you can use the SAN Volume Controller at 1 Gbps.

If a new SAN Volume Controller node is added to an existing SAN Volume Controller configuration, you must change the speed setting if the switch is only capable of running at 1 Gbps. If the SAN Volume Controller internal disk drive fails, the fibre-channel speed setting is lost, but the Node Rescue Procedure that you use to restore the SAN Volume Controller software automatically selects the correct speed. If a 1 Gbps fibre-channel switch is being replaced by a 2 Gbps fibre-channel switch, the existing SAN Volume Controller clusters operate at 1 Gbps. You can switch to 2 Gbps any time using the command-line interface.

Determining the fibre-channel port speed

You must determine the fibre-channel port speed for several actions.

Perform the following steps to determine the fibre-channel port speed:

1. Select any fibre-channel port from the front panel.
2. Press and hold **Down**.
3. Press and release **Select**.
4. Release **Down**.
5. Press **Select** again to cancel the text display or wait 60 seconds and the text display cancels itself.

If the node is in a cluster that is operational, you can also determine the fibre-channel port speed from the cluster vital product data by issuing the following command:

```
svcinfolcluster name
```

The port speed is also displayed in the console under Cluster Properties.

Changing the fibre-channel port speed for a node not in a cluster

You must occasionally change the fibre-channel port speed for a node that is not in a cluster.

Perform the following steps to change the fibre-channel port speed for a node that is not in a cluster:

1. From the front panel, select any fibre channel port.
2. Press and hold **Down**.
3. Press and release **Select**.
4. Release **Down**.
5. Press **Up** or **Down** until the required speed is displayed.
6. Press **Select** to activate the new speed.

Changing the fibre-channel port speed for a node in a cluster

The fibre channel port speed of all SAN Volume Controller 2145-4F2 and SAN Volume Controller 2145-8F2 nodes in the cluster can be changed by issuing the `svctask chcluster` command.

This is a customer task that is only available to users who are logged on using the admin ID and password.

Note: Changing the fibre-channel port speed causes all nodes in the cluster to simultaneously perform a warmstart. This causes any I/O activity through the cluster to fail and consequently might cause applications running on hosts to fail.

Cluster identification

A SAN Volume Controller cluster is identified by its IP address.

A SAN Volume Controller cluster is identified by its IP address. This address is used to access the cluster when you use the SAN Volume Controller graphical user interface or the command-line interface. When a node has been assigned to a cluster, you can display the cluster IP address on the front panel by selecting **Cluster** from the menu.

Configuration node addressing

Only one node within a SAN Volume Controller cluster can be set to use the cluster IP address.

This node then acts as the focal point for all configuration and other requests that are made from the SAN Volume Controller Console application or the CLI. This node is known as the *configuration node*.

If the configuration node is stopped or fails, the remaining nodes in the cluster determine which node will take on the role of configuration node. The new configuration node binds the cluster IP address to its Ethernet port. It broadcasts this new mapping so that connections to the cluster configuration interface can continue.

The new configuration node broadcasts the new IP address mapping using the Address Resolution Protocol (ARP). You must configure some switches to forward the ARP packet on to other devices on the subnetwork. Ensure that all Ethernet devices are configured to pass on unsolicited ARP packets. Otherwise, if the ARP packet is not forwarded, a device loses its connection to the SAN Volume Controller cluster.

If a device loses its connection to the SAN Volume Controller cluster, it can regenerate the address quickly if the device is on the same subnetwork as the cluster. However, if the device is not on the same subnetwork, it might take hours for the address resolution cache of the gateway to refresh. In this case, you can restore the connection by establishing a command line connection to the cluster from a terminal that is on the same subnetwork, and then by starting a secure copy to the device that has lost its connection.

Service mode overview

The service mode allows you to access vital product data (VPD), logs, and dump data on the node. It also provides you with a method of forcing the installation of a different version of software.

A SAN Volume Controller is assigned two IP addresses. The first address is the cluster IP address that is used for all normal configuration and service activity. The second address is not normally active; you can activate the second address for a single SAN Volume Controller by setting it into service mode.

The cluster can only be accessed through its IP address when the SAN Volume Controller nodes have formed into a cluster. If not enough cluster nodes can access each other through the fibre channel fabric or the node is not currently a member of a cluster, the node is inaccessible through the cluster IP address. The normal repair procedure for cluster access problems is to repair any faults on the fibre channel fabric and repair any nodes that are indicating failure conditions on their front panel displays. If, after performing these repair actions, it is still not possible to access the cluster, it might be necessary to enable service mode to help isolate or repair the problem.

Note: Use service mode only under the direction of IBM Support Center. Setting service mode for a node that is in an active cluster might cause data to be lost.

Service mode can only be reset through the Web browser or by turning the power to the node off and on.

Related reference

“Recover cluster navigation” on page 112

The Recover cluster menu is accessed through the SAN Volume Controller default menu.

Chapter 2. Redundant ac power switch

The redundant ac power switch is an optional feature that makes the SAN Volume Controller nodes more resilient to power failure. The redundant ac power switch is not a replacement for an uninterruptible power supply (UPS), you must still use a 2145 UPS-1U for each node.

You must connect the redundant ac power switch to two-independent power circuits. One power circuit connects to the main power input port and the other power circuit connects to the backup power input port. If the main power to the SAN Volume Controller node fails for any reason, the redundant ac power switch automatically uses the backup power source. When power is restored, the redundant ac power switch automatically changes back to using the main power source.

Place the redundant ac power switch in the same rack as the SAN Volume Controller node. The redundant ac power switch logically sits between the rack power distribution unit and the 2145 UPS-1U.

You can use a single redundant ac power switch to power one or two SAN Volume Controller nodes. If you use the redundant ac power switch to power two nodes, the nodes must be in different I/O groups. In the event that the redundant ac power switch fails or requires maintenance, both nodes power off. Because the nodes are in two different I/O groups, the hosts do not lose access to the backend disk data.

For maximum resilience to failure, use one redundant ac power switch to power each SAN Volume Controller node.

The following graphic shows a redundant ac power switch.



Preparing your redundant ac power environment

Ensure that your physical site meets the installation requirements for the redundant ac power switch.

The redundant ac power switch requires two independent power sources that are provided through two rack-mounted power distribution units (PDUs). The PDUs must have IEC320-C13 outlets.

The redundant ac power switch comes with two IEC 320-C19 to C14 power cables to connect to rack PDUs. There are no country-specific cables for the redundant ac power switch.

The power cable between the redundant ac power switch and the 2145 uninterruptible power supply-1U (2145 UPS-1U) is rated at 10 A.

Redundant ac power switch specifications

Dimensions and weight

Height	Width	Depth	Maximum weight
43 mm (1.69 in.)	192 mm (7.56 in.)	240 mm	2.6 kg (5.72 lb)

Additional space requirements

Location	Width	Reason
Left side	124 mm (4.89 in.)	Side mounting plate
Right side	124 mm (4.89 in.)	Side mounting plate

Heat output (maximum)

The maximum heat output dissipated inside the redundant ac power switch is approximately 50 watts (170 Btu per hour).

Cabling of redundant ac power switches (example)

You must properly cable the redundant ac power switches in your environment.

Figure 26 on page 75 shows an example of the main wiring for a SAN Volume Controller cluster with the redundant ac power switch feature. The four-node cluster consists of two I/O groups:

- I/O group 0 contains nodes A and B
- I/O group 1 contains nodes C and D



svc00358

Figure 26. A four-node SAN Volume Controller cluster with the redundant ac power switch feature

- 1** I/O group 0
- 2** SAN Volume Controller node A
- 3** 2145 UPS-1U A
- 4** SAN Volume Controller node B
- 5** 2145 UPS-1U B
- 6** I/O group 1
- 7** SAN Volume Controller node C
- 8** 2145 UPS-1U C
- 9** SAN Volume Controller node D
- 10** 2145 UPS-1U D
- 11** Redundant ac power switch 1
- 12** Redundant ac power switch 2

| **13** Site PDU X (C13 outlets)

| **14** Site PDU Y (C13 outlets)

| The site PDUs X and Y (**13** and **14**) are powered from two independent power
| sources.

| In this example, only two redundant ac power switches are used, and each powers
| one node in each I/O group. However, for maximum redundancy, use one
| redundant ac power switch to power each node in the cluster.

| **Note:** While this topic provides an example of the cable connections, it does not
| indicate a preferred physical location for the components.
|

Chapter 3. Uninterruptible power supply

The uninterruptible power supply protects a SAN Volume Controller node against blackouts, brownouts, and power surges. The uninterruptible power supply contains a power sensor to monitor the supply and a battery to provide power until an orderly shutdown of the system can be performed.

Using the 2145 UPS-1U

The 2145 uninterruptible power supply-1U (2145 UPS-1U) provides a SAN Volume Controller node with a secondary power source if you lose power from your primary power source due to power failures, power sags, power surges, or line noise.

Unlike the traditional UPS that enables continued operation of the devices that they supply when power is lost, these UPS units are used exclusively to maintain data that is held in the SAN Volume Controller dynamic random access memory (DRAM) in the event of an unexpected loss of external power. Data is saved to the internal disk of the SAN Volume Controller node. The UPS units are required to power the SAN Volume Controller nodes even if the input power source is considered uninterruptible.

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2 nodes can operate only with the 2145 UPS-1U. The SAN Volume Controller 2145-4F2 node can operate with either the 2145 UPS or the 2145 UPS-1U.

Note: The UPS maintains continuous SAN Volume Controller-specific communications with its attached SAN Volume Controller nodes. A SAN Volume Controller node cannot operate without the UPS. The UPS must be used in accordance with documented guidelines and procedures and must not power any equipment other than SAN Volume Controller nodes.

Connecting the 2145 UPS-1U to the SAN Volume Controller

To provide redundancy and concurrent maintenance, you can install the SAN Volume Controllers in pairs.

For connection to the 2145 uninterruptible power supply-1U (2145 UPS-1U), each SAN Volume Controller of a pair must be connected to only one 2145 UPS-1U.

Note: A cluster can contain no more than eight SAN Volume Controller nodes. The 2145 UPS-1U must be attached to a source that is both single phase and 200-240 V. The 2145 UPS-1U has an integrated circuit breaker and does not need external protection.

The SAN Volume Controller software determines whether the input voltage to the UPS is within range and sets an appropriate voltage alarm range on the UPS. The software continues to recheck the input voltage every few minutes. If it changes substantially but remains within the permitted range, the alarm limits are readjusted.

Note: The 2145 UPS-1U is equipped with a cable retention bracket that keeps the power cable from disengaging from the rear panel. See the related documentation for more information.

Related reference

“Hardware for the 2145 UPS-1U” on page 80

The 2145 uninterruptible power supply-1U (2145 UPS-1U) hardware is shown in the following graphics.

Controls and indicators for the 2145 UPS-1U

All controls for the 2145 uninterruptible power supply-1U (2145 UPS-1U) are located on the front panel assembly.

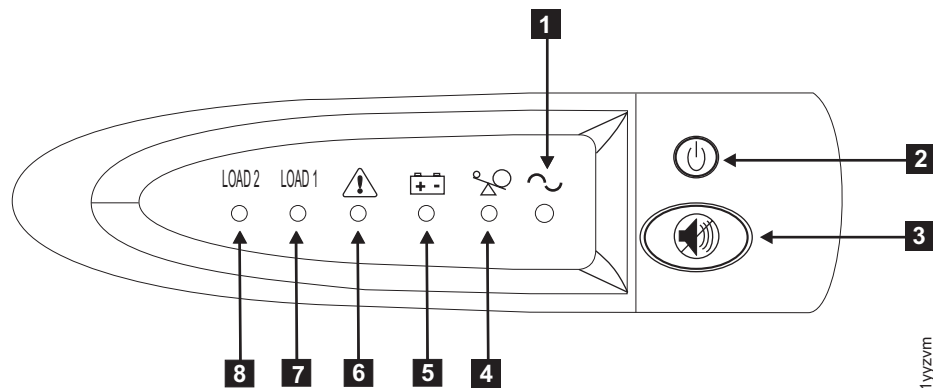


Figure 27. The 2145 UPS-1U front panel assembly

- 1** Power-on indicator
- 2** On/off button
- 3** Test and alarm reset button
- 4** Overload indicator
- 5** On-battery indicator
- 6** Service indicator
- 7** Load segment 1 indicator
- 8** Load segment 2 indicator

Power-on indicator

The power-on indicator is displayed when the 2145 uninterruptible power supply-1U (2145 UPS-1U) is functioning.

When the power-on indicator is a steady green, the 2145 UPS-1U is active.

On/off button

The on/off button turns the power on or turns the power off to the 2145 uninterruptible power supply-1U (2145 UPS-1U).

Turning on the 2145 UPS-1U

After connecting the 2145 UPS-1U to the outlet, it will be in *standby* mode until you turn it on. Press and hold the on/off button until the power-on indicator is

illuminated (approximately 5 seconds). A self-test is initiated that takes approximately 10 seconds, during which time the indicators are turned on and off several times. The 2145 UPS-1U then enters *normal* mode.

Turning off the 2145 UPS-1U

Press and hold the on/off button until the power-on light is extinguished (approximately 5 seconds). This places the 2145 UPS-1U in *standby* mode. You must then unplug the 2145 UPS-1U to power-off the unit.

Test and alarm reset button

Use the test and alarm reset button to start the self-test.

To start the self-test, press and hold the test and alarm reset button for three seconds. This button also resets the alarm.

Note: This button is applicable to both the 2145 uninterruptible power supply (2145 UPS) and the 2145 uninterruptible power supply-1U (2145 UPS-1U).

Overload indicator

The overload indicator lights up when the capacity of the 2145 uninterruptible power supply-1U (2145 UPS-1U) is exceeded.

If the overload indicator is on, go to the 2145 UPS-1U MAP to resolve the problem.

Related tasks

“MAP 5150: 2145 UPS-1U” on page 286

MAP 5150: 2145 UPS-1U helps you solve problems that have occurred in the 2145 uninterruptible power supply-1U (2145 UPS-1U) systems used on a SAN Volume Controller.

On-battery indicator

The on-battery indicator glows yellow when the 2145 uninterruptible power supply-1U (2145 UPS-1U) is powered by the battery. This indicates that the main power source has failed.

If the on-battery indicator is on, go to the 2145 UPS-1U MAP to resolve the problem.

Related tasks

“MAP 5150: 2145 UPS-1U” on page 286

MAP 5150: 2145 UPS-1U helps you solve problems that have occurred in the 2145 uninterruptible power supply-1U (2145 UPS-1U) systems used on a SAN Volume Controller.

Service indicator

If the service indicator on the 2145 uninterruptible power supply-1U (2145 UPS-1U) is flashing red, maintenance is required.

If the service indicator is on, go to the 2145 UPS-1U MAP to resolve the problem.

Related tasks

“MAP 5150: 2145 UPS-1U” on page 286

MAP 5150: 2145 UPS-1U helps you solve problems that have occurred in the 2145 uninterruptible power supply-1U (2145 UPS-1U) systems used on a SAN Volume Controller.

Load segment 1 indicator

The load segment 1 indicator on the 2145 uninterruptible power supply-1U (2145 UPS-1U) is not currently used.

Note: Load segment 1 is unused by the SAN Volume Controller. When the 2145 UPS-1U is configured by the SAN Volume Controller, this load segment is disabled. During normal operation, the load segment 1 indicator is off.

Related reference

“Hardware for the 2145 UPS-1U”

The 2145 uninterruptible power supply-1U (2145 UPS-1U) hardware is shown in the following graphics.

Load segment 2 indicator

The load segment 2 indicator on the 2145 uninterruptible power supply-1U (2145 UPS-1U) is lit (green) when power is available to load segment 2.

When the load segment 2 indicator is green, the 2145 UPS-1U is running normally and power is available to this segment.

See the 2145 UPS-1U hardware documentation for the location of the power outlets for this segment.

Related reference

“Hardware for the 2145 UPS-1U”

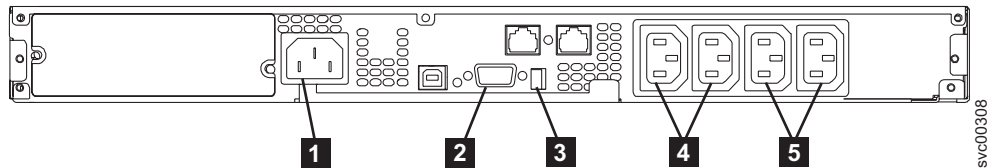
The 2145 uninterruptible power supply-1U (2145 UPS-1U) hardware is shown in the following graphics.

Hardware for the 2145 UPS-1U

The 2145 uninterruptible power supply-1U (2145 UPS-1U) hardware is shown in the following graphics.

Locations for the 2145 UPS-1U connectors and switches

The following diagrams illustrate the hardware for the 2145 UPS-1U:

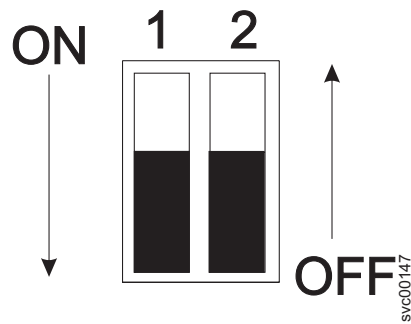


- 1** Main power connectors
- 2** Communication port
- 3** Dip switches
- 4** Load segment 1 receptacles
- 5** Load segment 2 receptacles

2145 UPS-1U dip switches

The dip switches are used to configure the input and output voltage ranges. Because this function is performed by the SAN Volume Controller software, both

switches must be left in the Off position.



2145 UPS-1U ports not used

The 2145 UPS-1U is equipped with ports that are not used by the SAN Volume Controller and have not been tested. Use of these ports, in conjunction with the SAN Volume Controller or any other application that may be used with the SAN Volume Controller, is not supported. Figure 28 shows the 2145 UPS-1U ports that are not used.

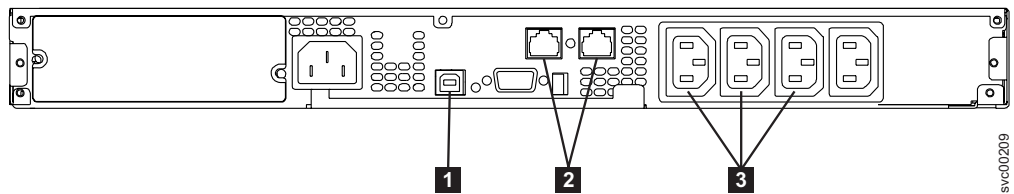
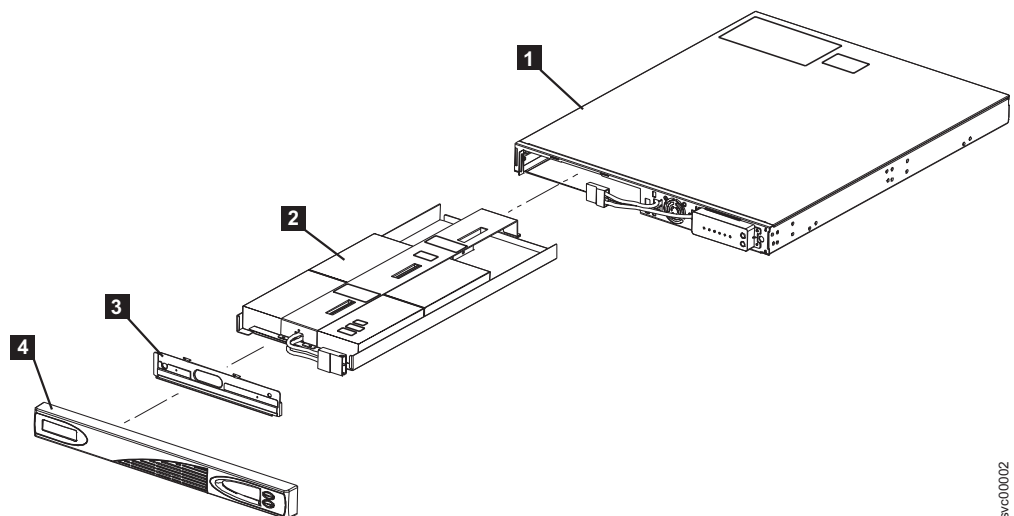


Figure 28. Ports not used by the 2145 UPS-1U

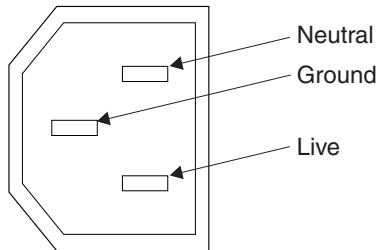
- 1 USB interface port
- 2 Network ports
- 3 Load segment receptacles

Hardware locations for the 2145 UPS-1U



- 1** Frame assembly
- 2** Battery pack assembly
- 3** Battery plate
- 4** Front panel assembly

2145 UPS-1U power connector



Related reference

“SAN Volume Controller 2145-8F4 hardware” on page 47

It is good to familiarize yourself with the SAN Volume Controller 2145-8F4 hardware.

Related information

Appendix A, “Parts catalog,” on page 527

Part numbers are available for the different parts and field replaceable units (FRUs) of the SAN Volume Controller and the uninterruptible power supply.

Using the 2145 UPS

The 2145 uninterruptible power supply (2145 UPS) provides a SAN Volume Controller 2145-4F2 node with a secondary power source if you lose power from your primary power source due to power failures, power sags, power surges, or line noise.

The SAN Volume Controller 2145-4F2 node can operate with either the 2145 UPS or the 2145 UPS-1U. For information about the 2145 UPS-1U, see “Using the 2145 UPS-1U” on page 77.

Connecting the 2145 UPS to the SAN Volume Controller 2145-4F2

To provide redundancy and concurrent maintenance, you can install the SAN Volume Controller 2145-4F2 nodes in pairs.

For connection to the 2145 uninterruptible power supply (2145 UPS), each SAN Volume Controller 2145-4F2 of a pair must be connected to a different UPS (both SAN Volume Controller 2145-4F2 nodes cannot be connected to the same UPS). Each 2145 UPS can support two SAN Volume Controller 2145-4F2 nodes.

Note: You must have two 2145 UPSs per cluster. A cluster can contain no more than eight SAN Volume Controller 2145-4F2 nodes and each UPS of a pair must be connected to a separate electrical input power source (if possible) to reduce the chance of input power failure at both UPSs.

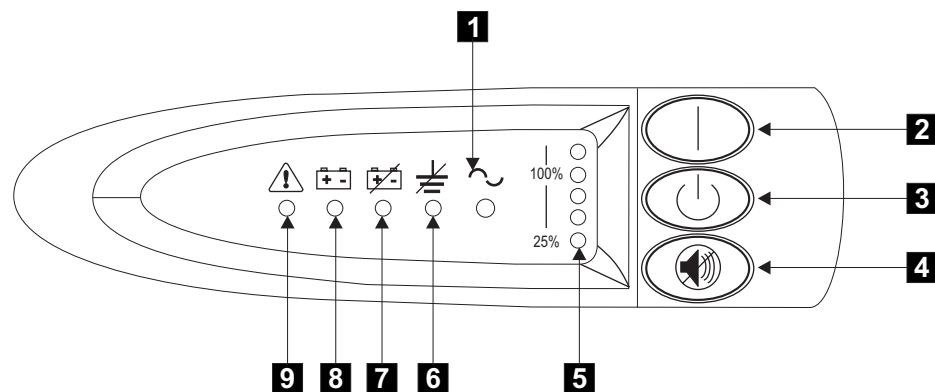
The 2145 UPS requires a dedicated branch circuit that meets the following specifications:

- A 15 A circuit breaker must be installed in each branch circuit that supplies the power to a UPS
- Single-phase
- 200 - 240 V

The SAN Volume Controller 2145-4F2 software determines whether the input voltage to the UPS is within range and sets an appropriate voltage alarm range on the UPS. The software continues to recheck the input voltage every few minutes. If it changes substantially but remains within the permitted range, the alarm limits are readjusted.

Controls and indicators for the 2145 UPS

All controls for the 2145 uninterruptible power supply (2145 UPS) are located on the front panel assembly.



- 1** Mode indicator
- 2** On button
- 3** Off button
- 4** Test and alarm reset button
- 5** Load-level indicators
- 6** Site wiring fault indicators
- 7** Battery service indicator
- 8** Battery mode indicator
- 9** General alarm indicator

Related reference

“Test and alarm reset button” on page 79

Use the test and alarm reset button to start the self-test.

Mode indicator

The mode indicator provides status information on the 2145 uninterruptible power supply (2145 UPS) and is located on the front panel.

When the mode indicator is a steady green, the 2145 UPS is in normal mode. The 2145 UPS checks and charges its battery as necessary.

When the mode indicator is flashing green, the 2145 UPS is in standby mode. Standby mode means that the 2145 UPS is turned off but is still connected to the main power source. No power is available from the 2145 UPS output sockets but the 2145 UPS monitors and charges its battery as necessary.

When the mode indicator is steady red, the 2145 UPS is in bypass mode because of one of the following conditions:

- The 2145 UPS has overheated
- The 2145 UPS has an overload condition of 103% through 110% for 30 seconds
- The 2145 UPS detects a fault in the battery or in the 2145 UPS electronics assembly

When the mode indicator is flashing red and the alarm is sounding, the voltage range setting might not be correct. When a SAN Volume Controller 2145-4F2 is connected to the 2145 UPS, the SAN Volume Controller 2145-4F2 automatically adjusts the voltage range setting. Take no action for this alarm condition unless it persists for more than five minutes after a SAN Volume Controller 2145-4F2 has been connected to a 2145 UPS and powered on.

On button

The on button turns on the main power to the 2145 uninterruptible power supply (2145 UPS).

To turn on the power, press and hold the on button until you hear a beep (approximately one second). The mode indicator stops flashing and the load-level indicators display the percentage of load that is being applied to the 2145 UPS.

Off button

The off button turns off the main power to the 2145 uninterruptible power supply (2145 UPS).

Attention: Never use the off button unless you are specifically directed to in the instructions that are provided with the SAN Volume Controller 2145-4F2. If you press it at any other time, you might lose data in the cluster if the other 2145 UPS fails.

To turn off the power, press and hold the off button until the long beep stops (approximately five seconds). The mode indicator starts to flash and the 2145 UPS remains in standby mode until you disconnect the 2145 UPS from the main power outlet.

Load-level indicators

The load-level indicators show the percentage of the 2145 uninterruptible power supply (2145 UPS) capacity that the SAN Volume Controller 2145-4F2 is using.

When all the indicators are lit, the power requirements of the SAN Volume Controller 2145-4F2 have exceeded the capacity of the 2145 UPS.

Site wiring fault indicator

The site wiring fault indicator on the 2145 uninterruptible power supply (2145 UPS) shows that either a ground wire connection does not exist or the live and neutral wires are reversed in the input power connection.

The site wiring fault indicator is located on the front panel of the 2145 UPS.

Battery service indicator

The battery service indicator is located on the front panel of the 2145 uninterruptible power supply (2145 UPS) and shows that the charge in the battery has become low while the 2145 UPS is in battery mode.

The alarm continues to beep once every five seconds. The application programs immediately complete and save the work to prevent loss of data. If the 2145 UPS shuts down, it automatically restarts when the main power returns.

Battery mode indicator

The battery mode indicator shows that the 2145 uninterruptible power supply (2145 UPS) is operating on batteries.

The battery mode indicator lights up when the main power source fails and the 2145 UPS is running on battery power. The alarm beeps once every five seconds. When main power returns, the 2145 UPS returns to normal mode and the battery recharges. The battery mode indicator then shuts off and the alarm ceases.

General alarm indicator

The general alarm indicator on the 2145 uninterruptible power supply (2145 UPS) turns on when a power or temperature problem occurs.

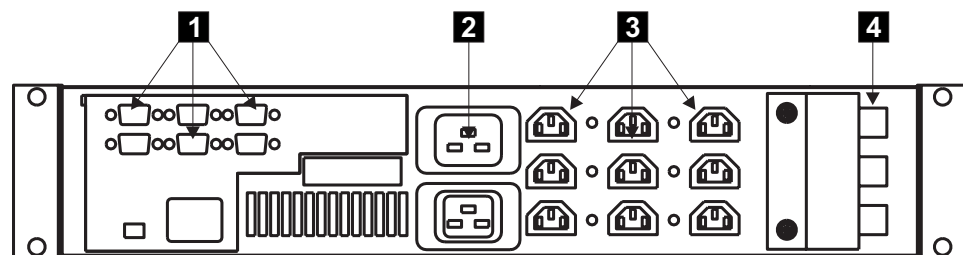
When the general alarm indicator is accompanied by the audio alarm beeping every five seconds, the battery is low. If the audio alarm is continuous, the internal temperature of the 2145 UPS is too high or there has been a momentary output overload.

Hardware for the 2145 UPS

The 2145 uninterruptible power supply (2145 UPS) hardware is displayed in the following graphics.

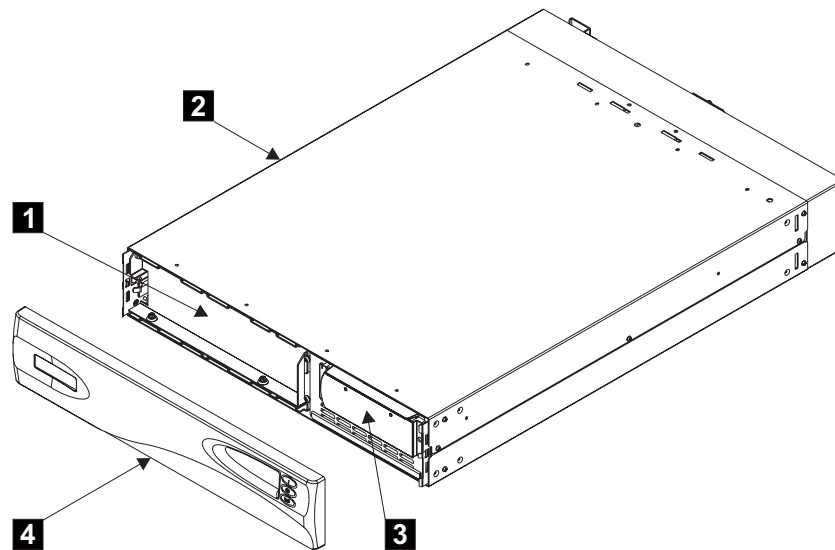
Locations for the 2145 UPS connectors and circuit breakers

The following diagrams illustrate the hardware for the 2145 UPS:



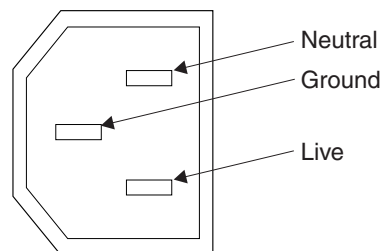
- 1** Signal cable connectors
- 2** Main power connector
- 3** Output connectors
- 4** Circuit breakers

Hardware locations for the 2145 UPS



- 1** Battery assembly
- 2** Frame assembly
- 3** Electronics assembly
- 4** Front panel assembly

2145 UPS connector



Related information

Appendix A, "Parts catalog," on page 527

Part numbers are available for the different parts and field replaceable units (FRUs) of the SAN Volume Controller and the uninterruptible power supply.

Preparing your UPS environment

Ensure that your physical site meets the installation requirements for the uninterruptible power supply (UPS).

2145 UPS-1U environment

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, SAN Volume Controller 2145-8F2, and SAN Volume Controller 2145-4F2 are supported with the 2145 uninterruptible power supply-1U (2145 UPS-1U).

UPS specifications

2145 UPS-1U dimensions and weight

Height	Width	Depth	Maximum weight
44 mm (1.73 in.)	439 mm (17.3 in.)	579 mm (22.8 in.)	16 kg (35.3 lb)
Note: The 2145 UPS-1U package, which includes support rails, weighs 18.8 kg (41.4 lb).			

Heat output

Model	Heat output during normal operation	Heat output during battery operation
2145 UPS-1U	40 W (135 Btu per hour)	150 W (510 Btu per hour)

2145 UPS environment

Ensure that your physical site meets the installation requirements of the 2145 uninterruptible power supply (2145 UPS).

UPS specifications

Attention: Ensure that you comply with the following requirements for the 2145 UPS units:

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

2145 UPS dimensions and weight

Height	Width	Depth	Maximum weight
89 mm (3.5 in.)	483 mm (19 in.)	622 mm (24.5 in.)	37 kg (84 lb)

Heat output

Model	Heat output during normal operation	Heat output during battery operation
2145 UPS powering two SAN Volume Controller 2145-4F2 nodes	140 W (480 Btu per hour)	250 W (850 Btu per hour)

Chapter 4. Installing and maintaining the software for the SAN Volume Controller

The software for the SAN Volume Controller is preinstalled on all nodes.

This software includes the following items:

- Operating system
- Application software

Introduction

Because the software is preinstalled, it is not necessary to replace the software on a node. However, if the software is lost for some reason (for example, if the hard disk drive in the node fails), it is possible to copy all the software from another node that is connected to the same fibre-channel fabric. This process is known as *node rescue*.

To allow nodes to operate as a cluster, you must run all nodes at the same version of software. This rule is enforced by the cluster software itself. When you attempt to add a node to a cluster, its software version is examined and if it is not running the same version of the software as the other nodes in the cluster, the software revisions are automatically copied from one of the other nodes in the cluster before the add operation is completed. If for some reason it is not possible to update the software on the node that you are adding, the operation fails and the cluster logs an error to explain the cause of the failure.

If the SAN Volume Controller detects software errors, an error code is generated. The additional data logged with the error indicates the source of the software error. The additional data might look like this:

```
Assert File /build/lodestone/030129_nd/src/user/vg/vgagentvt.c Line 1234
```

To view the additional data, you must access the SAN Volume Controller web pages and select the Analyze error log option for the software error that you are investigating. Report the error code and the additional data to your IBM Support Center.

If this problem is known for your version of software, the customer is advised to upgrade to the latest software level. If the problem is not known to the IBM Support Center, you might be asked to provide additional information for this error. In most cases a dump is taken automatically when the software error is detected.

You can use the command-line interface to list and save dump data. If more than one dump file exists, select the dump file with a time stamp closest to the time stamp on the software error report and save this file for use by the IBM Support Center. You can list dumps using the following commands:

- `svcinfo lserrlogdumps`
- `svcinfo lsiostatsdumps`
- `svcinfo lsiotracedumps`
- `svcinfo lsfeaturedumps`

- `svcinfol s2145dumps`

Secure copy can be used to copy a dump file to the master console.

Determining the version of the SAN Volume Controller software

The current software version can be obtained from the node or cluster vital product data (VPD).

During a software upgrade, the version number of each node is updated when the software is installed and that node is restarted. The cluster software version number is updated when the new version of software is committed.

Note: The software version number is in the format *x.y.z* where *x* is a version release number, *y* is a major number, and *z* is a minor number. For example, version number 1.2.3 has a version release number of 1, a major number of 2, and a minor number of 3. This number determines whether software versions can be reverted to the previous version. It is not possible to revert a version of software to a version that has a lower major number. For example, if version 1.2.3 is running on the cluster, it can be replaced with version 1.2.2 or 1.2.1 but it cannot be replaced with version 1.1.6.

Issue the following command on the CLI to determine the version of the software that is currently running on the cluster:

```
svcinfol scluster <cluster_name>
```

where *<cluster_name>* is the name of the cluster.

The cluster code level is listed in the code level field. In the following example, cluster `rc-cluster-8` is running at code level 1.1.1.0:

```
IBM_2145:your_cluster_name:admin>svcinfol scluster rc-cluster-8
id 000002006160EDCC
name rc-cluster-8
location local
partnership
bandwidth
cluster_IP_address 9.20.168.48
cluster_service_IP_address 0.0.0.0
total_mdisk_capacity 9.1GB
space_in_mdisk_grps 0
space_allocated_to_vdisks 0
total_free_space 9.1GB
statistics_status off
statistics_frequency 15
required_memory 4096
cluster_locale en_US
SNMP_setting none
SNMP_community
SNMP_server_IP_address 0.0.0.0
subnet_mask 255.255.255.0
default_gateway 9.20.168.1
time_zone 522 UTC
email_setting none
email_id
code_level 1.1.1.0 (build 0.28.0310210000)
FC_port_speed 2GB
console_IP 9.20.247.77:9080
id_alias 000002005FC0EDCC
```

Related tasks

“Recovering from software installation failures” on page 92
During the automatic software installation process, the installation process might stop if certain conditions occur.

Obtaining the SAN Volume Controller software packages

You must obtain software packages from the SAN Volume Controller Web site. Before you retrieve the software package, determine the type of packs and format that you need.

To obtain a revised software package, access the following site to download the type of software package that you need:

<http://www.ibm.com/storage/support/2145>

The software packages are available as full packages and as upgrade packages. The upgrade package contains only the software components that have been replaced since the previous software version. The full package contains all the software packages for that software version. The packages can be downloaded as either the install image file or as a CD image file.

It might be necessary to replace the operating system software, as well as the SAN Volume Controller application software, for some upgrades. When both packages have to be installed, they are supplied separately. Both packages must be copied to the SAN Volume Controller before the application software is applied.

The install image files can be installed directly on the SAN Volume Controller. The CD image format is suitable for creating a standard ISO format CD that contains the install image file if it is necessary to deliver a CD to the customer site. Software upgrades can only be performed in a strict order. The rules for upgrading from any given version to the latest version are also provided on the Web site.

Related tasks

“Determining the version of the SAN Volume Controller software” on page 90
The current software version can be obtained from the node or cluster vital product data (VPD).

“Recovering from software installation failures” on page 92
During the automatic software installation process, the installation process might stop if certain conditions occur.

Installing or upgrading the SAN Volume Controller software

The SAN Volume Controller software can be installed or upgraded after you download the software package from the SAN Volume Controller Web site.

Software package

The software installation or upgrade procedure copies the new software level to the cluster and starts an automatic installation process. During the installation process, each node is restarted. While each node restarts, there might be some degradation in the maximum I/O rate that can be sustained by the cluster. The amount of time that is needed to install or upgrade the software is dependent on the size of the cluster and the size of the software update package. The size of the software update package is determined by the number of components that are being replaced. After all the nodes in the cluster are successfully restarted with the new software level, the new software level is automatically committed.

Installation operation

The installation operation can normally be performed concurrently with normal user I/O operations. If any restrictions apply to the operations that can be performed during the upgrade, these restrictions are documented on the SAN Volume Controller Web site that you use to download the software packages. During the software upgrade procedure, only the following SAN Volume Controller commands are operational from the time the install process starts to the time that the new software level is committed, or until the process has been backed-out. All other commands fail with a message that indicates a software upgrade is in progress.

- All `svcinfo` commands
- `svctask rmnode`

To determine when your software upgrade process has completed, you will be notified through the SAN Volume Controller Console or, if you are using the command-line interface, examine the error log.

Because of the operational limitations that occur during the software upgrade process, the software installation is a user task.

Related tasks

“Determining the version of the SAN Volume Controller software” on page 90
The current software version can be obtained from the node or cluster vital product data (VPD).

“Obtaining the SAN Volume Controller software packages” on page 91
You must obtain software packages from the SAN Volume Controller Web site. Before you retrieve the software package, determine the type of packs and format that you need.

“Recovering from software installation failures”

During the automatic software installation process, the installation process might stop if certain conditions occur.

Recovering from software installation failures

During the automatic software installation process, the installation process might stop if certain conditions occur.

If any node failure is detected or if there is a loss of power to the cluster, the installation process is automatically stopped. The upgrade process will then idle until the failed node is repaired and restored to the cluster, and the user issues an upgrade abort command. When these tasks are completed, an automatic cleanup process starts and returns the cluster software to the pre-installation state. If you choose to force the upgrade abort *before* the node is repaired, there is a possibility that some I/O access might be lost while the partner node of the failed node is downgraded. While an upgrade is in process, the directed maintenance procedures cannot be used.

Perform the following steps to recover from software installation failures:

1. Resolve any hardware errors in the cluster.
2. Wait for the cleanup process to complete, which is signalled by a message in the event log (this might take up to four hours for an eight-node cluster).
3. Restart the software installation.

Related tasks

“Determining the version of the SAN Volume Controller software” on page 90
The current software version can be obtained from the node or cluster vital product data (VPD).

Replacing a version of the software

You might need to remove a version of software to replace it with a previous version.

You can only replace versions of software by previous versions if the major number in the software version has not changed. If the major number in the software version has changed, contact the IBM Support Center before proceeding.

Note: The software version number is in the format *x.y.z* where *x* is a version release number, *y* is a major number, and *z* is a minor number. For example, version number 1.2.3 has a version release number of 1, a major number of 2, and a minor number of 3. This number determines whether software versions can revert to the previous version. It is not possible to revert a version of software to a version that has a lower major number. For example, if version 1.2.3 is running on the cluster, it can be replaced with version 1.2.2 or 1.2.1 but it cannot be replaced with version 1.1.6.

Perform the following steps to replace the current version of your software with a previous version:

1. Determine the current level of the software.
2. Determine whether the major number in the current level of the software has changed.
 - If the major number in the current level of the software has not changed, you can replace it with a previous version of the software using the normal software upgrade procedures.
 - If the major number in the current level of the software has changed (has a lower major number), contact your IBM Support Center.

Related tasks

“Determining the version of the SAN Volume Controller software” on page 90
The current software version can be obtained from the node or cluster vital product data (VPD).

“Obtaining the SAN Volume Controller software packages” on page 91
You must obtain software packages from the SAN Volume Controller Web site. Before you retrieve the software package, determine the type of packs and format that you need.

“Recovering from software installation failures” on page 92
During the automatic software installation process, the installation process might stop if certain conditions occur.

Chapter 5. Introducing the vital product data

Vital product data (VPD) is information that uniquely defines each element in the SAN Volume Controller.

Prerequisites

The VPD for the SAN Volume Controller is maintained at the cluster level. For each SAN Volume Controller node, the VPD includes the following items:

- Installed software version
- Details of the hardware configuration
- Levels of the hardware
- FRU part numbers
- FRU microcode levels
- Firmware and software component levels
- VPD for the uninterruptible power supply that is powering the node
- Committed software level
- Details of the cluster configuration

You can view the VPD through the SAN Volume Controller graphical user interface or command-line interface. VPD is updated when a cluster is initialized (powered on), a new node is added to the cluster, or a missing node is reconfigured into the cluster.

See the related topic about node VPD for information about the fields for the system board, processor, processor cache, memory module, fibre-channel adapter card, SCSI and IDE devices, software, front panel assembly, and uninterruptible power supply. See the related topic about cluster VPD for information about the fields for the cluster.

Displaying the vital product data

You can use the command-line interface (CLI) to display the SAN Volume Controller cluster or node vital product data (VPD).

Issue the following CLI commands to display the VPD:

```
svcinfo lsnodevpd nodename  
svcinfo lscluster name
```

Note: If you use the SAN Volume Controller 2145-8F4, the output generated from issuing the `svcinfo lsnodevpd nodename` command contains "N/A" for the `device_serial_number` field.

For more information about the commands, see the *IBM System Storage SAN Volume Controller: Command-Line Interface User's Guide*.

See the related topic for information about displaying the vital product data from the SAN Volume Controller Console.

Related tasks

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

Understanding the fields for the node VPD

You must be aware of the fields for the node vital product data (VPD).

Table 4 shows the fields you see for the system board.

Table 4. Fields for the system board

Item	Field name
System board	Part number
	System serial number
	Number of processors
	Number of memory slots
	Number of fans
	Number of fibre-channel cards
	Number of SCSI or IDE devices Note: The service controller is a device.
	BIOS manufacturer
	BIOS version
	BIOS release date
	System manufacturer
	System product
	Planar manufacturer
	Power supply part number
	CMOS battery part number
Power cable assembly part number	
Service processor FW	

Table 5 shows the fields you see for each processor that is installed.

Table 5. Fields for the processors

Item	Field name
Processor	Part number
	Processor location
	Number of caches
	Manufacturer
	Version
	Speed
	Status

Table 6 on page 97 shows the fields that are repeated for each cache installed on each processor.

Table 6. Fields that are repeated for cache installed on each processor

Item	Field name
Processor cache	Type of cache
	Size of cache (KB)

Table 7 shows the fields that you see for each fan that is installed.

Table 7. Fields for the fans

Item	Field name
Fan	Part number
	Location

Table 8 shows the fields that are repeated for each installed memory module.

Table 8. Fields that are repeated for each installed memory module

Item	Field name
Memory module	Part number
	Device location
	Bank location
	Size (MB)

Table 9 shows the fields that are repeated for each installed fibre-channel adapter card.

Table 9. Fields that are repeated for each fibre-channel adapter card that is installed

Item	Field name
Fibre adapter card	Part number
	Port numbers
	Device serial number
	Manufacturer
	Device

Table 10 on page 98 shows the fields that are repeated for each SCSI and IDE device that is installed.

Table 10. Fields that are repeated for each SCSI and IDE device that is installed

Item	Field name
Device	Part number
	Bus
	Device
	Device vendor Note: Not provided for the service controller.
	Model
	Revision
	Serial number
	Approximate capacity

Table 11 shows the fields that are specific to the node software.

Table 11. Fields that are specific to the node software

Item	Field name
Software	Code level
	Node name
	Ethernet status
	Worldwide Node Name
	ID
	MAC address

Table 12 shows the fields that are provided for the front panel.

Table 12. Fields that are provided for the front panel

Item	Field name
Front panel	Part number
	Front panel ID
	Front panel locale

Table 13 on page 99 shows the fields that are provided for the uninterruptible power supply (UPS) assembly that is powering the node.

Table 13. Fields that are provided for the UPS assembly that is powering the node

Item	Field name
UPS	Electronics assembly part number
	Battery part number
	UPS assembly part number
	Input power cable part number
	UPS serial number
	UPS type
	UPS internal part number
	UPS unique ID
	UPS main firmware
	UPS communications firmware

Related reference

“Understanding the fields for the cluster VPD”

You must be aware of the fields for the cluster vital product data (VPD).

Understanding the fields for the cluster VPD

You must be aware of the fields for the cluster vital product data (VPD).

Table 14 shows the fields that are provided for the cluster.

Table 14. Fields that are provided for the cluster

Item	Field name
Cluster	ID Note: This is the unique identifier for the cluster.
	Name
	Location
	Partnership
	Bandwidth
	Cluster IP address
	Cluster service IP address
	Total mdisk capacity
	Space in mdisk_grps
	Space allocated to VDIs
	Total free space
	Statistics status
	Statistics frequency
	Required memory
	Cluster locale
	SNMP setting
	SNMP community
SNMP service IP address	

Table 14. Fields that are provided for the cluster (continued)

Item	Field name
	Subnet mask
	Default gateway
	Time zone
	Email Setting Note: This field is no longer used and will always be blank.
	Email ID Note: This field is no longer used and will always be blank.
	Code level
	Fibre-channel port speed Note: This field represents the speed at which nodes in the cluster that are not capable of speed negotiation will run. A SAN Volume Controller 2145-8G4 or SAN Volume Controller 2145-8F4 node that is capable of speed negotiation will not necessarily run at the speed value that is indicated in this field.
	Console IP
	ID Alias
	Global Mirror link tolerance
	Global Mirror intercluster delay simulation
	Global Mirror intracluster delay simulation
	Email server
	Email server port
	Email reply
	Email contact
	Email contact primary
	Email contact alternate
	Email contact location
	Email state
	Email user count
	Inventory mail interval

Related reference

“Understanding the fields for the node VPD” on page 96
 You must be aware of the fields for the node vital product data (VPD).

Chapter 6. Using the front panel of the SAN Volume Controller

The front panel of the SAN Volume Controller displays indicators and switches that are useful when servicing your SAN Volume Controller.

See the related topics for the SAN Volume Controller indicators and switches.

Boot progress indicator

Boot progress is displayed on the front panel of the SAN Volume Controller.

The Boot progress display on the front panel shows that the node is starting.



During the boot operation, boot progress codes are displayed and the progress bar moves to the right while the boot operation proceeds.

Boot failed

If the boot operation fails, a boot code is displayed.



See the topic that contains the boot codes in the *IBM System Storage SAN Volume Controller: Service Guide* where you can find a description of the failure and the appropriate steps that you must perform to correct the failure.

Related information

“Understanding the boot codes” on page 133

The boot codes are displayed on the screen when a node is booting.

Charging

The front panel indicates that the uninterruptible power supply (UPS) battery is charging.



A node will not start and join a cluster if there is insufficient power in the UPS battery to cope with a power failure. Charging is displayed until it is safe to start the node. This might take several hours.

Hardware boot

The hardware boot display shows system data when power is first applied to the node as the node searches for a disk drive to boot.



If this display remains active for longer than 3 minutes, there might be a problem. The cause might be a hardware failure or the software on the hard disk drive is missing or damaged. Refer to the topic on determining a hardware boot failure.

Related tasks

“Determining a hardware boot failure” on page 133

If you see that the hardware boot display stays on the front panel for more than three minutes, the node cannot boot. The cause might be a hardware failure or the software on the hard disk drive is missing or damaged.

Node rescue request

If software is lost, you can use the node rescue process to copy all software from another node.

The node-rescue-request display shows that a request has been made to exchange the software on this node. The SAN Volume Controller software is preinstalled on all SAN Volume Controller nodes. This software includes the operating system, the application software, and the SAN Volume Controller publications. It is normally not necessary to replace the software on a node, but if the software is lost for some reason (if the hard disk drive in the node fails), it is possible to copy all the software from another node connected to the same fibre-channel fabric. This process is known as node rescue.



Power failure

The SAN Volume Controller runs on battery power when main power is lost.

The Power failure display shows that the SAN Volume Controller is running on battery power because main power has been lost. All I/O operations have stopped. The node is saving cluster metadata and node cache data to the internal disk drive. When the progress bar reaches zero, the node powers off.

Note: When input power is restored to the uninterruptible power supply, the SAN Volume Controller turns on without the front panel power button being pressed.



Powering off

The progress bar on the display shows the progress of the power-off operation.

The Powering-off display shows that the power button has been pressed and the node is powering off. Powering off might take several minutes.



The progress bar moves to the left when the power is removed.

Recovering

The front panel indicates that the uninterruptible power supply (UPS) battery is not fully charged.



When a node is active in a cluster but the UPS battery is not fully charged, Recovering is displayed. If the power fails while this message is displayed, the node does not restart until the UPS has charged to a level where it can sustain a second power failure.

Restarting

The front panel indicates when the software on a node is restarting.



The software is restarting for one of the following reasons:

- An internal error was detected
- A power-off operation ended when the power button was pressed again while the node was powering off

If a power-off operation was ended, the progress bar continues to move to the left until the node finishes saving its data. After the data is saved, the progress bar moves to the right during the restart operation.

Shutting down

The front panel indicator tracks shutdown operations.

The Shutting down display is shown when you issue a shutdown command to a SAN Volume Controller cluster or a SAN Volume Controller node. The progress bar continues to move to the left until it is safe to be powered off.

When the shutdown operation is complete, all power is removed from the node. When power is removed from the last node that is connected to a 2145 uninterruptible power supply (2145 UPS), the 2145 UPS also shuts down. When a node that is connected to a 2145 uninterruptible power supply-1U (2145 UPS-1U) is shut down, the 2145 UPS-1U remains in the normal mode.



Error codes

Error codes are displayed on the front panel display.

For descriptions of the error codes that are displayed on the front panel display, see the various error code topics for a full description of the failure and the actions that you must perform to correct the failure.

Related reference

“Understanding the error log” on page 118

The SAN Volume Controller error log contains both error and event data.

SAN Volume Controller menu options

Menu options are available on the front panel display on the SAN Volume Controller.

Menu options enable you to review the operational status of the cluster, node, and external interfaces. They also provide access to the tools that you need to install and service the node.

Figure 29 on page 105 shows the sequence of the menu options. Only one option at a time is displayed on the front panel display. For some options, additional data is displayed on line 2. The first option displayed is the cluster option.

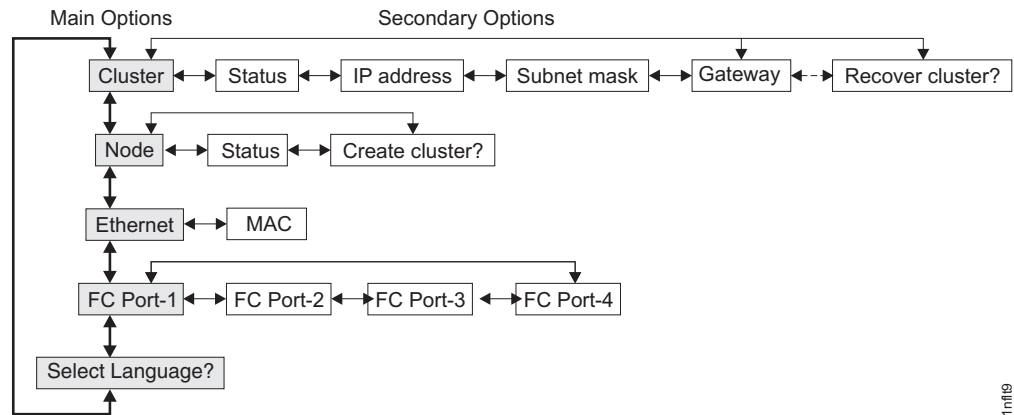


Figure 29. Menu options sequence

Use the Left and Right buttons to navigate through the secondary fields that are associated with some of the main fields.

Note: Messages might not display fully on the screen. You might see a right angle bracket (>) on the right-hand side of the display screen. If you see a right angle bracket, press the Right arrow button to scroll through the display. This action displays the rest of the text. Press the Left arrow button to scroll back. When there is no more text to display, you can move to the next item in the menu by pressing the Right arrow button.

There are five main options available:

- Cluster
- Node
- Ethernet
- FC port-1 through 4
- Select language

Related reference

“Create cluster menu navigation” on page 114

The Create cluster menu is accessed through the SAN Volume Controller default menu.

Cluster options

The main cluster option from the menu can display the cluster name, IP address, or can be blank.

The main cluster option displays the cluster name that the user has assigned. If no name has been assigned, the IP address of the cluster is displayed. If this SAN Volume Controller is not assigned to a cluster, the field is blank.

Related reference

“Recover cluster navigation” on page 112

The Recover cluster menu is accessed through the SAN Volume Controller default menu.

Status

Status is indicated on the front panel.

This field is blank if this SAN Volume Controller node is not a member of a cluster. If this SAN Volume Controller node is a member of a cluster, the field indicates the operational status of the cluster, as follows:

Active

- Indicates that this SAN Volume Controller node is an active member of the cluster.

Inactive

- Indicates that the SAN Volume Controller node is a member of a cluster, but is not now operational. It is not operational because the other SAN Volume Controller nodes that are in the cluster cannot be accessed or because this SAN Volume Controller node was excluded from the cluster.

Degraded

- Indicates that the cluster is operational, but one or more of the member SAN Volume Controller nodes are missing or have failed.

IP address

The IP address is used to access the cluster from the command line tools or Web browser.

This field contains the existing Ethernet IP address of the cluster. It is set during the create-cluster operation. You use this address to access the cluster from the command line tools or from a Web browser. If this SAN Volume Controller is not a member of a cluster, this field is blank.

Subnet mask

The subnet mask address is set when a cluster is created.

The subnet mask option displays the subnet mask address. It is set during the create-cluster operation.

Related reference

“Gateway”

The gateway address is set when the cluster is created.

Gateway

The gateway address is set when the cluster is created.

The gateway option displays the gateway address.

Related concepts

“Subnet mask”

The subnet mask address is set when a cluster is created.

Node options

The node option displays the identification number or name of the SAN Volume Controller.

The main node option displays the identification number of the SAN Volume Controller or the name of the SAN Volume Controller if the user has assigned a name.

Related concepts

“Hardware boot” on page 102

The hardware boot display shows system data when power is first applied to the node as the node searches for a disk drive to boot.

Related reference

“Node identification label” on page 36

The node identification label on the front panel displays a six-digit node identification number.

“Cluster identification” on page 71

A SAN Volume Controller cluster is identified by its IP address.

“Create cluster menu navigation” on page 114

The Create cluster menu is accessed through the SAN Volume Controller default menu.

Status

Use the status to diagnose cluster failures.

Active

- The SAN Volume Controller is operational and assigned to a cluster. It has access to the fibre-channel fabric.

Inactive

- The SAN Volume Controller is operational and assigned to a cluster. It has no access to the fibre-channel fabric.

Free

- The SAN Volume Controller is operational, but has not been assigned to any cluster. It has access to the fibre-channel fabric.

Disconnected

- The SAN Volume Controller is operational, but has not been assigned to any cluster. It has no access to the fibre-channel fabric.

Failed

- The SAN Volume Controller is not operational. A hardware fault is preventing the SAN Volume Controller from being part of a cluster.

Create cluster?

Clusters can be created from the Create Cluster menu.

The Create cluster? field allows you to create a new SAN Volume Controller cluster. Press the select button to go to the create cluster menu. Figure 30 on page 108 shows the create cluster menu sequence.

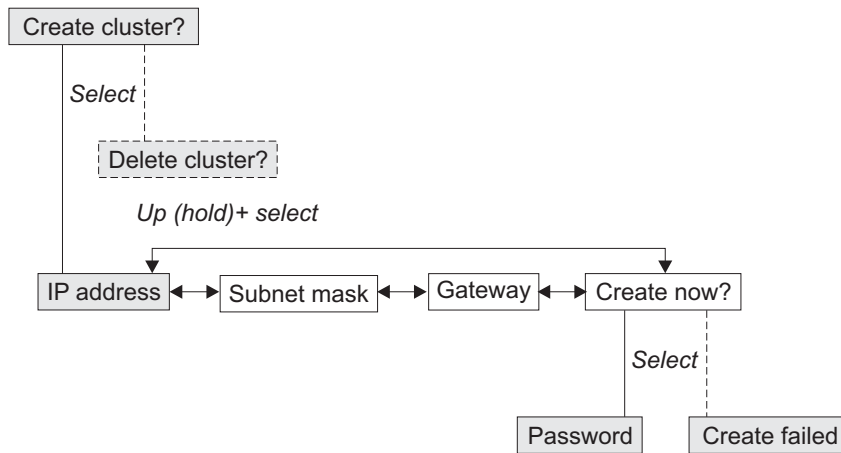


Figure 30. Create cluster? menu sequence

Press the left and right buttons to navigate through the secondary options that are associated with the Create cluster? option. When you have navigated to the desired option, press the select button. The secondary options available include:

- IP address
- Subnet mask
- Gateway
- Create now?

IP address

The IP address lets you display or change the Ethernet IP address for the cluster that you are going to create. Be sure to verify the correct IP address with the customer before you create a cluster.

Attention: If you change the IP address, ensure that you type the correct address. Otherwise, you cannot access the cluster using the command line tools or a Web browser.

Perform the following steps to change the IP address:

1. From the Create Cluster? option, press the select button. The IP address option is displayed.
2. Press the select button again. The first IP address number is highlighted.
3. Press the up button if you want to increase the value that is displayed; press the down button if you want to decrease that value. If you want to quickly increase the highlighted value, hold the up button. If you want to quickly decrease the highlighted value, hold the down button.

Note: If you want to disable the fast increase/decrease function, press and hold the down button, press and release the select button, and then release the down button. The disabling of the fast increase/decrease function lasts until cluster creation is completed or until the feature is again enabled. If the up or down buttons are pressed and held while the function is disabled, the value increases or decreases once every two seconds. To again enable the fast increase/decrease function, press and hold the up button, press and release the select button, and then release the up button.

4. Press the right or left buttons to move to the number field that you want to update.
5. Repeat steps 3 on page 108 and 4 for each number field that you want to update.
6. Press the select button to complete the change.

Press the right button to display the next secondary option or the left button to display the previous options.

Subnet Mask

This option lets you display or change the subnet mask.

Attention: If you change the subnet mask address, ensure that you type the correct address. Otherwise, you cannot access the cluster using the command line tools or a Web browser.

Perform the following steps to change the subnet mask:

1. Press the select button. The first subnet mask number is displayed.
2. Press the up button if you want to increase the value that is displayed; press the down button if you want to decrease that value. If you want to quickly increase the highlighted value, hold the up button. If you want to quickly decrease the highlighted value, hold the down button.

Note: If you want to disable the fast increase/decrease function, press and hold the down button, press and release the select button, and then release the down button. The disabling of the fast increase/decrease function lasts until cluster creation is completed or until the feature is again enabled. If the up or down buttons are pressed and held while the function is disabled, the value increases or decreases once every two seconds. To again enable the fast increase/decrease function, press and hold the up button, press and release the select button, and then release the up button.

3. Press the right or left buttons to move to the number field that you want to update.
4. Repeat steps 2 and 3 for each number field that you want to update.
5. Press the select button to complete the change.

Gateway

Attention: If you change the gateway address, ensure that you type the correct address. Otherwise, you cannot access the cluster from the Web interface or from a command line.

Perform the following steps to change the gateway address:

1. Press the select button. The first gateway address number field is highlighted.
2. Press the up button if you want to increase the value that is displayed; press the down button if you want to decrease that value. If you want to quickly increase the highlighted value, hold the up button. If you want to quickly decrease the highlighted value, hold the down button.

Note: If you want to disable the fast increase/decrease function, press and hold the down button, press and release the select button, and then release the down button. The disabling of the fast increase/decrease function

lasts until cluster creation is completed or until the feature is again enabled. If the up or down buttons are pressed and held while the function is disabled, the value increases or decreases once every two seconds. To again enable the fast increase/decrease function, press and hold the up button, press and release the select button, and then release the up button.

3. Press the right or left buttons to move to the number field that you want to update.
4. Repeat steps 2 on page 109 and 3 for each number field that you want to update.
5. Press the select button to complete the change.

Create Now?

This option lets you start an operation to create a cluster. Press the select button to start the operation.

If the create operation is successful, Password is displayed on line 1. The password that you can use to access the cluster is displayed on line 2. Be sure to immediately record the password; it is required on the first attempt to access the cluster.

Attention: The password displays for only 60 seconds, or until a front panel button is pressed. The cluster is created only after the password display is cleared.

If the create operation fails, Create Failed: is displayed on line 1 of the service display screen. Line 2 displays one of two possible error codes that you can use to isolate the cause of the failure.

Press the up button to return to the Create Cluster? option.

Delete Cluster?

The field for Delete Cluster? is displayed only if you select Create Cluster? on a SAN Volume Controller that is already a member of a cluster. Normally, you can use the command-line interface (CLI) or the graphical user interface (GUI) to delete a cluster. However, if you cannot use the CLI or GUI, you can use Delete Cluster to force the deletion of a node from a cluster. Perform the following steps to delete a node from the cluster:

1. Press and hold the up button.
2. Press and release the select button.
3. Release the up button.

The SAN Volume Controller is deleted from the cluster and the node is restarted. The display then returns to the default menu. The create cluster option must be selected again to start the create option.

Use the up button to return to the Create Cluster? option.

Ethernet option

The Ethernet option displays the operational states of the Ethernet port and its media access control (MAC) address.

When a cluster is created, only one node's Ethernet port becomes active for cluster configuration. If the node which has the active port fails, then another node in the cluster opens its Ethernet port and gains configuration access to that cluster.

Active The cluster is accessible through this port.

Inactive

The port is operational, but it cannot access the cluster. This port can be used to access the cluster if the cluster's active port fails.

Failed The port is not operational.

Press the right button to display the MAC address of the Ethernet port.

Fibre channel port-1 through 4 option

The fibre channel port-1 through 4 options display the operational status of the fibre-channel ports.

Active The port is operational and can access the fibre-channel fabric.

Inactive

The port is operational but cannot access the fibre-channel fabric. One of the following conditions caused this result:

- The fibre-channel cable has failed
- The fibre-channel cable is not installed
- The device that is at the other end of the cable has failed

Failed The port is not operational because of a hardware failure.

Not installed

This port is not installed.

To display the current fibre-channel port speed, press and hold the down button, press and release the select button, and release the down button. For the SAN Volume Controller 2145-4F2 or the SAN Volume Controller 2145-8F2, this action also allows you to change the fibre-channel port speed of a node that is not participating in a cluster, by pressing the up or down buttons.

Select language? option

The language displayed can be changed from the menu.

The Select language? option allows you to change the language that is displayed on the menu. Figure 31 shows the Select language? option sequence.

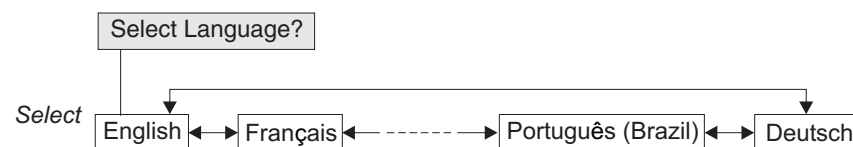


Figure 31. Select language? menu sequence

Press the right button to display the language that you want. When the required language is displayed, press the select button.

Note: Line 1 of the menu displays an option. For some options, additional data is displayed on line 2. If, the front panel is set to Japanese, Korean, or Chinese,

the menu shows only line 1. To display line 2, press the select button. To return to the option on line 1, press the select button again.

The following languages are available:

- English
- French
- German
- Italian
- Japanese
- Korean
- Portuguese
- Spanish
- Chinese (simplified)
- Chinese (traditional)

If you do not understand the language that is displayed, wait for at least 60 seconds for the menu to reset to the default option. To select the required language, perform the following steps:

1. Press the up button once.
2. Press the select button once. If the display changes, go to step 5.
3. Press the up button once.
4. Press the select button once.
5. Press the right button until your required language is displayed.
6. Press the select button.

Note: This procedure does not work if the node is displaying a boot error.

Recover cluster navigation

The Recover cluster menu is accessed through the SAN Volume Controller default menu.

Use the recover cluster option (see Figure 32) if the user has lost the administrator password or if the user is unable to access the cluster. If it is permitted by the user's password security policy, use this selection to reset the administrator password. Alternatively, use this selection to set the node into service mode. This makes the node available through the service IP address.

Select **Service Access** by pressing the select button after you access the Recover Cluster? menu.

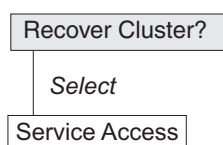


Figure 32. Recover cluster navigation

Resetting the password

To reset the administrator password on the cluster, complete the following steps from the Service Access? menu:

1. Press and hold the up button.

2. Press and release the select button.
3. Release the up button.

If your password security policy permits password recovery and if the node is currently a member of a cluster, the administrator password is reset and a new password is displayed for 60 seconds. If your password security policy does not permit password recovery or the node is not a member of a cluster, completing these steps has no effect.

Setting service mode

1. This function is capable of degrading the operation of a working cluster. Use it only to recover from a problem that is making the cluster inaccessible.
2. All SAN Volume Controllers share the same Service IP address. Set only one SAN Volume Controller at a time on the LAN in service mode. Setting more than one SAN Volume Controller in service mode might result in a LAN failure.

Important: Your cluster can use a fixed address for its service mode IP address. If you do use a fixed address for your service mode IP address, only one-node-at-a-time can be in service mode.

To set service mode, complete the following steps from the Service Access? menu:

1. Press and hold the down button.
2. Press and release the select button.
3. Release the down button.

The node restarts and service mode is enabled. **Service Address:** is displayed on the first line of the screen, and the current service IP address is displayed on line 2. The node can be accessed using this address. The service address continues to be displayed on the front panel until service mode is reset by a command sent to the service IP address, or until the power to the node is turned off and on.

Note: If you are using the service mode, you need only do this on one node at a time. Be sure to disable service mode before continuing on to other nodes.

Service IP address

You can access the service mode with the SAN Volume Controller application using the following Web address, where *serviceipaddress* is the IP address on the front panel display:

`https://serviceipaddress`

The service IP address is displayed while service access is enabled. The service IP address should have been correctly set during cluster configuration. If service IP address selection is set for DHCP, the front panel display will show 0.0.0.0 while the node attempts to obtain a DHCP address. It will change automatically when a DHCP address is allocated and activated, or remain at 0.0.0.0 if a DHCP address was not allocated.

If the service IP address was not set correctly or a DHCP address was not allocated, then you have the option of correcting the IP address from this panel. Note that the service IP address must be in the same subnet as the cluster IP address.

To set a specific service mode IP address while the Service Address: panel is displayed, perform the following steps:

1. Press and hold the down button.
2. Press and release the select button.
3. Release the down button. The network address based on the cluster IP configuration is displayed as a starting point for a new service IP address.
4. Press and release the select button. The address change menu is displayed. Use the left and right buttons to navigate between the fields. If you want to quickly increase the highlighted value, hold the up button. If you want to quickly decrease the highlighted value, hold the down button.

Note: If you want to disable the fast increase/decrease function, press and hold the down button, press and release the select button, and then release the down button. The disabling of the fast increase/decrease function lasts until you have set the Service Mode IP address or until you again enable the feature. If you press and hold the up or down buttons while the function is disabled, the value increases or decreases once every two seconds. To again enable fast increase/decrease, press and hold the up button, press and release the select button, and then release the up button.

5. Press select to set the IP address to the required value.
6. Press the left or right button to activate the new address.

The Service Address: panel is displayed. The new service IP address is not displayed until it has become active. If the new address has not been displayed after two minutes, check that the selected address is valid on the subnetwork and that the Ethernet switch is working correctly.

To set the service IP address to use DHCP while the Service Address: panel is displayed, perform the following steps:

1. Press and hold the up button.
2. Press and release the select button.
3. Release the up button. The display will show 0.0.0.0 while the node attempts to obtain a DHCP address. It will change automatically when a DHCP address is allocated and activated, or it will remain at 0.0.0.0 if a DHCP address was not allocated.

The service IP address is displayed continuously while the node remains in service mode. You can exit service mode through the Web browser, the CLI, or by turning the node off and on.

Related concepts

“SAN Volume Controller menu options” on page 104

Menu options are available on the front panel display on the SAN Volume Controller.

Create cluster menu navigation

The Create cluster menu is accessed through the SAN Volume Controller default menu.

Figure 33 on page 115 shows the create cluster menu sequence. Only one field at a time can be displayed on the menu screen. The arrows show the sequences that wrap automatically.

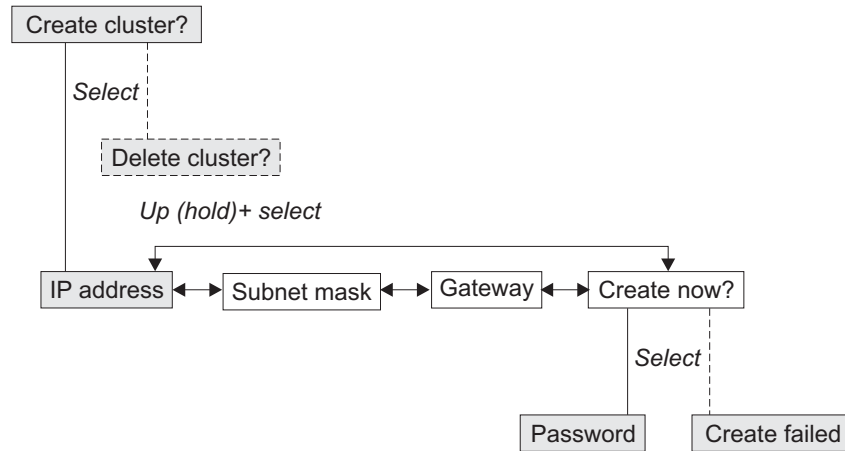


Figure 33. Create-cluster navigation menu sequence

Use the left and right buttons to navigate through the secondary fields that are associated with some of the main fields.

Related concepts

“SAN Volume Controller menu options” on page 104

Menu options are available on the front panel display on the SAN Volume Controller.

Deleting the cluster

The field for Delete Cluster is displayed only if you select **Create Cluster?** on a SAN Volume Controller that is already a member of a cluster.

Normally, you use the command-line interface (CLI) or the graphical user interface (GUI) to delete a cluster. However, if you cannot use the CLI or GUI, you can use Delete Cluster to force the deletion of a node from a cluster. To delete the node from the cluster, press and hold up, press and release select, and then release up. The SAN Volume Controller is deleted from the cluster and the node is restarted. The display returns to the default menu. The create cluster option must be selected again to start the create option.

Use the up and down buttons to return to the default menu.

Password

The password is displayed for only 60 seconds, or until you select the up, down, left, or right arrow button. You must have this password when you first attempt to access the cluster.

Create failed

If the create operation fails, Line 2 of the menu screen contains an error code that you can use to isolate the cause of the failure.

Related information

“Understanding the create cluster error codes” on page 174

Cluster Create error codes are displayed on the menu screen when you are using the front panel to create a new cluster, but the create operation fails.

Chapter 7. Diagnosing problems with the SAN Volume Controller, the uninterruptible power supply, and the master console

You can diagnose problems with SAN Volume Controller, the uninterruptible power supply, and the master console using either the command-line interface (CLI) or the SAN Volume Controller Console. For the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2 users, you can also use the light path diagnostics to help find the cause of errors.

Error logs

By understanding the error log, you can do the following:

- Manage the error log
- View the error log
- Describe the fields in the error log

Error codes

The error codes provide the information you need to do the following:

- Use the error code tables
- Define the FRU names
- Understand the cluster error codes
- Determine a hardware boot failure
- Understand the boot error codes
- Perform the node rescue
- Understand the node rescue error codes
- Understand the create cluster error codes
- Check the status of the node
- Mark errors as fixed
- Check the status of the node port
- List managed disks
- Understand managed disk status
- Include managed disks
- Understand managed disk mode
- Perform cluster discovery
- Understand managed disk group status
- Determine disk controller status

Related tasks

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

Related information

Appendix B, “Websphere and CIM Logging,” on page 545

You can obtain log files for the Websphere Application Server and the Common Information Model (CIM). Instructions are supplied in the following topics.

Understanding the error log

The SAN Volume Controller error log contains both error and event data.

Error data

Error data is logged when a failure condition is detected. When error data is logged, an error log analysis is performed to determine if the user should be notified of the condition.

Event data

Event data is logged when a configuration event has occurred.

Managing the error log

The error log has a limited size. After it is full, newer entries replace the oldest entries. If the old entry has not been fixed, it is not replaced by newer entries.

To avoid the possibility of an error condition causing the log to be flooded by a single error, some errors of the same type are recorded in the same space in the error log. When error log entries are coalesced in this way, the time stamp of the first occurrence and the last occurrence of the problem is saved in the log entry. A count of the number of times the error condition has occurred is also saved in the log entry. If a new entry is the same as one that you made more than 25 hours after the first entry, a new error record is opened.

Related tasks

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

Viewing the error log

You can view the error log by using the SAN Volume Controller command-line interface (CLI) or the SAN Volume Controller Console.

Perform the following steps to view the full contents of each error log entry using the CLI:

1. Issue the `svctask dumperrlog` command to create a dump file that contains the current error log data.
2. Issue the `svcinfo lserrlogdumps` command to determine the name of the dump file that you have just created.
3. Issue the `secure copy` command to copy the dump file to the master console.

You can then view the file with a text viewer.

Figure 34 on page 119 shows an example of an error log entry that might be displayed:

```

Error Log Entry 21
Node Identifier      : node3
Object Type         : adaptor
Object ID           : 1
Sequence Number     : 174
Root Sequence Number : 174
First Error Timestamp : Tue Aug 23 16:02:18 2005
                   : Epoch + 1051027338
Last Error Timestamp  : Tue Aug 23 16:02:18 2005
                   : Epoch + 1051027338
Error Count          : 1
Error ID             : 73003 : More/Less fibre channel ports operational
Error Code           : 1060 : Fibre Channel ports not operational
Status Flag          : UNFIXED
Type Flag            : ERROR CAT 1

02 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

Figure 34. Example of an error log entry when you use the command-line interface

You can also view the error log using the SAN Volume Controller Console. The error log contains a large number of entries, but by using this method of viewing the log you can select only the type of information that you need. For example, if you are repairing a fault, you might only want to select **Show unfixed errors**.

Figure 35 on page 120 shows an example of an error log summary that is displayed when you select the type of information that you want.

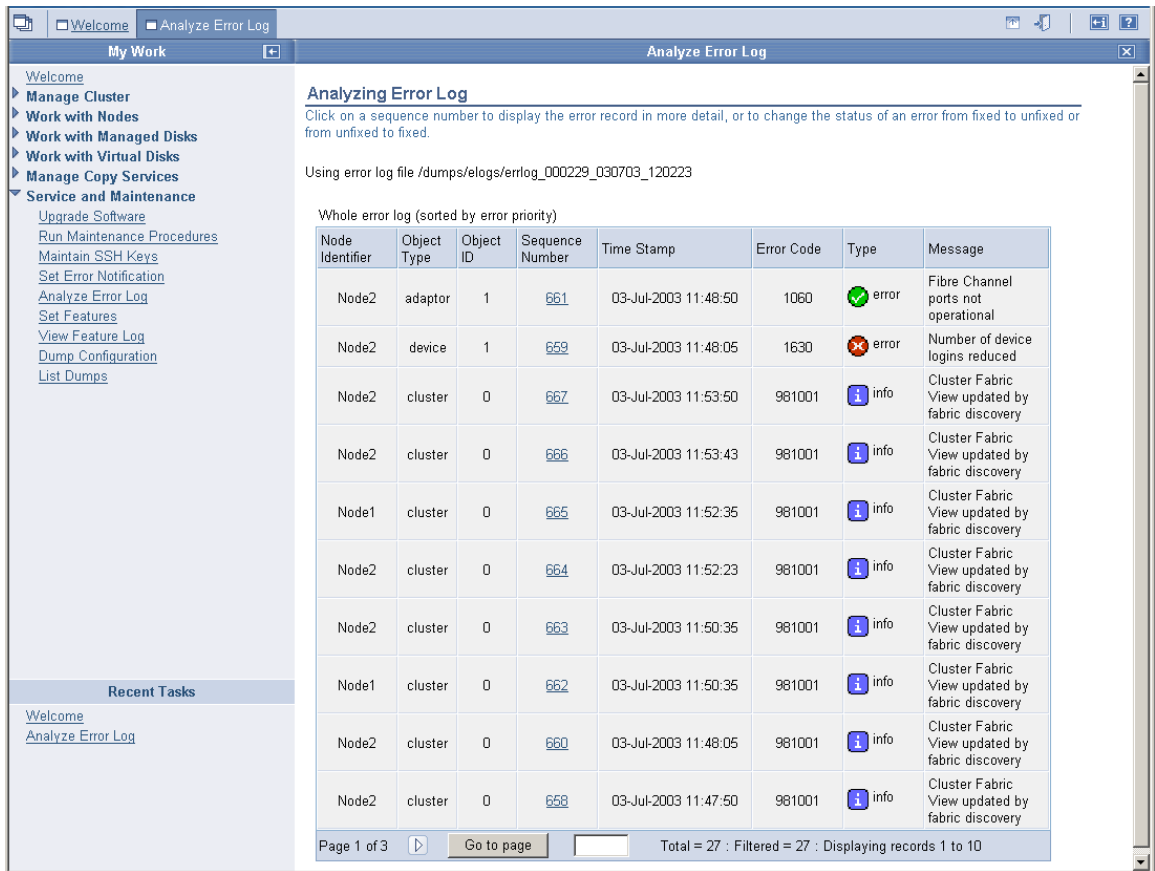




Figure 35. Example of an Error Log Summary

Details of each listed error can be displayed by clicking on the sequence number of any record. The Type field contains an icon and a text message to indicate the cause of the log entry. Table 15 describes the meaning of the information in the type field.

Table 15. Descriptions of Log Entry Icons

Icon	Description
	The Error icon indicates that this log entry requires service activity. Select Run Maintenance Procedures from the Service and Maintenance menu to start the repair activity.
	The Fixed icon indicates that a problem existed but has now been resolved. It might have been resolved as a result of service activity or it might have been resolved as a result of some other action, for example powering on a missing node.

Table 15. Descriptions of Log Entry Icons (continued)

Icon	Description
	The Warn icon indicates that some condition has occurred that might have been caused by a temporary problem or by a problem that is external to the SAN Volume Controller, such as an error in a RAID controller. If a specified number of these events occurs in 25 hours, the warning converts to an error. No service action is required on the SAN Volume Controller for this log entry.
	The Info icon indicates that the log entry provides information about a configuration change or the state of a command. In some cases, the SAN Volume Controller user might need to take some action based on this information.

Describing the fields in the error log

The error log includes fields with information you can use to diagnose problems.

Table 16 describes the fields you see when you use the command-line interface to produce an error log.

Table 16. Description of data fields for the error log

Data field	Description
Node identifier	The name of the node that created the error report.
Object type	The object type to which the error log relates. See Table 17 on page 122.
Object ID	A number that uniquely identifies the object on this node.
Sequence number	A sequentially assigned number that can be used to provide a cross reference to sense data returned to host systems.
Root sequence number	The sequence number of another log entry that enables all errors that have a single source to be marked as fixed by a single action.
First error timestamp	The time when the first instance of this error code was reported by this object type in the last 25 hours.
Last error timestamp	The time when the last instance of this error code was reported by this object type in the last 25 hours.
Error count	The number of times that this error code has been reported by this object in the last 25 hours.
Error ID	This number is a unique identifier for the error or event.
Error code	This number is used as the starting point for service procedures.
Status flag	For details of the status flag. See Table 18 on page 122.
Type flag	For details of the type flag. See Table 20 on page 123.

Table 16. Description of data fields for the error log (continued)

Data field	Description
Additional sense data	Data specific to this error or event code. This is a binary data record. When the error log is viewed using the command line tools, this data is shown in hex. When the data is viewed using the Web interface, this data is translated to ASCII characters on the right side of the page. You are not normally required to interpret this data as part of the service procedures. However, any procedures that do refer to the data describe the ASCII format.

Table 17 describes the types of error log objects.

Table 17. Description of object types and object IDs for the error log

Object type	Object ID
Node	Node ID
Fcgrp	Flash Copy consistency group number
Rcgrp	Metro Mirror consistency group number
Fcmap	Flash Copy MAP number
Rcmap	Metro Mirror MAP number
Cluster	Cluster name (shown in decimal)
Device	Device number
Mdisk	Managed disk number
Mdiskgrp	Managed disk group number

Table 18 shows the types of error log flags.

Note: Configuration Events have nothing in the flag field. Information Events only have the SNMP trap-raised flag on when configured to do so.

Table 18. Description of flags for the error log

Flag	Description
Unfixed	This log entry requires a service action.
Fixed	This entry is marked as fixed. It remains in the error log until it becomes the oldest record in the log, at which point it is overwritten by the next log entry.
Expired	The error log entry is over 25 hours old. Any new log entries of this error/event code for this object type produce a new log entry.
SNMP trap raised	An SNMP trap has been raised. SNMP traps are raised for unfixed errors and for information events.

Table 19 on page 123 shows the various combinations of flags that might be logged and the resulting status that is reported by the user interfaces.

Note: SNMP_TRAP_RAISED is independent of the other flags.

Table 19. Reported status for combinations of error-log status flags

UNFIXED	ERROR_FIXED	ERROR_EXPIRED	Reported Status
0	0	0	BELOW_THRESHOLD
0	0	1	EXPIRED
0	1	0	FIXED
0	1	1	<i>not possible</i>
1	0	0	UNFIXED
1	0	1	<i>not possible</i>
1	1	0	FIXED
1	1	1	<i>not possible</i>

Table 20 shows the types of error log flags.

Table 20. Description of types of error log flags

Flag	Description
Unknown error	This flag should never be seen. This flag can only result from a software defect.
Error Cat 1	These errors require a service action. A FRU or list of FRUs are included with the trap data sent with the error record.
Error Cat 2	These errors require a service action but more analysis is required before the service action or FRU can be identified.
Related error	These are errors that have a root cause that has been reported in another log entry. Marking the source error as fixed also marks this error as fixed.
Transient error	Errors flagged as transient have been recovered by an error recovery procedure.
Configuration event	This entry is from the Configuration Event log. This flag is useful when displaying both logs in a seamless display as an aid to relating logged error conditions to configuration events.
Information	This entry indicates that the log entry is an Information Event. Information events can be used to warn the user about an unexpected configuration result or prompt a user to initiate further configuration actions. This type of log entry causes an SNMP trap to be raised if requested by the user.

Related tasks

“Viewing the error log” on page 118

You can view the error log by using the SAN Volume Controller command-line interface (CLI) or the SAN Volume Controller Console.

Error reporting

Errors detected by the SAN Volume Controller are saved in an error log. As soon as an entry is made in this error log, the error condition is analyzed. If any service activity is required, the user is notified of the error.

Error reporting process

The following methods are used to notify the user and IBM service of a new error:

- The most serious cluster code is displayed on the front panel of each node in the cluster.
- If you enabled simple network management protocol (SNMP), a SNMP trap is sent to an SNMP manager that is configured by the customer.
The SNMP manager might be IBM Director, if it is installed, or another SNMP manager.
- If you enabled Call Home, critical faults are reported directly to IBM by e-mail..

Related tasks

“Using directed maintenance procedures” on page 63

You can use directed maintenance procedures (DMP) to diagnose and resolve problems with the SAN Volume Controller.

Related information

“Understanding cluster error codes” on page 175

Every cluster error code includes an error code number, a description, action, and possible field replaceable units (FRUs).

Sending notifications

The SAN Volume Controller can use SNMP traps, Call Home e-mail, and Inventory Information e-mail to provide necessary data and event notifications to you and to the IBM Support Center.

The following types of information are sent from the SAN Volume Controller:

- Simple Network Management Protocol (SNMP) traps
- Call Home e-mail
- Inventory information

Simple Network Management Protocol traps

Simple network management protocol (SNMP) is the standard protocol for managing networks and exchanging messages. SNMP enables the SAN Volume Controller to send external messages that notify personnel about an event. An SNMP manager allows you to view the messages that the SNMP agent sends. You can use the SAN Volume Controller Console or the SAN Volume Controller command-line interface to configure and modify your SNMP settings. SNMP traps and Call Home e-mail can be sent simultaneously.

Call Home e-mail

The Call Home feature allows the transmission of operational and error-related data to you and IBM through a Simple Mail Transfer Protocol (SMTP) server connection in the form of an event notification e-mail. This function alerts IBM service personnel about machine conditions or sends data for error analysis and resolution.

You must configure an SMTP server to be able to send e-mails outside of your local area network. The SMTP server must allow the relaying of e-mails from the SAN Volume Controller cluster IP address. You can then use the SAN Volume Controller Console or the SAN Volume Controller command-line interface to configure the e-mail settings, including contact information and e-mail recipients.

| For compatibility with other SMTP servers, ensure that you set the reply address to
| a valid e-mail address. Send a test e-mail to check that all connections and
| infrastructure are set up correctly. You can disable the Call Home function at any
| time using the SAN Volume Controller Console or the SAN Volume Controller
| command-line interface.

Call Home support is initiated for the following reasons or types of data:

- Problem or event notification: Data is sent when there is a problem or event that might require the attention of IBM service personnel.
- Communication tests: You can test for the successful installation and communication infrastructure.
- Inventory information: A notification is sent to provide the necessary status and hardware information to IBM service personnel.

Call Home e-mails can contain any combination of the following types of information:

- Contact name
- Contact phone number
- Offshift phone number
- Machine location
- Record type
- Machine type
- Machine serial number
- Error ID
- Error code
- Software version
- FRU part number
- Cluster name
- Node ID
- Error sequence number
- Timestamp
- Object type
- Object ID
- Problem data

Inventory information e-mail

Inventory information e-mail is a type of Call Home notification. Inventory information can be sent to IBM to assist IBM service personnel in evaluating your SAN Volume Controller system. Because inventory information is sent using the Call Home e-mail function, you must meet the Call Home function requirements and enable the Call Home e-mail function before you can attempt to send inventory information e-mail. You can adjust the contact information, adjust the frequency of inventory e-mail, or manually send an inventory e-mail using the SAN Volume Controller Console or the SAN Volume Controller command-line interface.

Inventory information that is sent to IBM can include the following information about the cluster on which the Call Home function is enabled:

- Timestamp

- Contact information, including name and phone number. This is initially set to the contact information that was set for the Call Home e-mail function. However, you can change the contact information specifically for inventory e-mail using the SAN Volume Controller Console or the **mkemailuser** or **chemailuser** CLI commands.
- Machine location. This is the machine location that is set for the Call Home e-mail function.
- Software level
- License information. This is the same information that it output from the **svcinfolicense** command.
- Cluster vital product data (VPD). The cluster VPD is the same information that is output from the **svcinfolcluster** command, including the following items:
 - Cluster name and IDs
 - Cluster location
 - Bandwidth
 - IP addresses
 - Memory capacities
 - SNMP settings
 - Time zone setting
 - E-mail settings
 - Microcode level
 - Fibre-channel port speed
- Node VPD for each node in the cluster. The node VPD is the same information that is output from the **svcinfolnodevpd** command, including the following items:
 - System part number
 - Number of various hardware parts, such as fans, processors, memory slots, fibre-channel cards, and SCSI/IDE devices
 - Part numbers of the various hardware parts
 - BIOS information
 - System manufacturing information, such as system product and manufacturer
 - Firmware level for the service processor
- Software VPD, including the following items:
 - Code level
 - Node name
 - Ethernet status
 - Worldwide node name (WWNN)
 - MAC address
- Processor information, including the following items for each processor:
 - Location of processor
 - Type of cache
 - Size of cache
 - Manufacturer
 - Version
 - Speed
 - Status (enabled or disabled)
- Memory information, including the following items:

- Part number
- Device location
- Bank location
- Size
- Fibre-channel card information, including the following items:
 - Part number
 - Port number
 - Device serial number
 - Manufacturer
- SCSI/IDE device information, including the following items:
 - Part number
 - Bus ID
 - Device ID
 - Model
 - Revision level
 - Serial number
 - Approximate capacity
- Front panel assembly information, including the following items:
 - Part number
 - ID
 - Location
- Universal power supply (UPS) information, including the following items:
 - Electronics part number
 - Battery part number
 - UPS assembly part number
 - Input power cable part number
 - UPS serial number
 - UPS type
 - UPS internal part number
 - ID
 - Firmware levels

Understanding the error codes

Error codes are generated for the SAN Volume Controller by the system error-log analysis and system configuration code.

Error codes help you to identify the cause of a problem, the failing field-replaceable units (FRUs), and the service actions that might be needed to solve the problem.

Note: If more than one error occurs during an operation, the highest priority error code displays on the front panel. The lower the number for the error code, the higher the priority. For example, cluster error code 1020 has a higher priority than cluster error code 1370.

Using the error code tables

The error code tables list the various error codes and describe the actions that you may take.

Perform the following steps to use the error code tables:

1. Locate the error code in one of the tables. If you cannot find a particular code in any table, call IBM Support Center for assistance.
2. Read about the action you must perform to correct the problem. Do not exchange field replaceable units (FRUs) unless you are instructed to do so.
3. Normally, exchange only one FRU at a time, starting from the top of the FRU list for that error code.

Related tasks

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

Chapter 9, “Removing and replacing parts,” on page 335

You can remove and replace field replaceable units (FRUs) from the SAN Volume Controller, redundant ac power switch, and uninterruptible power supply.

Definitions of the FRU names for the SAN Volume Controller

The glossaries for all SAN Volume Controllers are in this topic to provide you with all applicable field replaceable units (FRUs).

Glossary of FRU names for the SAN Volume Controller 2145-8G4

Name of FRU	Description
Frame assembly	A complete SAN Volume Controller 2145-8G4 with the exception of the fibre-channel cards and the service controller
4-port fibre-channel host bus adapter (HBA)	The SAN Volume Controller 2145-8G4 is connected to the fibre-channel fabric through the fibre-channel HBA, which is located in PCI slot 1.
Riser card, PCI Express	An interconnection card that provides the interface between the system board and the 4-port fibre-channel adapter.
Service controller	The FRU that provides the service functions and the front panel display and buttons.
Disk drive	A SATA (serial advanced technology attachment) disk drive for the SAN Volume Controller 2145-8G4
Disk drive cage assembly	A SATA disk drive cage assembly for the SAN Volume Controller 2145-8G4
SATA cable assembly	A SATA disk drive cable assembly with backplate

Name of FRU	Description
Memory module	A 1 GB ECC DRR2 memory module
Microprocessor	The dual core microprocessor with heat sink on the system board
Power supply assembly	An assembly that provides dc power to the SAN Volume Controller 2145-8G4
Power backplane	An assembly that provides a power interface between the system board and the power supply assembly
CMOS battery	A 3.0V battery on the system board that maintains power to backup the system BIOS settings
Front panel signal cable	A ribbon cable that connects the operator information panel to the system board
Operator information panel	The information panel that includes the power control button and the light path diagnostics LEDs
Fan assembly	A fan assembly containing two fans, which is used in all the fan positions
Input power cable assembly	The cable assembly that provides the power and signal connections between the SAN Volume Controller 2145-8G4 and the 2145 uninterruptible power supply-1U (2145 UPS-1U) assembly

Glossary of FRU names for the SAN Volume Controller 2145-8F4

Name of FRU	Header
Frame assembly	A complete SAN Volume Controller 2145-8F4 with the exception of the fibre-channel cards and the service controller
4-port fibre-channel host bus adapter (HBA)	The SAN Volume Controller 2145-8F4 is connected to the fibre-channel fabric through the fibre-channel HBA. The card assembly is located in PCI slot 2. It is not permitted to install a fibre-channel card in PCI slot 1 when the card is installed.
Riser card, PCI Express	An interconnection card that provides the interface between the system board and the 4-port fibre-channel adapter.
Service controller	The FRU that provides the service functions and the front panel display and buttons.
Disk drive assembly	A SATA (serial advanced technology attachment) disk drive assembly for the SAN Volume Controller 2145-8F4
Memory module	A 1 GB ECC DRR2 memory module
Microprocessor	The microprocessor on the system board
Voltage regulator module (VRM)	The VRM of the microprocessor
Power supply assembly	An assembly that provides dc power to the SAN Volume Controller 2145-8F4

Name of FRU	Header
Power backplane	An assembly that provides a power interface between the system board and the power supply assembly
CMOS battery	A 3.0V battery on the system board that maintains power to backup the system BIOS settings
Fan power cable	A kit that provides the cables for connecting the fan backplanes to the system board
Front panel signal cable	A ribbon cable that connects the operator information panel to the system board
Fan backplane	A kit that provides all fan holder and fan backplane assemblies
Operator information panel	The information panel that includes the power control button and the light path diagnostics LEDs
Fan, 40×40×28	The single fan assemblies located in fan positions 1 - 3
Fan, 40×40×56	The double fan assemblies located in fan positions 4 - 7
Input power cable assembly (SAN Volume Controller 2145-8F4 to 2145 uninterruptible power supply-1U (2145 UPS-1U))	The cable assembly that provides the power and signal connections between the SAN Volume Controller 2145-8F4 and the 2145 uninterruptible power supply-1U (2145 UPS-1U) assembly

Glossary of FRU names for the SAN Volume Controller 2145-8F2

Name of FRU	Header
Frame assembly	A complete SAN Volume Controller 2145-8F2 with the exception of the fibre-channel cards and the service controller
Fibre-channel host bus adapter (HBA) (full height)	The SAN Volume Controller 2145-8F2 is connected to the fibre-channel fabric through the fibre-channel HBA. The full height card assembly is located in PCI slot 2.
Riser card, PCI (full height)	An interconnection card that provides the interface between the system board and the PCI card in slot 2
Fibre-channel HBA (low profile)	The SAN Volume Controller 2145-8F2 is connected to the fibre-channel fabric through the fibre-channel HBA. The low profile card assembly is located in PCI slot 1.
Riser card, PCI (low profile)	An interconnection card that provides the interface between the system board and the PCI card in slot 1
Service controller	The FRU that provides the service functions and the front panel display and buttons.
Disk drive assembly	A SATA (serial advanced technology attachment) disk drive assembly for the SAN Volume Controller 2145-8F2

Name of FRU	Header
Memory module	A 1 GB ECC DRR2 memory module
Microprocessor	The microprocessor on the system board
Voltage regulator module (VRM)	The microprocessor's VRM
Power supply assembly	An assembly that provides DC power to the SAN Volume Controller 2145-8F2
Power backplane	An assembly that provides a power interface between the system board and the power supply assembly
CMOS battery	A 3.0V battery on the system board that maintains power to backup the system BIOS settings
Fan power cable	A kit that provides the cables for connecting the fan backplanes to the system board
Front panel signal cable	A ribbon cable that connects the operator information panel to the system board
Fan backplane	A kit that provides all fan holder and fan backplane assemblies
Operator information panel	The information panel that includes the power control button and the light path diagnostics LEDs
Fan, 40×40×28	The single fan assemblies located in fan positions 1-3
Fan, 40×40×56	The double fan assemblies located in fan positions 4-7
Input power cable assembly (SAN Volume Controller 2145-8F2 to 2145 uninterruptible power supply-1U (2145 UPS-1U))	The cable assembly that provides the power and signal connections between the SAN Volume Controller 2145-8F2 and the 2145 uninterruptible power supply-1U (2145 UPS-1U) assembly

Glossary of FRU names for the SAN Volume Controller 2145-4F2

Name of FRU	Definition
Frame assembly	The frame of the SAN Volume Controller 2145-4F2 and the cables that it contains
Disk drive assembly	The disk drive of the SAN Volume Controller 2145-4F2
Disk drive cables	The SCSI and power cable, which connect the disk drive to the SAN Volume Controller 2145-4F2 system board
Fibre channel cable	A cable that connects the SAN Volume Controller 2145-4F2 to a fibre-channel network
Ethernet cable	A cable that connects the SAN Volume Controller 2145-4F2 to an Ethernet network
Power supply assembly	An assembly that provides DC power to the SAN Volume Controller 2145-4F2 and also contains three fans

Name of FRU	Definition
Power cable assembly	The power cable and signal cable that connect the SAN Volume Controller to the uninterruptible power supply. This FRU consists of a power cable and a signal cable.
Fan assembly	An assembly that contains a DC cooling fan. The SAN Volume Controller 2145-4F2 has two types of fan assemblies, excluding those that are in the power supply assembly.
System board assembly	This FRU consists of the system board, two processors, VRM, riser card, voltage regulator, and CMOS battery
Fibre channel adapter assembly	The means by which the SAN Volume Controller 2145-4F2 is connected to the fibre-channel fabric
Service controller	The FRU that provides the service functions of the SAN Volume Controller 2145-4F2. This FRU consists of an electronics card, the flash module, and three connecting cables.
CMOS battery	The battery that maintains power to back up the system BIOS settings for time and date
Front panel assembly	The front cover of the SAN Volume Controller 2145-4F2. This FRU includes the front panel, controls, and display.

Related reference

“Definitions of the FRU names for the UPS”

The following glossary provides the field replaceable unit (FRU) names for the uninterruptible power supply (UPS):

Definitions of the FRU names for the redundant ac power switch

The following glossary provides the field replaceable unit (FRU) names for the redundant ac power switch:

Name of FRU	Description
Redundant ac power switch assembly	The redundant ac power switch and its input power cables.

Definitions of the FRU names for the UPS

The following glossary provides the field replaceable unit (FRU) names for the uninterruptible power supply (UPS):

Name of FRU	Description
Battery assembly	The battery that provides backup power to the SAN Volume Controller if a power failure occurs. This FRU is part of the UPS.
Battery plate	Cover plate for the 2145 UPS-1U’s battery pack assembly
Input power cable, power distribution unit to the UPS	Power cord for the 2145 UPS-1U
Front panel	Removable FRU for the 2145 UPS-1U

Name of FRU	Description
UPS electronics assembly	The unit that controls the functions of the 2145 UPS. This FRU is part of the 2145 UPS.
UPS	This FRU includes the frame of the UPS and all the FRUs contained within that frame.

Related reference

“Definitions of the FRU names for the SAN Volume Controller” on page 128
 The glossaries for all SAN Volume Controllers are in this topic to provide you with all applicable field replaceable units (FRUs).

Determining a hardware boot failure

If you see that the hardware boot display stays on the front panel for more than three minutes, the node cannot boot. The cause might be a hardware failure or the software on the hard disk drive is missing or damaged.

Perform the following steps to determine a hardware boot failure:

1. Attempt to restore the software by using the node rescue procedure.
2. If node rescue fails, perform the actions that are described for any failing node rescue code or procedure.

Related concepts

“Hardware boot” on page 102

The hardware boot display shows system data when power is first applied to the node as the node searches for a disk drive to boot.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

Understanding the boot codes

The boot codes are displayed on the screen when a node is booting.

The codes indicate the progress of the boot operation or the condition that has caused the node to fail to boot. The codes can isolate failures when the boot hangs or when the boot detects an unrecoverable error. Line 1 of the front panel displays the message `Booting` that is followed by the boot code. Line 2 of the display shows a boot progress indicator. If the boot hangs, the progress bar stops and you can use the code to isolate the fault. If the boot code detects a hardware error, `Failed` is displayed and you can use the error code to isolate the failure. In some cases, the same code that displays with the `Booting` message is also displayed as the `Failed` error code. Figure 36 provides a view of the boot progress display and Figure 37 on page 134 provides a view of the boot failed display.



Figure 36. Boot progress display

Figure 37. Boot failed display

Related concepts

“Boot progress indicator” on page 101

Boot progress is displayed on the front panel of the SAN Volume Controller.

100 Boot is running.

Explanation

If the progress bar does not advance for two minutes, the boot process is hung.

Action

Go to the hardware boot MAP to resolve the problem.

Possible Cause-FRUs or other:

2145-8F2 or 2145-8F4 or 2145-8G4

- Service controller (95%)
- Frame assembly (5%)

2145-4F2

- Service controller (95%)
- System board (5%)

Related tasks

“MAP 5900: Hardware boot” on page 329

MAP 5900: Hardware boot helps you solve problems that are preventing the node from starting its boot sequence.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470
During routine maintenance, you may be required to replace the system board.

110 The 2145 is loading kernel code.

Explanation

The progress bar has stopped.

Action

If the progress bar has been stopped for two minutes, power off the node and then power on the node. If the boot process stops again at this point, run the node rescue procedure.

Possible Cause-FRUs or other:

- None.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

120 A disk drive hardware error has occurred.

Explanation

A disk drive hardware error has occurred.

Action

Exchange the FRU for a new FRU. (See “Possible Cause-FRUs or other.”)

Possible Cause-FRUs or other:

2145-8G4

- Disk drive assembly (95%)
- Disk cable assembly (4%)
- Frame assembly (1%)

2145-8F2 or 2145-8F4

- Disk drive assembly (98%)
- Frame assembly (2%)

2145-4F2

- Disk drive assembly (95%)
- Disk drive cables (5%)

Related tasks

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 396

You might have to remove the SATA backplate for a service action.

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

“Replacing the disk drive” on page 398

You might have to replace the disk drive for a service action.

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

“Replacing the SAN Volume Controller 2145-4F2 disk drive cables” on page 403

The disk drive cables must be replaced if they are removed.

Related reference

“Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385

When you replace a service controller at the same time that you replace the disk drive, you cannot perform a node rescue because the nonvolatile memory in the “new” service controller does not contain the operating system software required to do so.

130 The 2145 is checking the file systems.

Explanation

The progress bar is stopped.

Action

If the progress bar has been stopped for at least five minutes, power off the node and then power on the node. If the boot process stops again at this point, run the node rescue procedure.

Possible Cause-FRUs or other:

- None.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

132 The 2145 is updating the node’s BIOS CMOS settings.

Explanation

When the update completes, the node reboots.

Action

If the progress bar has stopped for more than ten minutes, or if the display has shown codes 100 and 132 three times or more, go to MAP 5900: Hardware boot to resolve the problem.

Related tasks

“MAP 5900: Hardware boot” on page 329

MAP 5900: Hardware boot helps you solve problems that are preventing the node from starting its boot sequence.

135 The 2145 is verifying the software.

Explanation

The 2145 is verifying the software.

Action

If the progress bar has stopped for at least 90 minutes, power off the node and then power on the node. If the boot process stops again at this point, run the node rescue procedure.

Possible Cause-FRUs or other:

- None.

137 Updating the system board service processor firmware.

Explanation

The process of updating the system board service processor firmware might take up to 90 minutes.

Action

If the progress bar has been stopped for more than 90 minutes, power off and reboot the node. If the boot progress bar stops again on this code, replace the frame assembly.

Possible Cause-FRUs or other:

- Communications problem (95%)
- Frame assembly (5%)

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

140 The 2145 software is damaged.

Explanation

The 2145 software is damaged.

Action

Power off the node and then power on the node. If the boot process stops again at this point, run the node rescue procedure.

Possible Cause-FRUs or other:

- None.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

145 Unable to detect fibre-channel adapter

Explanation

The 2145 cannot detect any fibre-channel adapter cards.

Action

Ensure that a fibre-channel adapter card has been installed. Ensure that the fibre-channel card is seated correctly in the riser card. Ensure that the riser card is seated correctly on the system board. If the problem persists, exchange FRUs for new FRUs in the order shown.

Possible Cause-FRUs or other:

2145-8G4

- 4-port fibre-channel host bus adapter (80%)
- Riser card (19%)
- Frame assembly (1%)

2145-8F4

- 4-port fibre-channel host bus adapter (99%)
- Frame assembly (1%)

2145-8F2

- fibre-channel host bus adapter (full height) (40%)
- fibre-channel host bus adapter (low profile) (40%)
- Riser card, PCI (full height) (9%)
- Riser card, PCI (low profile) (9%)
- Frame assembly (2%)

2145-4F2

- fibre-channel adapter assembly (98%)
- System board (2%)

Related tasks

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

“Removing the SAN Volume Controller 2145-8G4 PCI express riser card assembly” on page 436

Use these instructions when you are prompted to remove the SAN Volume Controller 2145-8G4 PCI express riser card assembly.

“Replacing the SAN Volume Controller 2145-8G4 PCI express riser card assembly” on page 436

Use these instructions when you are prompted to replace the SAN Volume Controller 2145-8G4 PCI express riser card assembly.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

150 The 2145 is loading the cluster code.

Explanation

The 2145 is loading the cluster code.

Action

If the progress bar has been stopped for at least 90 seconds, power off the node and then power on the node. If the boot process stops again at this point, run the node rescue procedure.

Possible Cause-FRUs or other:

- None.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

155 The 2145 is loading the cluster data.

Explanation

The 2145 is loading the cluster data.

Action

If the progress bar has been stopped for at least 90 seconds, power off the node and then power on the node. If the boot process stops again at this point, run the node rescue procedure.

Possible Cause-FRUs or other:

- None.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

160 The 2145 is recovering flash disk.

Explanation

The flash disk recovery operation will take more time when a node rescue is occurring than when a node rescue is not occurring.

Action

When a node rescue is occurring, if the progress bar has been stopped for at least thirty minutes, exchange the FRU for a new FRU. When a node rescue is not occurring, if the progress bar has been stopped for at least fifteen minutes, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other” at the end of this section.

Possible Cause-FRUs or other:

- Service Controller (100%)

Related tasks

“Removing the service controller” on page 370

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

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

170 A flash module hardware error has occurred.

Explanation

A flash module hardware error has occurred.

Action

Exchange the FRU for a new FRU. (See "Possible Cause-FRUs or other.")

Possible Cause-FRUs or other:

- Service controller (100%)

Related tasks

"Removing the service controller" on page 370

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

"Replacing the service controller" on page 378

You can replace the SAN Volume Controller service controller.

174 The service processor on the system board has failed.

Explanation

The service processor on the system board has failed.

Action

Exchange the FRU for a new FRU. (See "Possible Cause-FRUs or other.")

Possible Cause-FRUs or other:

2145-8F2 or 2145-8F4 or 2145-8G4

- Frame assembly (100%)

2145-4F2

- System board assembly (100%)

Related tasks

"Replacing the frame assembly" on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

175 The service processor has indicated an overheating.

Explanation

The node temperature soft or hard shutdown threshold has been exceeded. The node will power off after 10 seconds.

Action

Clear the vents and remove any heat sources. Ensure that the airflow around the node is not restricted. Ensure that the operating environment meets requirements. Go to the light path diagnostic MAP and perform the light path diagnostic procedures. If these actions do not fix the problem, replace the FRU.

Possible Cause-FRUs or other:

2145-8F2 or 2145-8F4 or 2145-8G4

- Light path diagnostic FRU (25%)
- Frame assembly (5%)

2145-4F2

- System board assembly (30%)

Other:

- System environment (70%)

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

“MAP 5900: Hardware boot” on page 329

MAP 5900: Hardware boot helps you solve problems that are preventing the node from starting its boot sequence.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

“Preparing your SAN Volume Controller 2145-8G4 environment” on page 56

Before installing the SAN Volume Controller 2145-8G4, you must prepare the physical environment.

180 There is a fault in the communications cable, the serial interface in the uninterruptible power supply (UPS), or the 2145.

Explanation

There is a fault in the communications cable, the serial interface in the UPS, or 2145.

Action

Check that the communications cable is correctly plugged in to the 2145 and the 2145 UPS. If the cable is plugged in correctly, replace the FRUs in the order shown.

Possible Cause-FRUs or other:

2145-4F2

- 2145 power cable assembly (40%)

- 2145 UPS electronics assembly (30%)
- 2145 system board assembly (25%)
- 2145 disk drive assembly (5%)

Related tasks

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470
During routine maintenance, you may be required to replace the system board.

“Removing and replacing the SAN Volume Controller 2145-4F2 service controller cables” on page 375

You can remove the SAN Volume Controller 2145-4F2 service controller cables from the SAN Volume Controller 2145-4F2.

“Removing the power cable from the 2145 UPS” on page 509

You can replace the power cable from the 2145 uninterruptible power supply (2145 UPS) if you are having problems with the power supply and suspect that the power cable is defective.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

181 There is a fault in the communications cable, the serial interface in the uninterruptible power supply 2145 UPS-1U, or the 2145.

Explanation

There is a fault in the communications cable, the serial interface in the uninterruptible power supply 2145 UPS-1U, or 2145.

Action

Check that the communications cable is correctly plugged in to the 2145 and the UPS. If the cable is plugged in correctly, replace the FRUs in the order shown.

Possible Cause-FRUs or other:

2145-8F2 or 2145-8F4 or 2145-8G4

- 2145 power cable assembly (40%)
- 2145 UPS-1U assembly (30%)
- 2145 frame assembly (30%)

2145-4F2

- 2145 power cable assembly (40%)
- 2145 UPS-1U assembly (30%)
- 2145 system board assembly (25%)
- 2145 disk drive assembly (5%)

Related tasks

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and

the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the power supply” on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

“Replacing the power supply” on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

“Removing and replacing the SAN Volume Controller 2145-4F2 service controller cables” on page 375

You can remove the SAN Volume Controller 2145-4F2 service controller cables from the SAN Volume Controller 2145-4F2.

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

185 The uninterruptible power supply (UPS) battery has reached its end of life.

Explanation

The maximum available capacity can no longer support four 2145s.

Action

Exchange the FRU for a new FRU. (See “Possible Cause-FRUs or other.”)

Possible Cause-FRUs or other:

- 2145 UPS battery assembly (100%)

Related tasks

“Removing the 2145 UPS battery” on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

“Replacing the 2145 UPS battery” on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

186 The uninterruptible power supply (UPS) battery has reached its end of life.

Explanation

The maximum available capacity can no longer support one 2145.

Action

Exchange the FRU for a new FRU. (See "Possible Cause-FRUs or other.") After replacing the battery assembly, if the UPS service indicator is on, press and hold the UPS Test button for three seconds to start the self-test and verify the repair.

Possible Cause-FRUs or other:

- 2145 UPS-1U battery assembly (100%)

Related tasks

"Removing the 2145 UPS-1U battery" on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

"Replacing the 2145 UPS-1U battery" on page 497

Follow all safety notices when you are replacing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

190 A problem has occurred with the uninterruptible power supply (UPS) battery.

Explanation

A problem has occurred with the 2145 UPS battery.

Action

Exchange the FRU for a new FRU. (See "Possible Cause-FRUs or other.")

Possible Cause-FRUs or other:

- 2145 UPS battery assembly (100%)

Related tasks

"Removing the 2145 UPS battery" on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

"Replacing the 2145 UPS battery" on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

191 A problem has occurred with the uninterruptible power supply (UPS) battery.

Explanation

A problem has occurred with the uninterruptible power supply 2145 UPS-1U battery.

Action

Exchange the FRU for a new FRU. (See "Possible Cause-FRUs or other.") After replacing the battery assembly, if the UPS service indicator is on, press and hold the UPS Test button for three seconds to start the self-test and verify the repair.

Possible Cause-FRUs or other:

- 2145 UPS-1U battery assembly
- 2145 UPS-1U assembly

Related tasks

“Removing the 2145 UPS-1U battery” on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

“Replacing the 2145 UPS-1U battery” on page 497

Follow all safety notices when you are replacing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

195 A problem has occurred with the uninterruptible power supply (UPS) electronics.

Explanation

A problem has occurred with the 2145 UPS electronics.

Action

Exchange the FRU for a new FRU. (See “Possible Cause-FRUs or other.”)

Possible Cause-FRUs or other:

- 2145 UPS electronics assembly (100%)

Related tasks

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

196 A problem has occurred with the uninterruptible power supply (UPS) electronics.

Explanation

A problem has occurred with the 2145 UPS-1U electronics.

Action

Exchange the FRU for a new FRU. (See “Possible Cause-FRUs or other.”)

Possible Cause-FRUs or other:

- 2145 UPS-1U assembly

Related tasks

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

200 A problem has occurred with the uninterruptible power supply (UPS)

Explanation

A problem has occurred with the 2145 UPS.

Action

Exchange the FRU for a new FRU. (See “Possible Cause-FRUs or other.”)

Possible Cause-FRUs or other:

- 2145 UPS (100%)

Related tasks

“Removing the 2145 UPS” on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

“Replacing the 2145 UPS” on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

205 A problem with output overload was reported by the uninterruptible power supply (UPS).

Explanation

This is assumed to be a false error, or the UPS 2145 would have powered off and its Load Level Indicator would be red.

Action

Replace the FRU. (See “Possible Cause-FRUs or other.”)

Possible Cause-FRUs or other:

- 2145 UPS electronics assembly (100%)

Related tasks

“Removing the power supply” on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

“Replacing the power supply” on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

“Removing the 2145 UPS” on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

“Replacing the 2145 UPS” on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

206 A problem with output overload has been reported by the uninterruptible power supply (UPS). The Overload Indicator on the UPS front panel is illuminated red.

Explanation

A problem with output overload has been reported by the uninterruptible power supply 2145 UPS-1U. The Overload Indicator on the 2145 UPS-1U front panel is illuminated red.

Action

Ensure that only one 2145 is receiving power from the 2145 UPS-1U. Also ensure that no other devices are connected to the 2145 UPS-1U.

Disconnect the 2145 from the 2145 UPS-1U. If the Overload Indicator is now off, on the disconnected 2145, in the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section.

If the Overload Indicator is still illuminated with all outputs disconnected, replace the 2145 UPS-1U.

Possible Cause-FRUs or other:

- 2145 power cable assembly (45%)
- 2145 power supply assembly (45%)
- 2145 UPS-1U (10%)

Related tasks

"Removing the power supply" on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

"Replacing the power supply" on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

"Removing the 2145 UPS-1U" on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

"Replacing the 2145 UPS-1U" on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

210 A problem has occurred in the uninterruptible power supply.

Explanation

No specific FRU has been identified.

Action

In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other."

Possible Cause-FRUs or other:

- 2145 UPS electronics assembly (40%)
- 2145 UPS battery assembly (40%)

- 2145 UPS (20%)

Other:

- None.

Related tasks

“Removing the 2145 UPS” on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

“Replacing the 2145 UPS” on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

“Removing the 2145 UPS battery” on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

“Replacing the 2145 UPS battery” on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

211 A problem has occurred in the uninterruptible power supply (UPS).

Explanation

A problem has occurred in the 2145 UPS-1U.

Action

In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other.”

Possible Cause-FRUs or other:

- 2145 UPS-1U assembly (100%)

Other:

- None.

Related tasks

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

215 A problem has occurred with the uninterruptible power supply (UPS) load.

Explanation

The 2145 detected that the current of the 2145 UPS exceeds the current that four 2145s require.

Action

1. Ensure also that only 2145s are receiving power from the 2145 UPS; that is, no switches or disk controllers are connected to the 2145 UPS.
2. If only one 2145 is connected to the 2145 UPS, exchange the FRU for a new FRU. See "Possible Cause-FRU or other." If more than one 2145 is connected to the 2145 UPS, disconnect the 2145s from the 2145 UPS and reconnect them one-at-a-time. While the problem persists, the nodes fail to start with boot error code 215 displayed on the 2145 front panel. When the first failure occurs, exchange the FRU for a new FRU. See "Possible Cause-FRU or other."

Possible Cause-FRUs or other:

- 2145 UPS electronics assembly (40%)
- 2145 power supply assembly (10%)
- Other: Configuration error (50%)

Related tasks

"Removing the power supply" on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

"Replacing the power supply" on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

"Removing the 2145 UPS electronics" on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

"Replacing the 2145 UPS electronics" on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

216 A problem has occurred with the uninterruptible power supply (UPS) load.

Explanation

The 2145 has detected that the 2145 UPS-1U current exceeds the current that one 2145 requires.

Action

Ensure that only one 2145 is receiving power from the 2145 UPS-1U; that is, no other devices are connected to the 2145 UPS-1U.

Possible Cause-FRUs or other:

- None.

220 The uninterruptible power supply (UPS) is receiving input power that might be unstable or in low voltage conditions.

Explanation

The 2145 UPS is receiving input power that might be unstable or in low voltage conditions.

Action

Ask the customer to check the site power to the 2145 UPS providing power to this 2145. Check the connection, voltage and frequency. If the input power is sufficient, exchange the FRUs for new FRUs. (See "Possible Cause-FRUs or other.")

Possible Cause-FRUs or other:

- 2145 UPS input power cable (10%)
- 2145 UPS electronics assembly (10%)

Other:

- AC input power (80%)

Related tasks

"Removing the 2145 UPS electronics" on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

"Replacing the 2145 UPS electronics" on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

221 The uninterruptible power supply (UPS) is receiving input power that might be unstable in low or high voltage conditions.

Explanation

The 2145 UPS-1U is receiving input power that might be unstable in low or high voltage conditions.

Action

Ask the customer to check the site power to the 2145 UPS-1U providing power to this 2145. Check the connection, voltage, and frequency. If the input power is sufficient, exchange the FRUs for new FRUs. (See "Possible Cause-FRUs or other.")

Possible Cause-FRUs or other:

- 2145 UPS-1U input power cable (10%)
- 2145 UPS-1U assembly (10%)

Other:

- AC input power (80%)

Related tasks

"Removing the 2145 UPS-1U" on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

"Replacing the 2145 UPS-1U" on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

225 An incorrect type of uninterruptible power supply (UPS) was installed.

Explanation

The 2145 UPS installed is not compatible. If it is connected to a 2145 4F2, the incorrect model type is installed. The 2145 UPS cannot be used with other 2145 model types.

Action

Exchange the 2145 UPS for one of the correct type, or replace the 2145 UPS with a 2145 UPS-1U.

Possible Cause-FRUs or other:

- UPS (100%)

Related tasks

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

226 An incorrect type of uninterruptible power supply (UPS) was installed.

Explanation

An incorrect type of 2145 UPS-1U was installed.

Action

Exchange the UPS for one of the correct type.

Possible Cause-FRUs or other:

- 2145 UPS-1U (100%)

Related tasks

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

230 An uninterruptible power supply (UPS) is not configured correctly.

Explanation

The signal cable or the 2145 power cables are probably not connected correctly. The power cable and signal cable might be connected to different 2145 UPS assemblies.

Action

Connect the cables correctly.

Possible Cause-FRUs or other:

- None.

Other:

- Cabling error (100%)

231 An uninterruptible power supply (UPS) is not configured correctly.

Explanation

The signal cable or the 2145 power cables are probably not connected correctly. The power cable and signal cable might be connected to different 2145 UPS-1U assemblies.

Action

Connect the cables correctly.

Possible Cause-FRUs or other:

- None.

Other:

- Cabling error (100%)

235 A 2145 is powered on, but the uninterruptible power supply has been instructed by another 2145 to power off because a loss of AC input power has occurred.

Explanation

Although the AC input power has now returned, the 2145 still powers off. It then powers on again.

Action

Wait for the 2145 to power off.

Possible Cause-FRUs or other:

- None.

236 A 2145 is powered on, but the uninterruptible power supply has been instructed by the 2145 to power off because a loss of AC input power has occurred.

Explanation

Although the AC input power has now returned, the 2145 still powers off. It then powers on again.

Action

Wait for the 2145 to power off.

Possible Cause-FRUs or other:

- None.

240 The ambient temperature threshold for the uninterruptible power supply (UPS) has been exceeded.

Explanation

The 2145 UPS shows a red warning light, and an alarm sounds. The 2145 UPS switches to bypass mode to lower the temperature.

Action

1. Turn off the 2145 UPS and unplug it from the power source.
2. Clear the vents and remove any heat sources.
3. Ensure that the air flow around the 2145 UPS is not restricted.
4. Wait at least five minutes, and then restart the 2145 UPS.
5. If the problem remains, exchange, in the sequence shown, the FRUs for new FRUs. (See "Possible Cause-FRUs or other.")

Possible Cause-FRUs or other:

- 2145 UPS electronics assembly (60%)
- 2145 UPS battery assembly (20%)
- 2145 UPS (20%)

Related tasks

"Removing the 2145 UPS" on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

"Replacing the 2145 UPS" on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

"Removing the 2145 UPS electronics" on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

"Replacing the 2145 UPS electronics" on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

"Removing the 2145 UPS battery" on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

"Replacing the 2145 UPS battery" on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

241 The ambient temperature threshold for the uninterruptible power supply (UPS) has been exceeded.

Explanation

The ambient temperature threshold for the 2145 UPS-1U has been exceeded.

Action

1. Turn off the 2145 UPS-1U and unplug it from the power source.
2. Clear the vents and remove any heat sources.
3. Ensure that the air flow around the 2145 UPS-1U is not restricted.
4. Wait at least five minutes, and then restart the 2145 UPS-1U.
5. If the problem remains, exchange, in the sequence shown, the FRUs for new FRUs. (See "Possible Cause-FRUs or other.")

Possible Cause-FRUs or other:

- 2145 UPS-1U assembly (100%)

Related tasks

"Removing the 2145 UPS-1U" on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

"Replacing the 2145 UPS-1U" on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

245 Repetitive node restarts due to uninterruptible power supply (UPS) errors.

Explanation

Multiple node restarts have occurred due to 2145 UPS errors.

Action

The uninterruptible power supply (UPS) has been repeatedly restarted because UPS errors are being detected. Verify that the room temperature is within specified limits and that the input power is stable. Verify that the UPS signal cable is fastened securely at both ends.

The condition will be reset by powering off the node from the node front panel. If a reset does not fix the problem, replace FRUs in the order shown.

Possible Cause-FRUs or other:

- 2145 UPS electronics assembly (85%)
- 2145 UPS battery assembly (5%)
- 2145 UPS frame assembly (5%)
- Power/signal cable (5%)

Related tasks

"Removing the 2145 UPS battery" on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

"Replacing the 2145 UPS battery" on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

"Removing the 2145 UPS" on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

"Replacing the 2145 UPS" on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

246 Repetitive node restarts due to uninterruptible power supply (UPS) errors.

Explanation

Multiple node restarts have occurred due to 2145 UPS-1U errors.

Action

The uninterruptible power supply (UPS) has been repeatedly restarted because 2145 UPS-1U errors are being detected. Verify that the room temperature is within specified limits and that the input power is stable. Verify that the 2145 UPS-1U signal cable is fastened securely at both ends.

The condition will be reset by powering off the node from the node front panel.

Possible Cause-FRUs or other:

- 2145 UPS-1U assembly (95%)
- Power/signal cable (5%)

Related tasks

“MAP 5900: Hardware boot” on page 329

MAP 5900: Hardware boot helps you solve problems that are preventing the node from starting its boot sequence.

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

Performing the node rescue

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

Similarly, if you have replaced the service controller, you should use the node rescue procedure to ensure that the service controller has the correct software.

Attention: If you recently replaced both the service controller and the disk drive as part of the same repair operation, node rescue fails.

To provide an alternate boot device, a minimal operating system is also available in nonvolatile memory on the service controller. If it is necessary to replace the hard disk drive or the software on the hard disk drive has become corrupted, the node cannot boot and the hardware boot indicator remains on the front panel display or the boot operation does not progress. If this occurs, use the node rescue procedure to reinstall the SAN Volume Controller software.

Node rescue works by booting the operating system from the service controller and running a program that copies all the SAN Volume Controller software from any other node that can be found on the fibre-channel fabric.

Attention: When running node rescue operations, only run one node rescue operation on the same SAN, at any one time. Wait for one node rescue operation to complete before starting another.

Perform the following steps to complete the node rescue:

1. Ensure that the fibre-channel cables are connected.
2. Ensure that at least one other node is connected to the fibre-channel fabric.
3. Ensure that the SAN zoning allows a connection between at least one port of this node and one port of another node. It is better if multiple ports can connect. This is particularly important if the zoning is by worldwide port name (WWPN) and you are using a new service controller. In this case, you might need to use SAN monitoring tools to determine the WWPNs of the node. If you need to change the zoning, remember to set it back when the service procedure is complete.
4. Turn off the node.
5. Press and hold the left and right buttons on the front panel.
6. Press the power button.
7. Continue to hold the left and right buttons until the node-rescue-request symbol is displayed on the front panel (Figure 38).



Figure 38. Node-rescue-request display

The node rescue request symbol displays on the front panel display until the node starts to boot from the service controller. If the node rescue request symbol displays for more than two minutes, go to the hardware boot MAP to resolve the problem. When the node rescue starts, the service display shows the progress or failure of the node rescue operation.

Note: If the recovered node was part of a cluster, the node is now offline. Delete the offline node from the cluster and then add the node back into the cluster. If node recovery was used to recover a node that failed during a software upgrade process, the automatic software downgrade process starts but might not continue until the failed node is deleted from the cluster. After the failed node is deleted, it is not possible to add the node back into the cluster until the downgrade process has completed. This can take up to four hours for an eight-node cluster.

Related tasks

“Deleting a node from the cluster” on page 9

If it is required, you can delete a node from a cluster.

“Adding a node to a cluster” on page 10

You might have to add a node into the cluster if it has been removed or rejected by a cluster.

Related reference

“Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385

When you replace a service controller at the same time that you replace the disk drive, you cannot perform a node rescue because the nonvolatile memory in the “new” service controller does not contain the operating system software required to do so.

Understanding the node rescue codes

The node rescue codes are displayed on the menu screen during node rescue.

Start node rescue if the boot image on the hard disk is missing or corrupted. Corrupted code is indicated during the boot process either by the display of an error code or by a hang condition.

To start node rescue, press and hold the **left** and **right** buttons on the front panel during a power-on cycle. The menu screen displays the Node rescue request. See the node rescue request topic. The hard disk is formatted and, if the format completes without error, the software image is downloaded from any available node. During node recovery, Line 1 of the menu screen displays the message Booting followed by one of the node rescue codes. Line 2 of the menu screen displays a **boot progress indicator**. Figure 39 shows an example of a displayed node rescue code.



Figure 39. Example of a displayed node rescue code

The three-digit code that is shown in Figure 39 represents a node rescue code.

Attention: If the 2145 uninterruptible power supply (2145 UPS) is only connected to this SAN Volume Controller, the 2145 UPS powers off within five minutes of a node-rescue process failure. For example, if a donor node cannot be found. When the problem that is preventing node rescue has been resolved, the 2145 UPS must be powered on before powering on the SAN Volume Controller.

Note: The 2145 uninterruptible power supply-1U (2145 UPS-1U) will not power off following a node rescue failure.

Related concepts

“Node rescue request” on page 102

If software is lost, you can use the node rescue process to copy all software from another node.

300 The 2145 is running node rescue.

Explanation

The 2145 is running node rescue.

Action

If the progress bar has been stopped for at least two minutes, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other”.

Possible Cause-FRUs or other:

- Service controller (100%)

Related tasks

“Removing the service controller” on page 370

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

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

310 The 2145 is running a format operation.

Explanation

The 2145 is running a format operation.

Action

If the progress bar has been stopped for two minutes, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other”.

Possible Cause-FRUs or other:

2145-8G4

- Disk drive assembly (90%)
- Disk cable assembly (10%)

2145-8F2 or 2145-8F4

- Disk drive assembly (100%)

2145-4F2

- Disk drive assembly (95%)
- Disk drive cables (5%)

Related tasks

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 396

You might have to remove the SATA backplate for a service action.

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

“Replacing the disk drive” on page 398

You might have to replace the disk drive for a service action.

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

“Replacing the SAN Volume Controller 2145-4F2 disk drive cables” on page 403

The disk drive cables must be replaced if they are removed.

320 A 2145 format operation has failed.

Explanation

A 2145 format operation has failed.

Action

Exchange the FRU for a new FRU. See "Possible Cause-FRUs or other".

Possible Cause-FRUs or other:

2145-8G4

- Disk drive assembly (90%)
- Disk cable assembly (10%)

2145-8F2 or 2145-8F4

- Disk drive assembly (95%)
- Frame assembly (5%)

2145-4F2

- Disk drive assembly (95%)
- Disk drive cables (5%)

Related tasks

"Removing the disk drive" on page 391

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

"Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate" on page 396

You might have to remove the SATA backplate for a service action.

"Removing the SAN Volume Controller 2145-4F2 disk drive cables" on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

"Replacing the disk drive" on page 398

You might have to replace the disk drive for a service action.

"Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate" on page 402

You might have to replace the SATA backplate for a service action.

"Replacing the SAN Volume Controller 2145-4F2 disk drive cables" on page 403

The disk drive cables must be replaced if they are removed.

330 The 2145 is partitioning its disk drive.

Explanation

The 2145 is partitioning its disk drive.

Action

If the progress bar has been stopped for two minutes, exchange the FRU for a new FRU.

Possible Cause-FRUs or other:

2145-8G4

- Disk drive assembly (90%)
- Disk cable assembly (10%)

2145-8F2 or 2145-8F4

- Disk drive assembly (95%)

- Frame assembly (5%)

2145-4F2

- Disk drive assembly (95%)
- Disk drive cables (5%)

Other:

- Configuration problem
- Software error

Related tasks

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 396

You might have to remove the SATA backplate for a service action.

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397
The disk drive cables must be removed if they become defective or if you want to replace them.

“Replacing the disk drive” on page 398

You might have to replace the disk drive for a service action.

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

“Replacing the SAN Volume Controller 2145-4F2 disk drive cables” on page 403

The disk drive cables must be replaced if they are removed.

340 The 2145 is searching for donor node.

Explanation

The 2145 is searching for donor node.

Action

If the progress bar has been stopped for more than two minutes, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other”.

Possible Cause-FRUs or other:

- Fibre-channel adapter (100%)

Related tasks

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

345 The 2145 is searching for a donor node from which to copy the software.

Explanation

The node is searching at 1 Gb/s for a donor node.

Action

If the progress bar has stopped for more than two minutes, exchange the FRU for a new FRU. See "Possible Cause-FRUs or other".

Possible Cause-FRUs or other:

- Fibre-channel adapter (100%)

Related tasks

"Removing the fibre-channel adapter assembly" on page 427

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

"Replacing the fibre-channel adapter assembly" on page 433

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

350 The 2145 cannot find a donor node.

Explanation

The 2145 cannot find a donor node.

Action

If the progress bar has stopped for more than two minutes, perform the following steps:

1. Ensure that all of the fibre-channel cables are connected correctly and securely to the cluster.
2. Ensure that at least one other node is operational, is connected to the same fibre-channel network, and is a donor node candidate. A node is a donor node candidate if the version of software that is installed on that node supports the model type of the node that is being rescued.
3. Ensure that the fibre-channel zoning allows a connection between the node that is being rescued and the donor node candidate.
4. Perform the problem determination procedures for the network.

Possible Cause-FRUs or other:

- None

Other:

- Fibre-channel network problem

Related tasks

"MAP 5600: Fibre channel" on page 313

MAP 5600: Fibre channel helps you to solve problems that have occurred on the SAN Volume Controller fibre-channel ports.

360 The 2145 is loading software from the donor.

Explanation

The 2145 is loading software from the donor.

Action

If the progress bar has been stopped for at least two minutes, restart the node rescue procedure.

Possible Cause-FRUs or other:

- None

370 The 2145 is installing software.

Explanation

The 2145 is installing software.

Action

1. If this code is displayed and the progress bar has been stopped for at least ten minutes, the software install process has failed with an unexpected software error.
2. Power off the 2145 and wait for 60 seconds.
3. Power on the 2145. The software upgrade operation continues.
4. Report this problem immediately to your Software Support Center.

Possible Cause-FRUs or other:

- None

Understanding the node error codes

Node error codes are displayed on the display screen by node software.

Each code indicates that a critical error was detected that prevents the node from becoming a member of a cluster. Line 1 of the menu screen contains the message Node Error.

Line 2 contains either the error code or the error code and additional data. Figure 40 provides an example of a node error code. This data might exceed the maximum width of the menu screen. You can press the Right navigation to scroll the display.



```
Node Error:
550 000125
```

Figure 40. Example of a displayed node error code

The additional data is unique for any error code. It provides necessary information that enables you to isolate the problem in an offline environment. Examples of additional data are disk serial numbers and field replaceable unit (FRU) location codes. When these codes are displayed, you can do additional fault isolation by navigating the default menu to determine the node and fibre-channel port status.

510 The detected memory size for this 2145 does not match the expected memory size for the cluster.

Explanation

The detected memory size, in MB, is the first number following the error code. The expected memory size for the cluster is the second number following the error code. This problem might have occurred because a memory module has failed or because failing memory modules were exchanged and the wrong size modules were installed.

Action

Check the memory size of another 2145 that is in the same cluster. For the 2145-4F2, exchange the memory modules in this 2145-4F2 for modules of the correct size. For the 2145-8F2, 2145-8F4 and 2145-8G4, if you have just replaced a memory module, check that the module that you have installed is the correct size, then go to the light path MAP to isolate any possible failed memory modules.

Possible Cause-FRUs or other:

- Memory module (100%)

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

“Removing the memory modules (DIMM)” on page 387

You might need to remove one or more faulty memory modules.

“Replacing the memory modules (DIMM)” on page 390

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

511 Memory bank 1 of the 2145 is failing.

Explanation

Memory bank 1 of the 2145 is failing.

Action

For the 2145-8F2, 2145-8F4 and 2145-8G4, go to the light path MAP to resolve this problem.

For the 2145-4F2, exchange both memory modules of bank 1 for new modules.

Possible Cause-FRUs or other:

- Memory module (100%)

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

“Removing the memory modules (DIMM)” on page 387

You might need to remove one or more faulty memory modules.

“Replacing the memory modules (DIMM)” on page 390

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

513 Memory bank 2 of the 2145 is failing.

Explanation

Memory bank 2 of the 2145 is failing.

Action

For the 2145-8F2, 2145-8F4 and 2145-8G4, go to the light path MAP to resolve this problem.

For the 2145-4F2, exchange both memory modules of bank 2 for new modules.

Possible Cause-FRUs or other:

- Memory module (100%)

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

“Removing the memory modules (DIMM)” on page 387

You might need to remove one or more faulty memory modules.

“Replacing the memory modules (DIMM)” on page 390

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

514 Memory bank 3 of the 2145 is failing.

Explanation

This cannot occur on the 2145-4F2.

Action

For the 2145-8F2, 2145-8F4 and 2145-8G4, go to the light path MAP to resolve this problem.

Possible Cause-FRUs or other:

- Memory module (100%)

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

515 Memory bank 4 of the 2145 is failing.

Explanation

This cannot occur on the 2145-4F2.

Action

For the 2145-8F2, 2145-8F4 and 2145-8G4, go to the light path MAP to resolve this problem.

Possible Cause-FRUs or other:

- Memory module (100%)

Related tasks

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN

Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

520 The failing fibre-channel adapter port is shown by the number following the displayed error code.

Explanation

An error has been detected on a fibre-channel port. For the 2145-4F2 and 2145-8F2, port number 1 or 2 indicates adapter one and port number 3 or 4 indicates adapter two. For the 2145-8F4 and 2145-8G4 there is only one adapter.

Action

Exchange the failing FRU for a new FRU.

Possible Cause-FRUs or other:

2145-8F4 and 2145-8G4

- 4-port fibre channel host bus adapter (100%)

2145-8F2

- slot 1: Fibre-channel host bus adapter (low profile) (100%)
- slot 2: Fibre-channel host bus adapter (full height) (100%)

2145-4F2

- Fibre-channel adapter assembly (100%)

Other:

- Software problem.

Related tasks

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

540 An Ethernet port has failed on the 2145.

Explanation

An Ethernet port has failed on the 2145.

Action

Go to Ethernet MAP.

Possible Cause-FRUs or other:

2145-8F2 or 2145-8F4 or 2145-8G4

- Ethernet cable
- Frame assembly

2145-4F2

- Ethernet cable

- System board assembly

Other:

- The Ethernet cable is disconnected
- Ethernet hub

Related tasks

“MAP 5500: Ethernet” on page 310

MAP 5500: Ethernet helps you solve problems that have occurred on the SAN Volume Controller Ethernet.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

**550 Cannot form a cluster due to a lack of cluster resources.
Explanation**

Supplemental data displayed with this error code list the missing IDs for the 2145s and the quorum disk controller. Each missing node is listed by its node ID. A missing quorum disk is listed as WWWWWWWWWWWWWWWWW/LL, where WWWWWWWWWWWWWWWWW is a worldwide port name (WWPN) on the disk controller that contains the missing quorum disk and LL is the Logical Unit Number (LUN) of the missing quorum disk on that controller.

Action

1. Ensure that the other 2145s in the cluster are powered on and operational.
2. From the front panel, display the fibre-channel port status. If any port is not active, perform the fibre-channel port problem determination procedures.
3. Ensure that fibre-channel network zoning changes have not restricted communication between nodes, or between the nodes and the quorum disk.
4. Do the problem determination procedures for the network.
5. The quorum disk failed or cannot be accessed. Perform the problem determination procedures for the disk controller.

Possible Cause-FRUs or other:

- None

**555 Power Domain error.
Explanation**

Both 2145s in an I/O group are being powered by the same uninterruptible power supply. The other 2145's ID is displayed with the node error code on the front panel.

Action

Ensure that the configuration is correct and that each 2145 is in an I/O group is connected from a separate uninterruptible power supply.

Possible Cause-FRUs or other:

- None

Other:

- Configuration problem.

558 The 2145 cannot see the fibre-channel fabric or the fibre-channel card port speed might be set to a different speed than the fibre channel fabric.

Explanation

The 2145 cannot see the fibre-channel fabric or the fibre-channel card port speed might be set to a different speed than the fibre channel fabric.

Action

Ensure that:

1. The fibre-channel network fabric switch is powered-on.
2. At least one fibre-channel cable connects the 2145 to the fibre-channel network fabric.
3. The fibre-channel card port speed is equal to the fibre-channel fabric.
4. At least one fibre-channel adapter is installed in the 2145.
5. Go to the Fibre-channel MAP.

Possible Cause-FRUs or other:

- None

Related tasks

“MAP 5600: Fibre channel” on page 313

MAP 5600: Fibre channel helps you to solve problems that have occurred on the SAN Volume Controller fibre-channel ports.

Related reference

“Fibre-channel network speed” on page 69

You can change the speed of the fibre-channel ports on a SAN Volume Controller through the front panel on the SAN Volume Controller node or by a command sent to a SAN Volume Controller cluster using the Ethernet interface.

560 The fibre-channel network fabric is too big.

Explanation

The configuration is not valid.

Action

1. Ensure that all the fibre-channel connections are correct.
2. Restart the 2145.

Possible Cause-FRUs or other:

- None

Other:

- See your product's configuration guide

562 The hardware configuration is not valid.

Explanation

This error has probably been caused by a service action error when replacing FRUs.

Action

1. Ensure that the 2145 hardware is correct.
2. Restart the 2145.

Possible Cause-FRUs or other:

- None

564 This 2145 node is repeatedly crashing because of a software failure.

Explanation

Software dump data is available in the Dumps directory.

If this is the only node with this problem and if you can still access the data on the virtual disks (VDisks), perform the following actions. If more than one node has this problem or if you cannot access the data on the VDIsks, call your support center for assistance.

Action

1. Use the front panel controls to delete the node from the cluster. To do this:
 - a. Display Node on the front panel menu. See the 2145 menu options.
 - b. Press the left or right buttons until "Create Cluster?" is displayed.
 - c. Press select. "Delete Cluster?" is displayed.
 - d. Press and hold the up button.
 - e. Press and release the select button.
 - f. Release the up button. The node is deleted from the cluster and restarts.
2. Delete the node from the cluster.
3. Fully power-off the node.
4. Power on the node.
5. Add the node back into the cluster.
6. Call your software support center for assistance.

Possible Cause-FRUs or other:

- None

Other:

- Software error.

Related tasks

"Deleting a node from the cluster" on page 9

If it is required, you can delete a node from a cluster.

“Adding a node to a cluster” on page 10

You might have to add a node into the cluster if it has been removed or rejected by a cluster.

570 The 2145 data is readable, but damaged.

Explanation

The 2145 has been rejected by the cluster.

Action

If more than one node has this problem or if you cannot access the data on the virtual disks, call your support center for assistance. If this is the only node with this problem and if you can still access the data on the virtual disks (VDisks), perform the following actions.

If you believe that the power off sequence was interrupted, for example, if you pressed the power button on the UPS assembly or if you removed the power cables before a power-off sequence had completed, then delete and re-add the node to the cluster.

If the probable cause of the problem is unknown, delete and re-add the node, then contact your support center for assistance. The support center might want you to recover the dump and trace data records to help analyze the root cause of the problem. If the problem persists, exchange the FRUs for new FRUs in the sequence shown.

Possible Cause-FRUs or other:

2145-8G4

- Disk drive assembly (80%)
- Disk drive cables (10%)
- Frame assembly (10%)

2145-8F2 or 2145-8F4

- Disk drive assembly (90%)
- Frame assembly (10%)

2145-4F2

- Disk drive assembly (45%)
- System board assembly (50%)
- Disk drive cables (5%)

Other:

- Software problem.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 396

You might have to remove the SATA backplate for a service action.

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397
The disk drive cables must be removed if they become defective or if you want to replace them.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
During routine maintenance, you may be required to remove and replace the system board.

“Replacing the disk drive” on page 398

You might have to replace the disk drive for a service action.

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

572 The 2145 cannot determine the VPD for a FRU.

Explanation

A FRU in the 2145 has been changed, and the VPD is unreadable or unrecognized.

Action

1. Update the 2145 software to the latest level.
2. Exchange the most-recently replaced FRU for a new FRU.

Possible Cause-FRUs or other:

- None

Other:

- Software problem.

574 The 2145 software on this node is damaged.

Explanation

The 2145 software on this node is damaged. Recovery is required.

If this is the only node with this problem and if you can still access the data on the virtual disks (VDisks), perform the following actions. If more than one node has this problem or if you cannot access the data on the virtual disks, call your support center for assistance.

Action

1. Perform the node rescue procedure.

Possible Cause-FRUs or other:

- None

Other:

- Software problem.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

576 The 2145 data cannot be read. Explanation

The 2145 has been rejected from the cluster.

Action

In the sequence shown, exchange the FRUs for new FRUs.

Possible Cause-FRUs or other:

2145-8G4

- Disk drive assembly (80%)
- Disk drive cables (10%)
- Frame assembly (10%)

2145-8F2 or 2145-8F4

- Disk drive assembly (90%)
- Frame assembly (10%)

2145-4F2

- Disk drive assembly (45%)
- System board assembly (50%)
- Disk drive cables (5%)

Related tasks

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 396

You might have to remove the SATA backplate for a service action.

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the disk drive” on page 398

You might have to replace the disk drive for a service action.

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

578 This node has lost power without saving its current state data to its internal disk.

Explanation

The node has shut down without saving its current state to its internal disk. The node has restarted but it is not able to participate in the cluster.

The usual cause of this error is a user action that has removed power from the node in a manner that does not allow the node to save its state data to its internal disk. Actions that might cause this error include:

- Removing the node power cable from the node or UPS.
- Pressing the power button on the node for more than four seconds. This action causes an immediate power off.
- Powering off the UPS while the node is active or while the node is in the process of shutting down.

A software error or hardware error might also cause the node to power off without saving the state data. If the cause is a hardware error, the hardware problem is intermittent because the node has restarted. In this case, the node message and trace files might indicate the cause of the power off and your support center might request these files for analysis.

Action

1. If the node is offline to the cluster, delete the offline node from the cluster and then add the node back into the cluster to reintroduce the node to the cluster.
2. Determine whether this error has occurred because power was removed from this node in a manner that does not allow the node to save its state data to its internal disk. If the cause of the error has been determined, continue with MAP 5700: Repair verification.
3. If you cannot identify an action or event that has caused a temporary loss of power to the node, ensure that the input power cable is securely connected to both the node and to the uninterruptible power supply.
4. If you still cannot determine the cause of the temporary loss of power to the node, call your support center for assistance.

Possible Cause-FRUs or other:

Your support center might indicate a FRU based on their problem analysis (2%)

Other:

- User action (98%)

Related tasks

“Removing the service controller” on page 370

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

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

“Removing the power supply” on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

“Replacing the power supply” on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

580 The 2145 cannot read the unique ID from the service controller, so the fibre-channel adapters cannot be started.
Explanation

The 2145 cannot read the unique ID from the service controller, so the fibre-channel adapters cannot be started.

Action

In the sequence shown, exchange the following FRUs for new FRUs. See “Possible Cause-FRUs or other”.

Possible Cause-FRUs or other:

2145-8F2 or 2145-8F4 or 2145-8G4

Service controller (100%)

2145-4F2

- Front panel assembly (50%)
- Service controller (50%)

Other:

- None

Related tasks

“Removing the service controller” on page 370

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

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

“Removing the front panel from the SAN Volume Controller 2145-4F2” on page 465

You can remove the front panel to perform maintenance on the SAN Volume Controller 2145-4F2.

Understanding the create cluster error codes

Cluster Create error codes are displayed on the menu screen when you are using the front panel to create a new cluster, but the create operation fails.

Line 1 of the menu screen contains the message Create Failed. Line 2 shows the error code and, where necessary, additional data.

700 All the available unique identifications have been used.

Explanation

Each time a node creates a new cluster a unique ID is generated by the node's Service Controller. Once 255 clusters have been created the Service Controller must be replaced.

Action

Use a different node to create the cluster.

Possible Cause-FRUs or other:

- Service controller (100%)

Related tasks

“Removing the service controller” on page 370

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

710 The service controller cannot increase the cluster ID counter.

Explanation

When a new cluster ID is requested from the service controller, the service controller is told to increase the ID counter. The new ID is read back for verification. If the ID counter has not been increased, this error code is displayed. This error has occurred because the service controller failed.

Action

Exchange the FRU for a new FRU.

Possible Cause-FRUs or other:

- Service controller (100%)

Related tasks

“Removing the service controller” on page 370

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

Understanding the cluster recovery codes

Cluster recovery codes indicate that a critical software error has occurred that might corrupt your cluster.

You must perform software problem analysis before you can perform further cluster operations to avoid the possibility of corrupting your cluster configuration.

9xx
Explanation

A cluster recovery action is required.

Action

Contact the support center for assistance in performing the software problem analysis.

Possible Cause-FRUs or other:

- None

Understanding cluster error codes

Every cluster error code includes an error code number, a description, action, and possible field replaceable units (FRUs).

1001 Automatic cluster recovery has run.

Explanation

All cluster configuration commands are blocked.

Action

Call your software support center.

Caution:

You can unblock the configuration commands by issuing the `svctask enablecli` command, but you must first consult with your software support to avoid corrupting your cluster configuration.

Possible Cause-FRUs or other”:

- None

1002 Error log full.

Explanation

Error log full.

Action

To fix the errors in the error log, go to the start MAP.

Possible Cause-FRUs or other”:

- Unfixed errors in the log.

Related tasks

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

1010 A fibre-channel adapter was reported missing.

Explanation

A fibre-channel adapter was reported missing.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online," mark the error that you have just repaired "fixed." If any nodes do not show a status of "online," go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

- Fibre-channel adapter assembly (90%)
- System board assembly (10%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the fibre-channel adapter assembly" on page 427

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

"Replacing the fibre-channel adapter assembly" on page 433

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

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21
You can use the command-line interface (CLI) to check the status of the node ports.

1011 Fibre-channel adapter (4 port) in slot 1 is missing.

Explanation

Fibre-channel adapter (4 port) in slot 1 is missing.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed.” If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8G4

- 4-port fibre-channel host bus adapter (90%)
- PCI Express riser card (8%)
- Frame assembly (2%)

2145-8F4

N/A

2145-8F2

N/A

2145-4F2

N/A

1012 A fibre-channel adapter reported PCI bus errors.

Explanation

A fibre-channel adapter reported PCI bus errors.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

- Fibre-channel adapter assembly (90%)
- System board assembly (10%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1013 Fibre-channel adapter (4-port) in slot 1 PCI fault.

Explanation

Fibre-channel adapter (4-port) in slot 1 PCI fault.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8G4

- 4-port fibre-channel host bus adapter (80%)
- PCI Express riser card (10%)
- Frame assembly (10%)

2145-8F4

N/A

2145-8F2

N/A

2145-4F2

N/A

1014 Fibre-channel adapter in slot 1 is missing. Explanation

Fibre-channel adapter in slot 1 is missing.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2

- Dual port fibre-channel HBA - low profile (90%)
- PCI riser card - low profile (8%)
- Frame assembly (2%)

2145-8G4

N/A

2145-8F4

N/A

2145-4F2

N/A

Related tasks

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Replacing the frame assembly" on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

"Removing the fibre-channel adapter assembly" on page 427

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

"Replacing the fibre-channel adapter assembly" on page 433

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

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1015 Fibre-channel adapter in slot 2 is missing.

Explanation

Fibre-channel adapter in slot 2 is missing.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2

- Dual port fibre-channel host bus adapter - full height (90%)
- PCI riser card (8%)
- Frame assembly (2%)

2145-8G4

N/A

2145-8F4

N/A

2145-4F2

N/A

Related tasks

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1016 Fibre-channel adapter (4 port) in slot 2 is missing.

Explanation

Fibre-channel adapter (4 port) in slot 2 is missing.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F4

- 4-port fibre-channel host bus adapter (90%)
- PCI Express riser card (8%)
- Frame assembly (2%)

2145-8G4

N/A

2145-8F2

N/A

2145-4F2

N/A

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1017 Fibre-channel adapter in slot 1 PCI bus error.

Explanation

Fibre-channel adapter in slot 1 PCI bus error.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2

- Dual port fibre-channel host bus adapter - low profile (80%)
- PCI riser card (10%)
- Frame assembly (10%)

2145-8G4

N/A

2145-8F4

N/A

2145-4F2

N/A

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1018 Fibre-channel adapter in slot 2 PCI fault.

Explanation

Fibre-channel adapter in slot 2 PCI fault.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.

2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2

- Dual port fibre-channel host bus adapter - full height (80%)
- PCI riser card (10%)
- Frame assembly (10%)

2145-8G4

N/A

2145-8F4

N/A

2145-4F2

N/A

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the fibre-channel adapter assembly" on page 427

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

"Replacing the fibre-channel adapter assembly" on page 433

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

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1019 Fibre-channel adapter (4-port) in slot 2 PCI fault. Explanation

Fibre-channel adapter (4-port) in slot 2 PCI fault.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F4

- 4-port fibre-channel host bus adapter (80%)
- PCI Express riser card (10%)
- Frame assembly (10%)

2145-8G4

N/A

2145-8F2

N/A

2145-4F2

N/A

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21
You can use the command-line interface (CLI) to check the status of the node ports.

1020 The 2145 system board is failing.

Explanation

The 2145 system board is failing.

Action

1. Replace the system board assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

System board assembly (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1025 The 2145 system assembly is failing.

Explanation

The 2145 system assembly is failing.

Action

1. Go to the light path diagnostic MAP and perform the light path diagnostic procedures.
2. If the light path diagnostic procedure isolates the FRU, mark this error as "fixed" and go to the repair verification MAP. If you have just replaced a FRU but it has not corrected the problem, ensure that the FRU is installed correctly and go to the next step.
3. Replace the frame assembly.
4. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to the start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
5. Go to the repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

- The FRUs that are indicated by the Light path diagnostics (98%)
- Frame assembly (2%)

2145-4F2

N/A

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"MAP 5800: Light path" on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

"Replacing the frame assembly" on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1030 A node’s internal disk has failed.

Explanation

An error has occurred while attempting to read or write data to the internal disk of one of the nodes in the cluster. The disk has failed.

Action

Determine which node’s internal disk has failed using the node information in the error. Replace the FRUs in the order shown. Mark the error as fixed.

Possible Cause-FRUs or other”:

2145-8G4

- disk drive assembly (90%)
- disk drive cables (10%)

2145-8F4 or 2145-8F2

- disk drive assembly (100%)

2145-4F2

- disk drive assembly (90%)
- disk drive cables (10%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Removing the disk drive” on page 391

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

“Replacing the disk drive” on page 398

You might have to replace the disk drive for a service action.

“Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 396

You might have to remove the SATA backplate for a service action.

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

“Replacing the SAN Volume Controller 2145-4F2 disk drive cables” on page 403

The disk drive cables must be replaced if they are removed.

1040 A flash module error has occurred after a successful start of a 2145.

Explanation

Note: The node containing the flash module has not been rejected by the cluster.

Action

1. Replace the service controller assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

Service controller (100%)

2145-4F2

Service controller (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the service controller" on page 370

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

"Replacing the service controller" on page 378

You can replace the SAN Volume Controller service controller.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1044 A service controller read failure occurred.

Explanation

A service controller read failure occurred.

Action

1. Replace the service controller.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

Service controller (100%)

2145-4F2

Service controller (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the service controller" on page 370

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

"Replacing the service controller" on page 378

You can replace the SAN Volume Controller service controller.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1050 A 2145 fibre-channel adapter has failed a loop back, or similar, test.

Explanation

A 2145 fibre-channel adapter has failed a loop back, or similar, test.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section.

2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

- Fibre-channel adapter assembly (90%)
- System board assembly (10%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

"Removing the fibre-channel adapter assembly" on page 427

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

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1054 Fibre-channel adapter in slot 1 adapter present but failed.

Explanation

Fibre-channel adapter in slot 1 adapter present but failed.

Action

1. Replace the fibre-channel adapter.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2

Dual port fibre-channel host bus adapter - low profile (100%)

2145-8G4

N/A

2145-8F4

N/A

2145-4F2

N/A

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the fibre-channel adapter assembly" on page 427

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

"Replacing the fibre-channel adapter assembly" on page 433

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

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1055 Fibre-channel adapter (4 port) in slot 1 adapter present but failed.

Explanation

Fibre-channel adapter (4 port) in slot 1 adapter present but failed.

Action

1. Exchange the FRU for new FRU. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8G4

- 4-port fibre-channel host bus adapter (100%)

2145-8F4

N/A

2145-8F2

N/A

2145-4F2

N/A

1056 Fibre-channel adapter in slot 2 adapter present but failed.

Explanation

Fibre-channel adapter in slot 2 adapter present but failed.

Action

1. Replace the fibre-channel adapter.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2

Dual port fibre-channel host bus adapter - full height (100%)

2145-8G4

N/A

2145-8F4

N/A

2145-4F2

N/A

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1057 Fibre-channel adapter (4 port) in slot 2 adapter present but failed.

Explanation

Fibre-channel adapter (4 port) in slot 2 adapter present but failed.

Action

1. Exchange the FRU for new FRU. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F4

- 4-port fibre-channel host bus adapter (100%)

2145-8G4

N/A

2145-8F2

N/A

2145-4F2

N/A

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1060 One or more fibre-channel ports on the 2145 are not operational.

Explanation

One or more fibre-channel ports on the 2145 are not operational.

Action

1. Go to MAP 5600: Fibre-channel to isolate and repair the problem.
2. Go to the repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F4 or 2145-8G4

- Fibre-channel cable (80%)
- 4-port fibre-channel host bus adapter (20%)

2145-8F2

- Fibre-channel cable (80%)
- Dual port fibre-channel host bus adapter (fibre-channel MAP isolates to the correct type) (10%)

2145-4F2

- Fibre-channel cable (80%)
- Fibre-channel adapter port (10%)

other”:

- Fibre-channel network fabric (10%)

Related tasks

“MAP 5600: Fibre channel” on page 313

MAP 5600: Fibre channel helps you to solve problems that have occurred on the SAN Volume Controller fibre-channel ports.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1065 One or more fibre channel ports are running at lower than the previously saved speed.

Explanation

The fibre channel ports will normally operate at the highest speed permitted by the fibre-channel switch, but this speed might be reduced if the signal quality on the fibre-channel connection is poor. The fibre-channel switch could have been set to operate at a lower speed by the user, or the quality of the fibre-channel signal has deteriorated.

Action

- Go to MAP 5600: Fibre Channel to resolve the problem.

Possible Cause-FRUs or other”:

2145-8F4 or 2145-8G4

- Fibre-channel cable (50%)
- 4-port fibre-channel host bus adapter (25%)

other”:

- Fibre-channel switch or GBIC (25%)

Related tasks

“MAP 5600: Fibre channel” on page 313

MAP 5600: Fibre channel helps you to solve problems that have occurred on the SAN Volume Controller fibre-channel ports.

1070 One of the four fan assemblies that cool the processors has returned a status of Failed status through the service processor.

Explanation

One of the four fan assemblies that cool the processors has returned a status of Failed status through the service processor.

Action

1. Check the error log and verify which fan failed.
2. In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section.
3. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

- Microprocessor fan (90%)
- System board assembly (10%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the fibre-channel adapter assembly" on page 427

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

"Replacing the fibre-channel adapter assembly" on page 433

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

"Removing the fans" on page 448

The SAN Volume Controller fans might have to be replaced due to failure.

"Replacing the fans" on page 452

The SAN Volume Controller fans might have to be replaced due to failure.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21
You can use the command-line interface (CLI) to check the status of the node ports.

1071 The fan assembly that cools the disk drive assembly has returned a Failed status using the service processor.

Explanation

The fan assembly that cools the disk drive assembly has returned a Failed status using the service processor.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

- Disk drive fan (90%)
- System board assembly (10%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Replacing the SAN Volume Controller 2145-4F2 disk drive fan” on page 404

The disk drive fan must be removed if it is defective or if it needs to be replaced.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1075 The ambient temperature threshold of the node was exceeded.

Explanation

The ambient temperature threshold of the node was exceeded.

Action

1. Check that the room temperature is within the limits allowed.
2. Check for obstructions in the air flow.
3. Mark the error that you have just repaired, “fixed”.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

System environment (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Preparing your SAN Volume Controller 2145-8G4 environment” on page 56

Before installing the SAN Volume Controller 2145-8G4, you must prepare the physical environment.

1076 The internal temperature sensor of the 2145 has reported that the temperature warning threshold has been exceeded.

Explanation

The internal temperature sensor of the 2145 has reported that the temperature warning threshold has been exceeded.

Action

1. Check whether the internal airflow of the 2145 has been obstructed. Clear any obstructions. If you cannot find an obstruction, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other” after the last action in this section.

2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

System board assembly (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1077 The temperature soft or hard shutdown threshold of the 2145 has been exceeded.

Explanation

The 2145 has powered off automatically.

Action

1. In the sequence shown, exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.

2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

System board assembly (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1080 One of the voltages that is monitored on the system board, but generated elsewhere, is outside the set thresholds.

Explanation

One of the voltages that is monitored on the system board, but generated elsewhere, is outside the set thresholds.

Action

1. In the sequence shown, exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.

2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

- Power supply unit (98%)
- System board assembly (2%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the power supply" on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

"Replacing the power supply" on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1081 One of the voltages that is generated and monitored on the system board is outside the set thresholds.

Explanation

One of the voltages that is generated and monitored on the system board is outside the set thresholds.

Action

1. Exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

System board assembly (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1089 One or more fans are failing.

Explanation

One or more fans are failing.

Action

1. Determine the failing fan(s) from the fan indicator on the system board or from the text of the error data in the log. If you have determined the failing fan number from the error data in the log, use the following table to determine the position of the fan assembly to replace. Each fan assembly contains two fans.
2. Exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.
3. Go to repair verification MAP.
 - Fan number:Fan assembly position
 - 1 or 2 :1
 - 3 or 4 :2
 - 5 or 6 :3
 - 7 or 8 :4
 - 9 or 10:5
 - 11 or 12:6

Possible Cause-FRUs or other":

2145-8G4

- Fan assembly (100%)

2145-4F2 or 2145-4F2 or 2145-8F4

N/A

1090 One or more fans (40×40×28) are failing.

Explanation

One or more fans (40×40×28) are failing.

Action

1. Determine the failing fan(s) from the fan indicator on the system board or from the text of the error data in the log.
2. If all fans on the fan backplane are failing or if no fan fault lights are illuminated, verify that the cable between the fan backplane and the system board is connected.
3. Exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4

- Fan 40×40×28 (98%)
- Fan power cable assembly (2%)

2145-4F2 or 2145-8G4

N/A

Related tasks

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the fans” on page 448

The SAN Volume Controller fans might have to be replaced due to failure.

“Replacing the fans” on page 452

The SAN Volume Controller fans might have to be replaced due to failure.

“Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fan holder and fan backplanes” on page 455

The fan holder with fan backplanes field replaceable unit (FRU) is supplied as a kit of parts. Replace only the failed assembly and discard any unused part.

“Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fan holder and fan backplanes” on page 456

The fan holder with fan backplanes field replaceable unit (FRU) is supplied as a kit of parts. Replace only the failed assembly and discard any unused part.

1091 One or more fans (40×40×56) are failing.

Explanation

One or more fans (40×40×56) are failing.

Action

1. Determine the failing fan(s) from the fan indicator on the system board or from the text of the error data in the log.
2. If all fans on the fan backplane are failing or if no fan fault lights are illuminated, verify that the cable between the fan backplane and the system board is connected.
3. Exchange the FRU for a new FRU. See “Possible Cause-FRUs or other” after the last action in this section.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4

- Fan 40×40×56 (98%)
- Fan power cable assembly (2%)

2145-4F2 or 2145-8G4

N/A

Related tasks

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the fans” on page 448

The SAN Volume Controller fans might have to be replaced due to failure.

“Replacing the fans” on page 452

The SAN Volume Controller fans might have to be replaced due to failure.

“Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fan holder and fan backplanes” on page 455

The fan holder with fan backplanes field replaceable unit (FRU) is supplied as a kit of parts. Replace only the failed assembly and discard any unused part.

“Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fan holder and fan backplanes” on page 456

The fan holder with fan backplanes field replaceable unit (FRU) is supplied as a kit of parts. Replace only the failed assembly and discard any unused part.

1092 The temperature soft or hard shutdown threshold of the 2145 has been exceeded. The 2145 has automatically powered off. Explanation

The temperature soft or hard shutdown threshold of the 2145 has been exceeded. The 2145 has automatically powered off.

Action

1. Ensure that the operating environment meets specifications.
2. Ensure that the airflow is not obstructed.
3. Ensure that the fans are operational.
4. Go to the light path diagnostic MAP and perform the light path diagnostic procedures.
5. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to the start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
6. Go to the repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4 or 2145-8G4

- The FRU that is indicated by the Light path diagnostics (25%)
- Frame assembly (5%)

2145-4F2

N/A

other”

System environment or airflow blockage (70%)

Related tasks

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and

the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

1093 The internal temperature sensor of the 2145 has reported that the temperature warning threshold has been exceeded.

Explanation

The internal temperature sensor of the 2145 has reported that the temperature warning threshold has been exceeded.

Action

1. Ensure that the internal airflow of the node has been obstructed.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to the start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4 or 2145-8G4

- Fan assembly (25%)
- Frame assembly (5%)

2145-4F2

N/A

other”

Airflow blockage (70%)

Related tasks

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

**1094 The ambient temperature threshold has been exceeded.
Explanation**

The ambient temperature threshold has been exceeded.

Action

1. Check that the room temperature is within the limits allowed.
2. Check for obstructions in the air flow.
3. Mark the errors as fixed.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

None

other”:

System environment (100%)

Related tasks

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

**1100 One of the voltages that is monitored on the system board is over the set threshold.
Explanation**

One of the voltages that is monitored on the system board is over the set threshold.

Action

1. See the light path diagnostic MAP.
2. If the light path diagnostic MAP does not resolve the issue, exchange the frame assembly.
3. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4 or 2145-8G4

- Light path diagnostic MAP FRUs (98%)
- Frame assembly (2%)

2145-4F2

N/A

Related tasks

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

1101 One of the voltages that is monitored on the system board is over the set threshold.

Explanation

One of the voltages that is monitored on the system board is over the set threshold.

Action

1. See the light path diagnostic MAP.
2. If the light path diagnostic MAP does not resolve the issue, exchange the frame assembly.
3. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8G4

- Light path diagnostic MAP FRUs (98%)
- Frame assembly (2%)

2145-8F2 or 2145-8F4 or 2145-4F2

N/A

1105 One of the voltages that is monitored on the system board is under the set threshold.

Explanation

One of the voltages that is monitored on the system board is under the set threshold.

Action

1. Check the cable connections.
2. See the light path diagnostic MAP.
3. If the light path diagnostic MAP does not resolve the issue, exchange the frame assembly.
4. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
5. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

- Light path diagnostic MAP FRUs (98%)
- Frame assembly (2%)

2145-4F2

N/A

Related tasks

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"MAP 5800: Light path" on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

"Replacing the frame assembly" on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

1106 One of the voltages that is monitored on the system board is under the set threshold.

Explanation

One of the voltages that is monitored on the system board is under the set threshold.

Action

1. Check the cable connections.
2. See the light path diagnostic MAP.
3. If the light path diagnostic MAP does not resolve the issue, exchange the frame assembly.
4. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
5. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8G4

- Light path diagnostic MAP FRUs (98%)
- Frame assembly (2%)

2145-8F2 or 2145-8F4 or 2145-4F2

N/A

1110 The power management board detected a voltage that is outside of the set thresholds.

Explanation

The power management board detected a voltage that is outside of the set thresholds.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See "Possible Cause-FRUs or other".
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

- Power backplane (90%)
- Power supply assembly (5%)
- Frame assembly (5%)

2145-4F2

N/A

Related tasks

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the power backplane” on page 421

The SAN Volume Controller power backplane might have to be removed.

“Replacing the power backplane” on page 423

The power backplane might have to be replaced for a service action.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the power supply” on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

“Replacing the power supply” on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

1135 The 2145 UPS has reported an ambient over temperature.

Explanation

The 2145 UPS has reported an ambient over temperature. The uninterruptible power supply (UPS) switches to Bypass mode to allow the UPS to cool.

Action

1. Power off the nodes attached to the UPS.
2. Turn off the UPS, and then unplug the UPS from the main power source.
3. Ensure that the air vents of the UPS are not obstructed.
4. Ensure that the air flow around the UPS is not restricted.
5. Wait for at least five minutes, and then restart the UPS. If the problem remains, check the ambient temperature. Correct the problem. otherwise, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other” after the last action in this section.
6. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
7. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS electronics unit (50%)

other”:

The system ambient temperature is outside the specification (50%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

“Preparing your UPS environment” on page 86

Ensure that your physical site meets the installation requirements for the uninterruptible power supply (UPS).

1136 The 2145 UPS-1U has reported an ambient over temperature. Explanation

The 2145 UPS-1U has reported an ambient over temperature.

Action

1. Power off the node attached to the UPS.
2. Turn off the UPS, and then unplug the UPS from the main power source.
3. Ensure that the air vents of the UPS are not obstructed.
4. Ensure that the air flow around the UPS is not restricted.
5. Wait for at least five minutes, and then restart the UPS. If the problem remains, check the ambient temperature. Correct the problem. other”wise, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other” after the last action in this section.
6. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”,

go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.

7. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS assembly (50%)

other”:

The system ambient temperature is outside the specification (50%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

“Removing the power cable from the 2145 UPS-1U” on page 492

You can remove the power cable from the 2145 uninterruptible power supply-1U (2145 UPS-1U) if you are having problems with the power supply and suspect that the power cable is defective.

“Removing the 2145 UPS-1U battery” on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

“Replacing the 2145 UPS-1U battery” on page 497

Follow all safety notices when you are replacing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

Related information

“Removing and replacing 2145 UPS-1U parts” on page 476

The remove and replace procedures for the 2145 UPS-1U field replaceable units are described in the topics which follow.

1140 The 2145 UPS has reported that it has a problem with the input AC power.

Explanation

The 2145 UPS has reported that it has a problem with the input AC power.

Action

1. Check the input AC power, whether it is missing or out of specification. Correct if necessary. otherwise, exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- UPS input power cable (10%)
- Electronics assembly (10%)

other":

- The input AC power is missing (40%)
- The input AC power is not in specification (40%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1141 The 2145 UPS-1U has reported that it has a problem with the input AC power.

Explanation

The 2145 UPS-1U has reported that it has a problem with the input AC power.

Action

1. Check the input AC power, whether it is missing or out of specification. Correct if necessary. otherwise, exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- UPS input power cable (10%)
- UPS assembly (10%)

other":

- The input AC power is missing (40%)
- The input AC power is not in specification (40%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1145 The signal connection between a 2145 and its 2145 UPS is failing.

Explanation

The signal connection between a 2145 and its 2145 UPS is failing.

Action

1. If other" 2145s that are using this uninterruptible power supply are reporting this error, exchange the UPS electronics unit for a new one.
2. If only this 2145 is reporting the problem, check that the signal cable, exchange the FRUs for new FRUs in the sequence shown. See "Possible Cause-FRUs or other" after the last action in this section.

3. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

N/A

2145-4F2

- Power cable assembly (40%)
- UPS electronics assembly (30%)
- System board assembly (25%)
- 2145 disk drive assembly (5%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the disk drive" on page 391

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

"Removing the SAN Volume Controller 2145-4F2 disk drive cables" on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

"Replacing the SAN Volume Controller 2145-4F2 disk drive cables" on page 403

The disk drive cables must be replaced if they are removed.

"Replacing the SAN Volume Controller 2145-4F2 disk drive fan" on page 404

The disk drive fan must be removed if it is defective or if it needs to be replaced.

"Removing the SAN Volume Controller 2145-4F2 system board" on page 467

During routine maintenance, you may be required to remove and replace the system board.

"Replacing the SAN Volume Controller 2145-4F2 system board" on page 470

During routine maintenance, you may be required to replace the system board.

"Removing the 2145 UPS electronics" on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1146 The signal connection between a 2145 and its 2145 UPS-1U is failing.

Explanation

The signal connection between a 2145 and its 2145 UPS-1U is failing.

Action

1. Exchange the FRUs for new FRUs in the sequence shown. See “Possible Cause-FRU or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

2145-8F2 or 2145-8F4 or 2145-8G4

- Power cable assembly (40%)
- UPS assembly (30%)
- Frame assembly (30%)

2145-4F2

- Power cable assembly (40%)
- UPS assembly (30%)
- System board assembly (25%)
- 2145 disk drive assembly (5%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller 2145-4F2 disk drive cables” on page 397

The disk drive cables must be removed if they become defective or if you want to replace them.

“Replacing the SAN Volume Controller 2145-4F2 disk drive cables” on page 403

The disk drive cables must be replaced if they are removed.

“Replacing the SAN Volume Controller 2145-4F2 disk drive fan” on page 404

The disk drive fan must be removed if it is defective or if it needs to be replaced.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467

During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470

During routine maintenance, you may be required to replace the system board.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1150 Data that the 2145 has received from the UPS suggests the 2145 UPS power cable, the signal cable, or both, are not connected correctly.

Explanation

Data that the 2145 has received from the UPS suggests the 2145 UPS power cable, the signal cable, or both, are not connected correctly.

Action

1. Connect the cables correctly. See your product’s installation guide.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

- Configuration error

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the

cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1151 Data that the 2145 has received from the UPS suggests the 2145 UPS-1U power cable, the signal cable, or both, are not connected correctly.

Explanation

Data that the 2145 has received from the UPS suggests the 2145 UPS-1U power cable, the signal cable, or both, are not connected correctly.

Action

1. Connect the cables correctly. See your product’s installation guide.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

- Configuration error

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1155 A power domain error has occurred.

Explanation

Both 2145s of a pair are powered by the same UPS.

Action

1. List the cluster’s 2145s and check that 2145s in the same I/O group are connected to a different UPS.
2. Connect one of the 2145s as identified in step 1 to a different UPS.
3. Mark the error that you have just repaired, “fixed”.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

- Configuration error

Related tasks

“Viewing the vital product data” on page 13

You can view the vital product data for a node from the Viewing Vital Product Data panel.

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

1160 The output load on the 2145 UPS exceeds the specification (reported by UPS alarm bits).

Explanation

The output load on the 2145 UPS exceeds the specification (reported by UPS alarm bits).

Action

1. Ensure that only 2145s are receiving power from the uninterruptible power supply (UPS). Ensure that there are no switches or disk controllers that are connected to the UPS.
2. Remove each connected 2145 input power in turn, until the output overload is removed.
3. Exchange the FRUs for new FRUs in the sequence shown, on the overcurrent 2145. See "Possible Cause-FRU or other" after the last action in this section.
4. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the UPS.
5. Go to repair verification MAP.

Possible Cause-FRUs or other":

- Power cable assembly (50%)
- Power supply assembly (40%)
- UPS electronics assembly (10%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the power supply" on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

"Replacing the power supply" on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1161 The output load on the 2145 UPS-1U exceeds the specifications (reported by UPS alarm bits). Explanation

The output load on the 2145 UPS-1U exceeds the specifications (reported by UPS alarm bits).

Action

1. Ensure that only 2145s are receiving power from the uninterruptible power supply (UPS). Also, ensure that no other devices are connected to the UPS.
2. Exchange, in the sequence shown, the FRUs for new FRUs. See "Possible Cause-FRUs or other" after the last action in this section. If the Overload Indicator is still illuminated with all outputs disconnected, replace the UPS.
3. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the UPS.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

- Power cable assembly (50%)
- Power supply assembly (40%)
- UPS assembly (10%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the power supply" on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

"Replacing the power supply" on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1165 The 2145 UPS output load is unexpectedly high. The UPS output is possibly connected to an extra non-2145 load.

Explanation

The 2145 UPS output load is unexpectedly high. The UPS output is possibly connected to an extra non-2145 load.

Action

1. Ensure that only 2145s are receiving power from the uninterruptible power supply (UPS). Ensure that there are no switches or disk controllers that are connected to the UPS.
2. Check node status. If all nodes show a status of "online", the problem no longer exists. Mark the error that you have just repaired "fixed" and go to the repair verification MAP.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

None

other":

- Configuration error

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1166 The 2145 UPS-1U output load is unexpectedly high.

Explanation

The uninterruptible power supply (UPS) output is possibly connected to an extra non-2145 load.

Action

1. Ensure that there are no other" devices that are connected to the UPS.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the UPS.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- UPS assembly (5%)

other”:

- Configuration error (95%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1170 2145 UPS electronics fault (reported by the UPS alarm bits).

Explanation

2145 UPS electronics fault (reported by the UPS alarm bits).

Action

1. Replace the uninterruptible power supply (UPS) electronics assembly.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the UPS.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS electronics assembly (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Replacing the 2145 UPS electronics” on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1171 2145 UPS-1U electronics fault (reported by the UPS alarm bits).

Explanation

2145 UPS-1U electronics fault (reported by the UPS alarm bits).

Action

1. Replace the uninterruptible power supply (UPS) assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the UPS.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS assembly (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1175 A problem has occurred with the UPS frame fault (reported by UPS alarm bits).

Explanation

A problem has occurred with the UPS frame fault (reported by UPS alarm bits).

Action

1. Replace the uninterruptible power supply (UPS) assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the UPS.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS assembly (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

“Removing the 2145 UPS” on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

“Replacing the 2145 UPS” on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

Related reference

“Checking the status of the node using the CLI” on page 21
You can use the command-line interface (CLI) to check the status of the node.
“Checking the status of the node ports using the CLI” on page 21
You can use the command-line interface (CLI) to check the status of the node ports.

1180 2145 UPS battery fault (reported by UPS alarm bits).

Explanation

2145 UPS battery fault (reported by UPS alarm bits).

Action

1. Replace the 2145 UPS battery assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS battery assembly (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the 2145 UPS battery” on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

“Replacing the 2145 UPS battery” on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1181 2145 UPS-1U battery fault (reported by 2145 UPS-1U alarm bits).

Explanation

2145 UPS-1U battery fault (reported by 2145 UPS-1U alarm bits).

Action

1. Replace the UPS-1U battery assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

UPS battery assembly (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the 2145 UPS-1U battery" on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

"Replacing the 2145 UPS-1U battery" on page 497

Follow all safety notices when you are replacing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1185 2145 UPS fault, with no specific FRU identified (reported by uninterruptible power supply (UPS) alarm bits).

Explanation

2145 UPS fault, with no specific FRU identified (reported by UPS alarm bits).

Action

1. In the sequence shown, exchange the FRU for a new FRU. See "Possible Cause-FRUs or other" after the last action in this section.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the UPS.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- UPS electronics assembly (60%)
- UPS battery assembly (20%)
- UPS assembly (20%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the 2145 UPS" on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

"Replacing the 2145 UPS" on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

"Removing the 2145 UPS electronics" on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

"Replacing the 2145 UPS electronics" on page 512

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

"Removing the 2145 UPS battery" on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

"Replacing the 2145 UPS battery" on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21
You can use the command-line interface (CLI) to check the status of the node ports.

**1186 A problem has occurred in the 2145 UPS-1U, with no specific FRU identified (reported by 2145 UPS-1U alarm bits).
Explanation**

A problem has occurred in the 2145 UPS-1U, with no specific FRU identified (reported by 2145 UPS-1U alarm bits).

Action

1. In the sequence shown, exchange the FRU for a new FRU. See “Possible Cause-FRUs or other” after the last action in this section.
2. Check node status. If all nodes show a status of “online”, mark the error that you have just repaired “fixed”. If any nodes do not show a status of “online”, go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply (UPS).
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS assembly (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

“Replacing the 2145 UPS-1U” on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

“Removing the 2145 UPS-1U battery” on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

“Replacing the 2145 UPS-1U battery” on page 497

Follow all safety notices when you are replacing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21
You can use the command-line interface (CLI) to check the status of the node ports.

1190 The 2145 UPS battery has reached its end of life.

Explanation

The 2145 UPS battery has reached its end of life.

Action

1. Replace the 2145 UPS battery assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply (UPS).
3. Go to repair verification MAP.

Possible Cause-FRUs or other”:

UPS battery assembly (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the 2145 UPS battery” on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

“Replacing the 2145 UPS battery” on page 519

Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1191 The 2145 UPS-1U battery has reached its end of life.

Explanation

The 2145 UPS-1U battery has reached its end of life.

Action

1. Replace the 2145 UPS-1U battery assembly.
2. Check node status. If all nodes show a status of "online", mark the error that you have just repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the uninterruptible power supply.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

UPS battery assembly (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the 2145 UPS-1U battery" on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

"Replacing the 2145 UPS-1U battery" on page 497

Follow all safety notices when you are replacing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1195 A 2145 is missing from the cluster.

Explanation

You can resolve this problem by repairing the failure on the missing 2145.

Action

1. If it is not obvious which node in the cluster has failed, check the status of the nodes and find the 2145 with a status of offline.
2. Go to the Start MAP and perform the repair on the failing node.
3. When the repair has been completed, this error is automatically marked as fixed.
4. Check node status. If all nodes show a status of "online", but the error in the log has not been marked as fixed, manually mark the error that you have just

repaired "fixed". If any nodes do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the 2145.

5. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Viewing the node status" on page 7

You can view the properties for a node from the Viewing General Details panel.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Checking the status of the node using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node.

"Checking the status of the node ports using the CLI" on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1200 The configuration is not valid. Too many devices have been presented to the cluster or 2145.

Explanation

The configuration is not valid. Too many devices have been presented to the cluster or 2145.

Action

1. Remove unwanted devices from the fibre-channel network fabric.
2. Start a cluster discovery operation to find devices/disks by rescanning the fibre-channel network.
3. List all connected managed disks. Check with the customer that the configuration is as expected. Mark the error that you have just repaired fixed.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Fibre-channel network fabric fault (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Listing MDisks using the CLI” on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

“Discovering MDisks” on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

“Discovering MDisks using the CLI” on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1203 A duplicate fibre channel frame has been received.

Explanation

A duplicate fibre channel frame should never be detected. Receiving a duplicate fibre channel frame indicates that there is a problem with the fibre channel fabric. other” errors related to the fibre channel fabric might be generated.

Action

1. Use the transmitting and receiving WWPNs indicated in the error data to determine the section of the fibre channel fabric that has generated the duplicate frame. Search for the cause of the problem by using fabric monitoring tools. The duplicate frame might be caused by a design error in the topology of the fabric, by a configuration error, or by a software or hardware fault in one of the components of the fibre channel fabric.
2. When you are satisfied that the problem has been corrected, mark the error that you have just repaired “fixed”.
3. Go to MAP 5700: Repair verification.

Possible Cause-FRUs or other”:

- Fibre-channel cable assembly (1%)
- Fibre-channel adapter (1%)

other”:

- Fibre-channel network fabric fault (98%)

1210 A local fibre-channel port has been excluded.

Explanation

A local fibre-channel port has been excluded.

Action

1. Repair faults in the order shown.

2. Check the status of the disk controllers. If all disk controllers show a "good" status, mark the error that you just repaired, "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- Fibre-channel cable assembly (80%)
- Fibre-channel adapter (10%)

other":

- Fibre-channel network fabric fault (10%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5600: Fibre channel" on page 313

MAP 5600: Fibre channel helps you to solve problems that have occurred on the SAN Volume Controller fibre-channel ports.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1220 A remote fibre-channel port has been excluded.

Explanation

A remote fibre-channel port has been excluded.

Action

1. View the error log. Note the MDisk ID associated with the error code.
2. From the MDisk, determine the failing disk controller ID.
3. Refer to the service documentation for the disk controller and the fibre-channel network to resolve the reported problem.
4. After the disk drive is repaired, start a cluster discovery operation to recover the excluded fibre-channel port by rescanning the fibre-channel network.
5. To restore MDisk online status, include the managed disk that you noted in step 1.
6. Check the status of the disk controller. If all disk controllers show a "good" status, mark the error that you have just repaired, "fixed".
7. If all disk controllers do not show a good status, contact your support center to resolve the problem with the disk controller.
8. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

- Enclosure/controller fault (50%)
- Fibre-channel network fabric (50%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Listing MDisks using the CLI” on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

“Discovering MDisks” on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

“Discovering MDisks using the CLI” on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

“Viewing the error log” on page 118

You can view the error log by using the SAN Volume Controller command-line interface (CLI) or the SAN Volume Controller Console.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking disk controller status using the CLI” on page 28

You can use the command-line interface (CLI) to check the status of the disk controllers.

“Determining the failing enclosure or disk controller using the CLI” on page 29

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

1230 Login has been excluded.

Explanation

Login has been excluded.

Action

1. In the sequence shown, exchange the FRUs for new FRUs. See “Possible Cause-FRUs or other” after the last action in this section.
2. Start a cluster discovery operation to recover the login by rescanning the fibre-channel network.
3. Check the status of the disk controller. If all disk controllers show a “good” status, mark the error that you have just repaired, “fixed”. If any disk controllers do not show “good” status, go to start MAP. If you return to this step, contact the support center to resolve the problem with the disk controller.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- Fibre-channel cable, switch to remote port, (50%)
- Fibre-channel cable, local port to switch (50%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the

cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Discovering MDisks” on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

“Discovering MDisks using the CLI” on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking disk controller status using the CLI” on page 28

You can use the command-line interface (CLI) to check the status of the disk controllers.

1310 A managed disk is reporting excessive errors.

Explanation

A managed disk is reporting excessive errors.

Action

1. Repair the enclosure/controller fault.
2. Check the managed disk status. If all managed disks show a status of "online", mark the error that you have just repaired as "fixed". If any managed disks show a status of "excluded", include the excluded managed disks and then mark the error as "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Enclosure/controller fault (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Listing MDisks using the CLI” on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units

(FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1320 A disk I/O medium error has occurred.

Explanation

A disk I/O medium error has occurred.

Action

1. Ask the customer to rewrite the incorrect data to the block LBA that is reported in the host systems SCSI sense data. If this error has occurred during a migration, the host system does not notice the error until the target device is accessed.
2. Check managed disk status. If all managed disks show a status of "online", mark the error that you have just repaired as "fixed". If any managed disks do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the disk controller.
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Enclosure/controller fault (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Listing MDisks using the CLI" on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1330 No managed disk (MDisk) is suitable for use as a quorum disk.

Explanation

When a cluster is created, three disks are automatically selected as quorum disks. A quorum disk is needed to enable a tie-break when some cluster members are missing. To become a quorum disk:

- The MDisk must be accessible by all nodes in the cluster.
- The MDisk must have free extents

This error code is produced when at least one quorum disk is not accessible by all nodes in the cluster.

A quorum disk might not be available because of a fibre-channel network failure or because of a fibre-channel switch zoning problem.

Action

1. Resolve any known fibre-channel network problems.
2. Ask the customer to confirm that MDisks have been created and that those MDisks have free extents. If at least one managed disk shows a mode of managed, mark the error that you have just repaired as "fixed".
3. List the MDisks. If at least one MDisk shows a mode of managed, mark the error as "fixed".
4. If the customer is unable to make the appropriate changes, ask your software support center for assistance.
5. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Configuration error (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Listing MDisks using the CLI" on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

"SAN problem determination" on page 264

The procedures to service the SAN Volume Controller that are provided here help you solve problems on the SAN Volume Controller and its connection to the storage area network (SAN).

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1335 Quorum disk not available.

Explanation

Quorum disk not available.

Action

1. View the error log entry to identify the managed disk (MDisk) being used as a quorum disk, that is no longer available.
2. Perform the disk controller problem determination and repair procedures for the MDisk identified in step 1.
3. Include the MDisks into the cluster.

4. Check the managed disk status. If the managed disk identified in step 1 shows a status of "online", mark the error that you have just repaired as "fixed". If the managed disk does not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the disk controller.
5. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Enclosure/controller fault (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Listing MDisks using the CLI" on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Determining the failing enclosure or disk controller using the CLI" on page 29

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

1340 A managed disk has timed out.

Explanation

This error was reported because a large number of disk timeout conditions have been detected. The problem is probably caused by a failure of some other" component on the SAN.

Action

1. Repair problems on all enclosures/controllers and switches on the same SAN as this 2145 cluster.
2. If problems are found, mark this error as "fixed".
3. If no switch or disk controller failures can be found, take an error log dump and call your hardware support center.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

- Enclosure/controller fault
- Fibre-channel switch

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1360 A SAN transport error occurred.

Explanation

This error has been reported because the 2145 performed error recovery procedures in response to SAN component associated transport errors. The problem is probably caused by a failure of a component of the SAN.

Action

1. View the error log entry to determine the node that logged the problem. Determine the 2145 node or controller that the problem was logged against.
2. Perform fibre-channel switch problem determination and repair procedures for the switches connected to the 2145 node or controller.
3. Perform fibre-channel cabling problem determination and repair procedures for the cables connected to the 2145 node or controller.
4. If any problems are found and resolved in step 2 and 3, mark this error as “fixed”.
5. If no switch or cable failures were found in steps 2 and 3, take an error log dump. Call your hardware support center.
6. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

- Fibre-channel switch
- Fibre-channel cabling

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1370 A managed disk error recovery procedure (ERP) has occurred.

Explanation

This error was reported because a large number of disk error recovery procedures have been performed by the disk controller. The problem is probably caused by a failure of some other" component on the SAN.

Action

1. View the error log entry and determine the managed disk that was being accessed when the problem was detected.
2. Perform the disk controller problem determination and repair procedures for the MDisk determined in step 1.
3. Perform problem determination and repair procedures for the fibre channel switches connected to the 2145 and any other" fibre-channel network components.
4. If any problems are found and resolved in steps 2 and 3, mark this error as "fixed".
5. If no switch or disk controller failures were found in steps 2 and 3, take an error log dump. Call your hardware support center.
6. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

- Enclosure/controller fault
- Fibre-channel switch

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1400 The 2145 cannot detect the Ethernet connection.

Explanation

The 2145 cannot detect the Ethernet connection.

Action

1. Go to the Ethernet MAP.
2. Go to the repair verification MAP.

Possible Cause-FRUs or other":

2145-8F2 or 2145-8F4 or 2145-8G4

- Ethernet cable (25%)

- Frame assembly (25%)

2145-4F2

- Ethernet cable (25%)
- System board assembly (25%)

other”:

- Ethernet cable is disconnected or damaged (25%)
- Ethernet hub fault (25%)

Related tasks

“MAP 5500: Ethernet” on page 310

MAP 5500: Ethernet helps you solve problems that have occurred on the SAN Volume Controller Ethernet.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470
During routine maintenance, you may be required to replace the system board.

1550 A cluster path has failed.

Explanation

One of the 2145 fibre-channel ports is unable to communicate with all the other 2145s in the cluster.

Action

1. Check for incorrect switch zoning.
2. Repair the fault in the fibre-channel network fabric.
3. Check the status of the node ports. If the status of the node ports shows as active, mark the error that you have just repaired as “fixed”. If any node ports do not show a status of active, go to start MAP. If you return to this step contact your support center to resolve the problem with the 2145.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

Fibre-channel network fabric fault (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node ports using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node ports.

1610 Media errors on back-end managed disk.

Explanation

Media errors on back-end managed disk.

Action

1. Repair fault in the enclosure/controller.
2. To restore MDisk online status, include the managed disk into the cluster.
3. Check managed disk status. If all managed disks show a status of "online", mark the error that you have just repaired as "fixed". If any managed disks do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the disk controller.
4. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

Enclosure/controller fault (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Listing MDisks using the CLI” on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Determining the failing enclosure or disk controller using the CLI” on page 29

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

1620 An Mdisk group is offline.

Explanation

An Mdisk group is offline.

Action

1. Repair the faults in the order shown.
2. Start a cluster discovery operation by rescanning the fibre-channel network.
3. Check managed disk (MDisk) status. If all MDisks show a status of "online", mark the error that you have just repaired as "fixed". If any MDisks do not show a status of "online", go to start MAP. If you return to this step, contact your support center to resolve the problem with the disk controller.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

- Fibre-channel network fabric fault (50%)
- Enclosure/controller fault (50%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Listing MDisks using the CLI" on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

"Discovering MDisks" on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

"Discovering MDisks using the CLI" on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Determining the failing enclosure or disk controller using the CLI" on page 29

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

1625 Incorrect disk controller configuration.

Explanation

Details of the configuration error are contained in bytes 32 to 63 of the Additional Sense Data field of the error log entry and the error report.

Action

1. Using service documentation for the disk controller, check that the correct configuration is set up for the disk controller. See also your product's configuration guide.
2. Start a cluster discovery operation by rescanning the fibre-channel network.
3. Mark the error that you have just repaired as "fixed".
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

- Enclosure/controller fault

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Discovering MDisks" on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

"Discovering MDisks using the CLI" on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1627 The cluster has insufficient redundancy in its controller connectivity.

Explanation

The cluster has detected that it does not have sufficient redundancy in its connections to the disk controllers. This means that another failure in the SAN could result in loss of access to the application data. The cluster SAN environment should have redundant connections to every disk controller. This redundancy allows for continued operation when there is a failure in one of the SAN components.

To provide recommended redundancy, a cluster should be configured so that:

- each node can access each disk controller through two or more different initiator ports on the node.

- each node can access each disk controller through two or more different controller target ports. Note: Some disk controllers only provide a single target port.
- each node can access each disk controller target port through at least one initiator port on the node.

If there are no higher-priority errors being reported, this error usually indicates a problem with the SAN design, a problem with the SAN zoning or a problem with the disk controller.

If there are unfixed higher-priority errors that relate to the SAN or to disk controllers, those errors should be fixed before resolving this error because they might indicate the reason for the lack of redundancy. Error codes that must be fixed first are:

- 1210 Local FC port excluded
- 1230 Login has been excluded

Note: This error can be reported if the required action, to rescan the fibre-channel network for new MDisks, has not been performed after a deliberate reconfiguration of a disk controller or after SAN rezoning.

The 1627 error code is reported for a number of different error IDs. The error ID indicates the area where there is a lack of redundancy. The data reported in an error log entry indicates where the condition was found.

The meaning of the error IDs is shown below. For each error ID the most likely reason for the condition is given. If the problem is not found in the suggested areas, check the configuration and state of all of the SAN components (switches, controllers, disks, cables and cluster) to determine where there is a single point of failure.

010040 A disk controller is only accessible from a single node port.

- A node has detected that it only has a connection to the disk controller through exactly one initiator port, and more than one initiator port is operational.
- The error data indicates the device WWNN and the WWPN of the connected port.
- A zoning issue or a fibre-channel connection hardware fault might cause this condition.

010041 A disk controller is only accessible from a single port on the controller.

- A node has detected that it is only connected to exactly one target port on a disk controller, and more than one target port connection is expected.
- The error data indicates the WWPN of the disk controller port that is connected.
- A zoning issue or a fibre-channel connection hardware fault might cause this condition.

010042 Only a single port on a disk controller is accessible from every node in the cluster.

- Only a single port on a disk controller is accessible to every node when there are multiple ports on the controller that could be connected.
- The error data indicates the WWPN of the disk controller port that is connected.
- A zoning issue or a fibre-channel connection hardware fault might cause this condition.

010043 A disk controller is accessible through only half, or less, of the previously configured controller ports.

- Although there might still be multiple ports that are accessible on the disk controller, a hardware component of the controller might have failed or one of the SAN fabrics has failed such that the operational system configuration has been reduced to a single point of failure.
- The error data indicates a port on the disk controller that is still connected, and also lists controller ports that are expected but that are not connected.
- A disk controller issue, switch hardware issue, zoning issue or cable fault might cause this condition.

010044 A disk controller is not accessible from a node.

- A node has detected that it has no access to a disk controller. The controller is still accessible from the partner node in the I/O group, so its data is still accessible to the host applications.
- The error data indicates the WWPN of the missing disk controller.
- A zoning issue or a cabling error might cause this condition.

Action

1. Check the error ID and data for a more detailed description of the error.
2. Determine if there has been an intentional change to the SAN zoning or to a disk controller configuration that reduces the cluster's access to the indicated disk controller. If either action has occurred, continue with step 8.
3. Use the GUI or the CLI command `svcinfolsfabric` to ensure that all disk controller WWPNs are reported as expected.
4. Ensure that all disk controller WWPNs are zoned appropriately for use by the cluster.
5. Check for any unfixed errors on the disk controllers.
6. Ensure that all of the fibre-channel cables are connected to the correct ports at each end.
7. Check for failures in the fibre-channel cables and connectors.
8. When you have resolved the issues, use the GUI or the CLI command `svctask detectmdisk` to rescan the fibre-channel network for changes to the MDisks.
NOTE: Do not attempt to detect MDisks unless you are sure that all problems have been fixed. Detecting MDisks prematurely might mask an issue.
9. Mark the error that you have just repaired as fixed. The cluster will revalidate the redundancy and will report another error if there is still not sufficient redundancy.
10. Go to MAP 5700: Repair verification.

Possible Cause-FRUs or other:

- None

1630 The number of device logins was reduced.

Explanation

One possible cause is that the user intentionally reconfigured the system.

Action

1. Check the error in the cluster error log to identify the object ID associated with the error.

2. Check the availability of the failing device using the following command line: `svcinfo lscontroller object_ID`. If the command fails with the message "CMMVC6014E The command failed because the requested object is either unavailable or does not exist," ask the customer if this device was removed from the system.
 - If "yes", mark the error as fixed in the cluster error log and continue with the repair verification MAP.
 - If "no" or if the command lists details of the failing controller, continue with the next step.
3. Check whether the device has regained connectivity. If it has not, check the cable connection to the remote-device port.
4. If all attempts to log in to a remote-device port have failed and you cannot solve the problem by changing cables, check the condition of the remote-device port and the condition of the remote device.
5. Start a cluster discovery operation by rescanning the fibre-channel network.
6. Check the status of the disk controller. If all disk controllers show a "good" status, mark the error that you have just repaired as "fixed". If any disk controllers do not show "good" status, go to start MAP. If you return to this step, contact the support center to resolve the problem with the disk controller.
7. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

- Fibre-channel network fabric fault (50%)
- Enclosure/controller fault (50%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Discovering MDisks" on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

"Discovering MDisks using the CLI" on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Checking disk controller status using the CLI" on page 28

You can use the command-line interface (CLI) to check the status of the disk controllers.

1660 The initialization of the managed disk has failed.

Explanation

The initialization of the managed disk has failed.

Action

1. View the error log entry to identify the managed disk (MDisk) that was being accessed when the problem was detected.
2. Perform the disk controller problem determination and repair procedures for the MDisk identified in step 1.
3. Include the MDisk into the cluster.
4. Check the managed disk status. If all managed disks show a status of "online", mark the error that you have just repaired as "fixed". If any managed disks do not show a status of "online", go to the start MAP. If you return to this step, contact your support center to resolve the problem with the disk controller.
5. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Enclosure/controller fault (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Listing MDisks using the CLI" on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

"Discovering MDisks" on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

"Discovering MDisks using the CLI" on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Determining the failing enclosure or disk controller using the CLI" on page 29

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

1670 The CMOS battery on the 2145 system board failed. Explanation

The CMOS battery on the 2145 system board failed.

Action

1. Replace the CMOS battery.
2. Mark the error that you have just repaired as "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

CMOS battery (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

"Removing the CMOS battery" on page 405

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

1720 In a Metro Mirror or Global Mirror operation, the relationship has stopped and lost synchronization, for a reason other" than a persistent I/O error.

Explanation

In a Metro Mirror or Global Mirror operation, the relationship has stopped and lost synchronization, for a reason other" than a persistent I/O error.

Action

1. Restart the relationship after fixing errors of higher priority.
2. Mark the error that you have just repaired as "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units

(FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1800 The SAN has been zoned incorrectly.

Explanation

This has resulted in more than 512 other" ports on the SAN logging into one port of a 2145 node.

Action

1. Ask the user to reconfigure the SAN.
2. Mark the error as "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

- Fibre-channel switch configuration error
- Fibre-channel switch

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Listing MDisks using the CLI" on page 24

You can use the command-line interface (CLI) to list the managed disks (MDisks).

"Discovering MDisks" on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDisks) that might have been added to the cluster and rebalances MDisk access across the available controller device ports.

"Discovering MDisks using the CLI" on page 25

You can use the command-line interface (CLI) to discover managed disks (MDisks).

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Determining the failing enclosure or disk controller using the CLI" on page 29

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

1850 A cluster recovery operation was performed but data on one or more VDIs has not been recovered.

Explanation

A cluster recovery operation was performed but data on one or more VDIs has not been recovered.

Action

1. The support center will direct the user to restore the data on the affected virtual disks (VDIs).
2. When the VDI data has been restored or the user has chosen not to restore the data, mark the error as "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"Listing MDIs using the CLI" on page 24

You can use the command-line interface (CLI) to list the managed disks (MDIs).

"Discovering MDIs" on page 12

You can have the cluster rescan the fibre-channel network. The rescan discovers any new managed disks (MDIs) that might have been added to the cluster and rebalances MDI access across the available controller device ports.

"Discovering MDIs using the CLI" on page 25

You can use the command-line interface (CLI) to discover managed disks (MDIs).

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

"Determining the failing enclosure or disk controller using the CLI" on page 29

You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

1900 A FlashCopy, Trigger Prepare command has failed because a cache flush has failed.

Explanation

A FlashCopy, Trigger Prepare command has failed because a cache flush has failed.

Action

1. Correct higher priority errors, and then try the Trigger Prepare command again.
2. Mark the error that you have just repaired as "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Cache flush error (100%)

1910 A FlashCopy mapping task was stopped because of the error that is indicated in the sense data.

Explanation

A stopped FlashCopy might affect the status of other" VDisks in the same I/O group. Preparing the stopped FlashCopy operations as soon as possible is advised.

Action

1. Correct higher priority errors, and then prepare and start the FlashCopy task again.
2. Mark the error that you have just repaired as "fixed".
3. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

Data error (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1920 A Metro Mirror or Global Mirror relationship has stopped due to poor performance.

Explanation

This error might be caused by a problem on the primary cluster, a problem on the secondary cluster, or a problem on the inter-cluster link. The problem might be a failure of a component, a component becoming unavailable or having reduced performance due to a service action or it may be that the performance of a component has dropped to a level where the Metro Mirror or Global Mirror

relationship cannot be maintained. Alternatively the error might be caused by a change in the performance requirements of the applications using Metro Mirror or Global Mirror.

This error is reported on the primary cluster when the copy relationship has not progressed sufficiently over a period of time. Therefore, if the relationship is restarted before all the problems are fixed, the error may be reported again when the time period next expires (the default period is five minutes).

You may need to refer to the "SVC Configuration Requirements and Guidelines (CRG)" document while diagnosing this error. This document is at <http://www.ibm.com/storage/support/2145>.

Action

1. If the 1920 error has occurred previously on Metro Mirror or Global Mirror between the same clusters and all the following actions have been attempted, contact your product support center to resolve the problem.
2. On the primary cluster reporting the error, correct any higher priority errors.
3. On the secondary cluster, review the maintenance logs to determine if the cluster was operating with reduced capability at the time the error was reported. The reduced capability might be due to a software upgrade, hardware maintenance to a 2145 node, maintenance to a backend disk sub-system or maintenance to the SAN.
4. On the secondary 2145 cluster, correct any errors that are not fixed.
5. On the inter-cluster link, review the logs of each link component for any incidents that would cause reduced capability at the time of the error. Ensure the problems are fixed.
6. If a reason for the error has been found and corrected, go to Action 10.
7. On the primary cluster reporting the error, examine the 2145 statistics using a SAN productivity monitoring tool and confirm that all the Metro Mirror and Global Mirror requirements described in the "SVC Configuration Requirements and Guidelines (CRG)" document are met. Ensure that any changes to the applications using Metro Mirror or Global Mirror have been taken into account. Resolve any issues.
8. On the secondary cluster, examine the 2145 statistics using a SAN productivity monitoring tool and confirm that all the Metro Mirror and Global Mirror requirements described in the "SVC Configuration Requirements and Guidelines (CRG)" document are met. Resolve any issues.
9. On the inter-cluster link, examine the performance of each component using an appropriate SAN productivity monitoring tool to determine they are operating as expected. Resolve any issues.
10. Mark the error as "fixed" and restart the Metro Mirror or Global Mirror relationship.

When you restart the Metro Mirror or Global Mirror relationship there will be an initial period during which Metro Mirror or Global Mirror performs a background copy to resynchronize the vdisk data on the primary and secondary clusters. During this period the data on the Metro Mirror or Global Mirror auxiliary vdisks on the secondary cluster is inconsistent and the vdisks could not be used as backup disks by your applications.

Attention: To ensure the system has the capacity to handle the background copy load you may wish to delay restarting the Metro Mirror or Global Mirror

relationship until there is a quiet period when the secondary cluster and the SAN fabric (including the inter-cluster link) have the required capacity. If the required capacity is not available you may experience another "1920 error and the Metro Mirror or Global Mirror relationship will stop in an inconsistent state.

Attention: If the Metro Mirror or Global Mirror relationship has stopped in a consistent state ("consistent-stopped") it is possible to use the data on the Metro Mirror or Global Mirror auxiliary vdisks on the secondary cluster as backup disks by your applications. You may therefore wish to start a Flash Copy of your Metro Mirror or Global Mirror auxiliary disks on the secondary system before restarting the Metro Mirror or Global Mirror relationship. This means you maintain the current, consistent, image until the time when the Metro Mirror or Global Mirror relationship is again synchronized and in a consistent state.

Possible Cause-FRUs or other":

- None

other":

- Primary 2145 cluster or SAN fabric problem (10%)
- Primary 2145 cluster or SAN fabric configuration (10%)
- Secondary 2145 cluster or SAN fabric problem (15%)
- Secondary 2145 cluster or SAN fabric configuration (25%)
- Inter-cluster link problem (15%)
- Inter-cluster link configuration (25%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

1930 Migration suspended.

Explanation

Migration suspended.

Action

1. Ensure that all error codes of a higher priority have already been fixed.
2. Ask the customer to ensure that all MDisk groups that are the destination of suspended migrate operations have available free extents.
3. Mark this error as "fixed". This causes the migrate operation to be restarted. If the restart fails, a new error is logged.
4. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

2010 A software upgrade has failed.

Explanation

This might be caused by a hardware error or it might be from a failure in the new version of the software. When the upgrade operation is stopped, an automatic software downgrade is performed to restore the 2145s to their previous software version. If the downgrade operation fails to downgrade a 2145 (for example, because it is offline), the download operation stops and waits for the offline 2145 to be repaired or deleted from the cluster. When the downgrade operation is in progress, configuration commands sent to the cluster fail with a message indicating that a software upgrade operation is still in progress. The downgrade operation might take up to four hours for an eight-node cluster.

Action

1. Display the status of the nodes on the cluster.
2. If any node is offline, delete the offline node from the cluster. See the cluster diagnostic and service-aid commands in your product’s command-line interface user’s guide for detailed information about deleting a node from a cluster. If the delete operation fails with a message indicating that a software upgrade is in progress, the downgrade process is still active. Wait for this operation to either complete or stop on the offline node and then try the delete operation again. If the downgrade operation had stopped, it can now continue.
3. Solve all logged hardware problems.
4. Ask the user to try the software install again.
5. If the installation fails again, report the problem to your software support center.
6. Mark the error that you have just repaired as “fixed”.
7. Go to repair verification MAP.

Possible Cause-FRUs or other”:

- None

other”:

2145 software (100%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

2030 The error that is logged in the cluster error log indicates a software problem either in the 2145 cluster or in a disk enclosure/controller that is connected to the 2145.

Explanation

The error that is logged in the cluster error log indicates a software problem either in the 2145 cluster or in a disk enclosure/controller that is connected to the 2145.

Action

1. Ensure that the software is at the latest level on the cluster and on the controllers.
2. Save the dump data with the configuration dump and logged data dump.
3. Contact your product support center to resolve the problem.
4. Mark the error that you have just repaired as "fixed".
5. Go to repair verification Map.

Possible Cause-FRUs or other”:

- None

other”:

- 2145 software (50%)
- Enclosure/controller software (50%)

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

2040 A software upgrade is required.

Explanation

The software cannot determine the VPD for a FRU. Probably, a new FRU has been installed and the software does not recognize that FRU.

Action

1. If a FRU has been replaced, ensure that the correct replacement part was used. The node VPD indicates which part is not recognized.
2. Ensure that the cluster software is at the latest level.
3. Save dump data with configuration dump and logged data dump.

4. Contact your product support center to resolve the problem.
5. Mark the error that you have just repaired as "fixed".
6. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

2145 software (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

2100 A software error has occurred.

Explanation

One of the 2145 server software components (sshd, crond, or httpd) has failed and reported an error.

Action

1. Ensure that the software is at the latest level on the cluster.
2. Save dump data with configuration dump and logged data dump.
3. Contact your product support center to resolve the problem.
4. Mark the error that you have just repaired as "fixed".
5. Go to repair verification MAP.

Possible Cause-FRUs or other":

- None

other":

2145 software (100%)

Related tasks

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

"MAP 5000: Start" on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

"MAP 5700: Repair verification" on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units

(FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

2500 A secure shell (SSH) session limit for the cluster has been reached.

Explanation

Secure Shell (SSH) sessions are used by applications that manage the cluster. An example of such an application is the command-line interface (CLI). An application must initially log in to the cluster to create an SSH session. The cluster imposes a limit on the number of SSH sessions that can be open at one time. This error indicates that the limit on the number of SSH sessions has been reached and that no more logins can be accepted until a current session logs out.

The limit on the number of SSH sessions is usually reached because multiple users have opened an SSH session but have forgotten to close the SSH session when they are no longer using the application.

A separate SSH session limit allocation is maintained for each user type. Examples of user type are "admin" and "service".

Action

- Because this error indicates a problem with the number of sessions that are attempting external access to the cluster, determine the reason that so many SSH sessions have been opened.
- Select Launch Maintenance Procedures for the cluster on the Viewing Clusters panel of the IBM System Storage SAN Volume Controller Console.
- Select List the current sessions.
- Either use the maintenance procedures option to terminate all sessions, or close individual sessions that are no longer required. Identify sessions based on the host system and application using the session.
- If you are unable to resolve the error using one of the above options, stop and restart the configuration node to terminate all SSH sessions.
- Mark the error as "fixed".

Related tasks

"Using the SAN Volume Controller Console application" on page 4
The SAN Volume Controller Console is a component of the master console software. It can also be installed on any other server that meets the requirements.

"Marking errors as fixed" on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

2600 The cluster was unable to send an e-mail.

Explanation

The cluster has attempted to send an e-mail in response to an event, but there was no acknowledgement that it was successfully received by the SMTP mail server. It might have failed because the cluster was unable to connect to the configured SMTP server, the e-mail might have been rejected by the server, or a timeout might have occurred. The SMTP server might not be running or might not be correctly configured, or the cluster might not be correctly configured. This error is not

logged by the test e-mail function because it responds immediately with a result code.

Action

- Ensure that the SMTP e-mail server is active.
- Ensure that the SMTP server TCP/IP address and port are correctly configured in the cluster e-mail configuration.
- Send a test e-mail and validate that the change has corrected the issue.
- Mark the error that you have just repaired as fixed.
- Go to MAP 5700: Repair verification.

Possible Cause-FRUs or other:

- None

2601 Error detected while sending an e-mail. Explanation

An error has occurred while the cluster was attempting to send an e-mail in response to an event. The cluster is unable to determine if the e-mail has been sent and will attempt to resend it. The problem might be with the SMTP server or with the cluster e-mail configuration. The problem might also be caused by a failover of the configuration node. This error is not logged by the test e-mail function because it responds immediately with a result code.

Action

- If there are higher-priority unfixed errors in the log, fix those errors first.
- Ensure that the SMTP e-mail server is active.
- Ensure that the SMTP server TCP/IP address and port are correctly configured in the cluster e-mail configuration.
- Send a test e-mail and validate that the change has corrected the issue.
- Mark the error that you have just repaired as fixed.
- Go to MAP 5700: Repair verification.

Possible Cause-FRUs or other:

- None

3000 The 2145 UPS temperature is close to its upper limit. If the temperature continues to rise the UPS will power off. Explanation

The temperature sensor in the 2145 UPS is reporting a temperature that is close to the operational limit of the unit. If the temperature continues to rise the UPS will power off for safety reasons. The sensor is probably reporting an excessively high temperature because the environment in which the UPS is operating is too hot.

Action

1. Ensure that the room ambient temperature is within the permitted limits.
2. Ensure that the air vents at the front and back of the UPS are not obstructed.
3. Ensure that other devices in the same rack are not overheating.
4. When you are satisfied that the cause of the overheating has been resolved, mark the error "fixed".

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

3001 The 2145 UPS-1U temperature is close to its upper limit. If the temperature continues to rise the UPS will power off.

Explanation

The temperature sensor in the 2145 UPS-1U is reporting a temperature that is close to the operational limit of the unit. If the temperature continues to rise the UPS will power off for safety reasons. The sensor is probably reporting an excessively high temperature because the environment in which the UPS is operating is too hot.

Action

1. Ensure that the room ambient temperature is within the permitted limits.
2. Ensure that the air vents at the front and back of the UPS are not obstructed.
3. Ensure that other” devices in the same rack are not overheating.
4. When you are satisfied that the cause of the overheating has been resolved, mark the error “fixed”.

Related tasks

“Marking errors as fixed” on page 14

You can use the SAN Volume Controller Console to mark errors as fixed for the cluster error log. This action is only necessary if you fix an error without using the online maintenance procedures. The online procedures automatically mark an error as fixed after a successful repair.

3010 Internal UPS software error detected.

Explanation

Some of the tests that are performed during node startup did not complete because some of the data reported by the UPS during node startup is inconsistent because of a software error in the UPS. The node has determined that the UPS is functioning sufficiently for the node to continue operations. The operation of the cluster is not affected by this error. This error is usually resolved by power cycling the UPS.

Action

1. Power cycle the UPS at a convenient time. The one or two nodes attached to the UPS should be powered off before powering off the UPS. Once the nodes have powered down, wait 5 minutes for the UPS to go into standby mode (flashing green AC LED). If this does not happen automatically then check the cabling to confirm that all nodes powered by this UPS have been powered off. Remove the power input cable from the UPS and wait at least 2 minutes for the UPS to clear its internal state. Reconnect the UPS power input cable. Press the UPS ON button. Power on the nodes connected to this UPS.
2. If the error is reported again after the nodes are restarted replace the 2145 UPS electronics assembly.

Possible Cause-FRUs or other”:

- 2145 UPS electronics assembly (5%)

other”:

- Transient UPS error (95%)

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

SAN problem determination

The procedures to service the SAN Volume Controller that are provided here help you solve problems on the SAN Volume Controller and its connection to the storage area network (SAN).

SAN failures might cause the SAN Volume Controller cluster to be unable to form or they might cause SAN Volume Controller disks to be inaccessible to host systems. Failures can be caused by SAN configuration changes or by hardware failures in SAN components.

Perform the following steps if you were sent here from either the Maintenance Analysis Procedures or the error codes:

1. If the customer has changed the SAN configuration by changing the fibre-channel cable connections or switch zoning, ask the customer to verify that the changes were correct and, if necessary, reverse those changes.
2. Verify that the power is turned on to all switches and redundant array of independent disk (RAID) controllers that the SAN Volume Controller uses and that they are not reporting any hardware failures. If problems are found, resolve those problems before proceeding further.
3. Verify that the fibre-channel cables that connect the SAN Volume Controllers to the switches are securely connected.
4. If the customer is running a SAN management tool that you are familiar with and that you have access to, you can use that tool to view the SAN topology and isolate the failing component. You can also review the topic that describes how to view the fibre-channel fabric connections to understand the SAN Volume Controller view of the SAN.

Related tasks

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“Viewing the fibre-channel fabric connections” on page 14

Failures of the SAN Volume Controller hardware, fibre-channel cables, fibre-channel switches, fibre-channel hardware in host systems, or disk controllers can cause fibre-channel connectivity problems.

Troubleshooting the master console

These topics provide information that can help you troubleshoot and resolve problems with the master console.

In addition to troubleshooting on your own, you can also request an Assist On-site session with an IBM service representative.

Clearing the Microsoft Windows event logs

When you change the master console IP address or host name, you might create entries in the Microsoft® Windows event logs.

Clear all three logs to ensure that these log entries do not cause confusion when you try to isolate problems.

The following procedure assumes that your Windows desktop is displayed.

Perform the following steps to clear the event logs:

1. Right-click **My Computer** and select **Manage**.
2. Expand **Event Viewer**.
3. Right-click **Application** and select **Clear All Events**. Click **No** when you are asked if you want to save the log before clearing.
4. Right-click **Security** and select **Clear All Events**. Click **No** when you are asked if you want to save the log before clearing.
5. Right-click **System** and select **Clear All Events**. Click **No** when you are asked if you want to save the log before clearing.
6. Close the computer management window.

Troubleshooting unexpected shutdowns of the SAN Volume Controller Console

If you are working with the SAN Volume Controller Console and you receive a You have signed off message before the SAN Volume Controller Console closes unexpectedly, use these instructions to help you troubleshoot the problem.

You can perform any of the following actions to troubleshoot an unexpected shutdown of the SAN Volume Controller Console:

- Open a new browser window and try to reconnect to the SAN Volume Controller Console. The logoff message is typically caused when an open session times out. This often happens if the browser window was left open from a previous session.
- Increase the allocation of memory for the SAN Volume Controller Console and then try again to reconnect to the application. An unexpected shutdown can occur because of a memory failure on the master console hardware, which causes the SAN Volume Controller Console to run with less memory than is required.
- Determine if the IP address of the master console hardware has changed since the last time that the system was restarted. If it has changed, restart the system to correct the problem.

Troubleshooting Microsoft Windows boot problems

Use this section to help you resolve Microsoft Windows boot problems on the master console system.

Perform the following actions to resolve Windows boot problems:

- If you cannot start the Windows system from the boot drive, try to start the master console system from the second disk drive (the mirrored disk).
- If you continue to have problems starting the system from either the boot disk drive or the second disk drive, you must replace the corrupted disk drive, and then mirror the boot drive again.

Note: After you set up mirroring, the hard disk drive on the system that runs the master console is actually a mirrored pair of hard disks. This strategy protects against loss of access to the master console due to a disk failure. This mirroring can help you start the master console system if the boot disk does not work. Whenever you replace one of the disks on your master console, you must make sure that you mirror the disks again.

Starting the master console hardware from the mirrored disk

During the Microsoft Windows boot process on the master console hardware, if Windows tries to start but fails with an Inaccessible Boot Device message on a blue screen, and another restart attempt does not solve the problem, the Windows boot code on the startup device might be corrupted.

The following instructions require that you use the administrator password for the power-on password when you restart the system. If the system is set up with an administrator password and you use a regular power-on password, you can see only a limited version of the **Configuration/Setup** menu.

Perform the following steps to resolve the problem:

1. Restart the master console system and watch the screen. When the Press F1 for Configuration/Setup message appears, press F1.
The main menu for Configuration/Setup Utility is displayed.
2. Select **Start Options** from the main menu.
3. Select **Start Sequence**.
4. Step down the sequence to the one that contains the hard disk.
5. Use the left and right cursor keys to select the other hard disk. For example, if the hard disk is set to 1, select 0. If the hard disk is set to 0, select 1.
6. Press Esc to exit each menu until the option to save and exit is displayed. Select **Yes** to save the changes and exit the Configuration/Setup Utility.
7. If the master console system starts, proceed with the steps for recovering from a master console disk failure. If the master console system does not start, contact your IBM service representative.

Replace a disk on the master console hardware

If one of the disk drives on the master console system fails, you might need to replace it with a new disk drive. The new drive must be the same capacity or larger than the drive being replaced.

Perform the following steps if one of the mirrored disk drives fails and must be replaced:

1. If you cannot determine which of the two disk drives has failed, restart the system with each disk drive to determine which drive is not functioning.
2. Right-click the **My Computer** icon on your desktop and select **Manage**.
3. Select **Disk Management** from the left navigation panel. The hard drives are displayed in the right panel.
4. If the failing disk drive is displayed, right-click the main volume of the drive and select **Break Mirror**.
5. Shut down the master console hardware and replace the failing disk drive using the procedures that are detailed in the documentation for your replacement hard drive. Ensure that the jumper settings for the new drive are the same as the jumper settings for the drive that is being replaced.

Notes: If the replacement drive has a master boot record (MBR), erase the MBR prior to using the replacement drive. However, if the master console computer fails to start because it cannot find the MBR, change the start sequence in the BIOS to the other hard drive.

6. Restart the computer.
7. Right-click **My Computer** on your desktop and select **Manage**.
8. Select **Disk Management**. The hard drives are displayed in the right panel.
9. If a disk drive is marked **Missing**, right-click the drive and select **Remove Disk**.
10. If a no entry sign is displayed on the new disk drive, right-click that disk drive and select **Write Signature**. This removes the no entry sign.
11. Right-click the new disk drive and select **Upgrade to Dynamic Disk**.
12. Right-click the volume that you want to mirror and select **Add Mirror**. The Add Mirror wizard is started.
13. Use the Add Mirror wizard to configure the second volume.
14. Ignore the window for making changes to the boot.ini file.

The status of both volumes, the existing drive, and the new drive changes to **Regenerating**. After a short period of time, the status shows the percentage of regeneration that has completed. When the regeneration completes, the status is displayed as **Healthy**.

Chapter 8. Maintenance analysis procedures

The maintenance analysis procedures (MAPs) inform you how to analyze a failure that occurs with a SAN Volume Controller.

With the MAPs you can isolate the field replaceable units (FRUs) of the SAN Volume Controller that fails. The following MAPs are defined for the SAN Volume Controller:

- Start
- Power on
- Power off
- 2145 uninterruptible power supply-1U (2145 UPS-1U)
- 2145 uninterruptible power supply (2145 UPS)
- 2145 UPS-1U repair verification
- 2145 UPS repair verification
- Redundant ac power
- Redundant ac power verification
- Front panel
- Ethernet
- Fibre-channel
- Repair verification
- Light path
- Hardware boot

Note: Start all problem determination procedures and repair procedures with “MAP 5000: Start” on page 270.

Using the maintenance analysis procedures

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

When you service one SAN Volume Controller, the other keeps the storage area network (SAN) operational. With concurrent maintenance, all field replaceable units (FRUs) can be removed, replaced, and tested on one SAN Volume Controller while the SAN and host systems are powered on and doing productive work.

Note: Unless you have a particular reason, do not remove the power from both SAN Volume Controllers unless instructed to do so. When you need to remove power, see “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

- To isolate the FRUs in the failing SAN Volume Controller, complete the actions and answer the questions given in these maintenance analysis procedures (MAPs).
- When instructed to exchange two or more FRUs in sequence:
 1. Exchange the first FRU in the list for a new one.
 2. Verify that the problem is solved.
 3. If the problem remains:

- a. Reinstall the original FRU.
 - b. Exchange the next FRU in the list for a new one.
4. Repeat steps 2 on page 269 and 3 on page 269 until either the problem is solved, or all the related FRUs have been exchanged.
 5. Complete the next action indicated by the MAP.
 6. If the MAPs are being used due to a cluster error code, following the repair, mark the error as fixed in the cluster error log before verifying the repair.

Related tasks

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

MAP 5000: Start

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

If you are not familiar with the MAPs, first read the topic about using the MAPs. This MAP is used for the SAN Volume Controller 2145-4F2, the SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8G4. Be sure that you know which model you are using before you start this procedure. To determine which model you are working with, see the overview topic for the SAN Volume Controller.

You might have been sent here for one of the following reasons:

- The web-based Directed Maintenance procedure sent you here
- A problem occurred during the installation of a SAN Volume Controller
- Another MAP sent you here
- A user observed a problem that was not detected by the system

SAN Volume Controller nodes are configured in pairs. While you service one SAN Volume Controller, the other permits access to all the storage managed by the pair. With concurrent maintenance, all FRUs can be removed, replaced, and tested on one SAN Volume Controller while the SAN and host systems are powered on and doing productive work.

Note: Unless you have a particular reason, do not remove the power from both SAN Volume Controller nodes unless instructed to do so.

Perform the following steps:

1. Were you sent here from a Directed Maintenance procedure?

NO Go to step 2

YES Go to step 8 on page 271

2. (from step 1)

Find the master console system that is used to access the SAN Volume Controller cluster. This is normally located in the same rack as the SAN Volume Controller nodes but might be located in another rack if the master console is used to support more than one SAN Volume Controller cluster or if the user has installed the “software master” feature.

3. (from step 2)

Log in to the master console system using the user ID and password that is provided by the user.

4. (from step 3 on page 270)

Log into the SAN Volume Controller Console using the user ID and password that is provided by the user and launch the SAN Volume Controller Console for the cluster that you are repairing.

5. (from step 4)

Does the SAN Volume Controller Console start?

NO Go to step 8.

YES Go to step 6.

6. (from step 5)

When the SAN Volume Controller cluster that you want to service is selected, is the Welcome panel displayed?

NO Go to step 8.

YES Go to step 7.

7. (from step 6)

Start the Directed Maintenance Procedures.

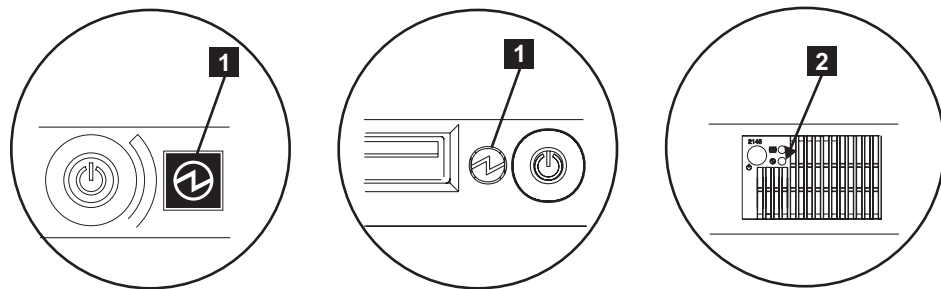
Did the maintenance procedures find an error that needs to be fixed?

NO Go to step 8.

YES Follow the Directed Maintenance procedures.

8. (from steps 1 on page 270, 5, 6, and 7)

Is the power indicator on any SAN Volume Controller front panel off? On the SAN Volume Controller 2145-4F2, check to see if the power light **2** on the front panel is off; on other models, check to see if the power LED **1** on the operator information panel is off.



1 SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 operator information panel Power LED

2 SAN Volume Controller 2145-4F2 power light

NO Go to step 9 on page 272.

YES Try to power on the SAN Volume Controller nodes. See “Using the power control for the SAN Volume Controller” on page 62.

Note: The uninterruptible power supply (UPS) that supplies the SAN Volume Controller might also be powered off. This must be powered on before the SAN Volume Controller powers on.

If the SAN Volume Controller nodes power on, go to step 9; otherwise, go to the Power MAP.

9. (from step 8 on page 271)

Is any SAN Volume Controller front panel showing a hardware error? There is a hardware error if any of the following conditions are true for the node:

- None of the LEDs on the front panel are on and the front panel display is blank.
- The node is a SAN Volume Controller 2145-4F2 and the check LED on the front panel is on.
- The node is a SAN Volume Controller 2145-8F2, a SAN Volume Controller 2145-8F4, or a SAN Volume Controller 2145-8G4, and the error LED on the front panel is on.

Figure 41 shows the location of the service controller check or error light.

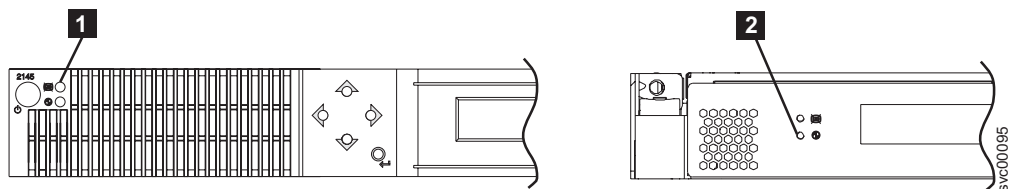


Figure 41. Service controller check lights

1 SAN Volume Controller 2145-4F2 service controller check light

2 SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8G4 service controller error light

NO Go to step 10.

YES The service controller for the SAN Volume Controller has failed.

- a. Check that the service controller that is indicating an error is correctly installed. If it is, replace the service controller.
- b. Go to “MAP 5700: Repair verification” on page 319.

10. Are you working on the SAN Volume Controller 2145-4F2?

NO Go to step 11.

YES Go to step 12 on page 273.

11. (from step 10)

Is the operator panel error LED **1 that you see in Figure 42 on page 273 illuminated or flashing?**

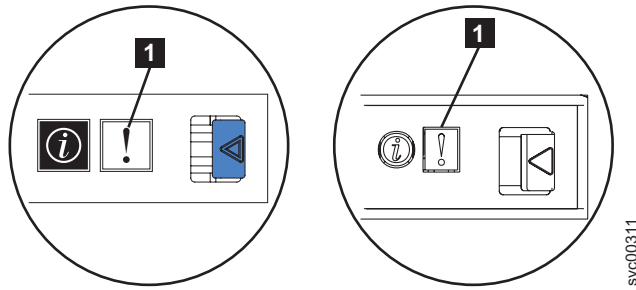


Figure 42. Operator information panel error LED

- NO Go to step 12.
 - YES Go to “MAP 5800: Light path” on page 321.
12. (from step 10 on page 272 and step 11 on page 272)
- Is the hardware boot display that you see in Figure 43 displayed on any of the SAN Volume Controllers?**



Figure 43. Hardware boot display

- NO Go to step 14.
 - YES Go to step 13.
13. (from step 12)
- Has the hardware boot display that you see in Figure 43 displayed for more than three minutes?**
- NO Go to step 14.
 - YES Perform the following:
 - a. Go to “MAP 5900: Hardware boot” on page 329.
 - b. Go to “MAP 5700: Repair verification” on page 319.
14. (from steps 12 and 13)
- Is Failed displayed on the top line of the service display of any SAN Volume Controller?**
- NO Go to step 15.
 - YES Perform the following:
 - a. Note the failure code and go to the boot codes to perform the repair actions.
 - b. Go to “MAP 5700: Repair verification” on page 319.
15. (from step 14)
- Is Booting displayed on the top line of the service display of any SAN Volume Controller?**
- NO Go to step 17 on page 274.
 - YES Go to step 16.
16. (from step 15)

A progress bar and a boot code are displayed. If the progress bar does not advance for more than three minutes, it has stalled.

Has the progress bar stalled?

NO Go to step 17.

YES Perform the following:

- a. Note the failure code and go to “Understanding the boot codes” on page 133 to perform the repair actions.
- b. Go to “MAP 5700: Repair verification” on page 319.

17. (from steps 15 on page 273 and step 16 on page 273)

If you pressed any of the navigation buttons on the front panel, wait for 60 seconds to ensure that the display has switched to its default display.

Is Node Error displayed on the top line of the service display of any SAN Volume Controller?

NO Go to step 18.

YES Perform the following steps:

- a. Note the failure code and go to the node error codes to perform the repair actions.
- b. Go to “MAP 5700: Repair verification” on page 319.

18. (from step 17)

Is Cluster Error displayed on the top line of the service display of any SAN Volume Controller?

NO Go to step 19.

YES A cluster error was detected. This error code is displayed on all the operational nodes in the cluster. This type of error is normally repaired using the Directed Maintenance procedures. Perform the following steps:

- a. Go to step 2 on page 270 to perform the Directed Maintenance procedure. If you return here, go to the cluster error codes to perform the repair actions.
- b. Go to “MAP 5700: Repair verification” on page 319.

19. (from step 18)

Is Powering Off, Restarting, Shutting Down, or Power Failure displayed in the top line of the service display?

NO Go to step 21 on page 275.

YES The progress bar moves every few seconds. Wait for the operation to complete and then return to step 1 on page 270 in this MAP. If the progress bar does not move for three minutes, press the power button and go to step 20.

20. (from step 19)

Did the SAN Volume Controller power off?

NO Perform the following steps:

- a. Remove the power cord from the rear of the box.
- b. Wait 60 seconds.
- c. Replace the power cord.

- d. If the node does not power on, press the power button to power-on the SAN Volume Controller and then return to step 1 on page 270 in this MAP.

YES Perform the following steps:

- a. Wait 60 seconds.
- b. Click the power button to power-on the SAN Volume Controller and then return to step 1 on page 270 in this MAP.

Note: If the SAN Volume Controller is powered off for more than five minutes and it is the only SAN Volume Controller that is connected to the 2145 uninterruptible power supply (2145 UPS), the 2145 UPS also powers off. Before pressing the power button on the SAN Volume Controller, press the power-on button on the 2145 UPS. The 2145 uninterruptible power supply-1U (2145 UPS-1U) does not power-off if the SAN Volume Controller was powered off. The 2145 UPS-1U only powers off if its power button is pressed, input power has been lost for more than five minutes, or the SAN Volume Controller has shut it down following a reported loss of input power.

21. (from step 20 on page 274)

Is Charging or Recovering displayed in the top line of the service display of any SAN Volume Controller?

NO Go to step 22.

YES If Charging is displayed, the UPS battery is not yet charged sufficiently to support the SAN Volume Controller. If Charging is displayed for more than three hours, go to the MAP for your UPS: "MAP 5150: 2145 UPS-1U" on page 286 or "MAP 5200: 2145 UPS" on page 290. If Recovering is displayed, the UPS battery is not yet charged sufficiently to be able to support the SAN Volume Controller immediately following a power supply failure. However, if Recovering is displayed, the SAN Volume Controller can be used normally. If Recovering is displayed for more than two hours, go to the MAP for your specific UPS.

22. (from step 21)

Is WWNN displayed on the top line of the service display of any SAN Volume Controller with the last five characters of a worldwide node name (WWNN) displayed on the second line?

NO Go to step 23 on page 276.

YES The node is indicating that its WWNN might need changing. It enters this mode when the node service controller or disk have been changed but the required service procedures have not been followed. The last five characters of the WWNN that are shown is the suggested change.

Note: Do not accept the displayed WWNN value until you read the following information to ensure that the value is correct. If you accept an incorrect value, you might find that the SAN zoning for the node is also not correct and more than one node is using the same WWNN. Therefore, it is important to establish the correct WWNN before you continue.

If the following statement is true ...	The displayed WWNN ...
The service controller has been replaced.	Is probably the required value.
The disk has been replaced, perhaps as part of a frame replacement procedure, but has not been re-initialized.	Is not the correct value, and it must be changed.

You can view the correct WWNN in the node VPD. Use the console application or run the **svcinfo lsnodevpd** command from the command line to display the VPD and find the WWNN for the node. The VPD shows the full 16-character WWNN. Only the last five characters differ for SAN Volume Controller nodes, so only these are shown on the front panel.

- If the last five characters that are shown in the node VPD match the displayed value on the front panel, accept the displayed value by pressing the select button.
- If the last five characters that are shown in the node VPD do not match the displayed value on the front panel, change the value on the front panel to that shown in the node VPD. To change this value, perform the following steps:
 - a. Press and hold the down button, press and release the select button and then release the down button to enter the WWNN edit mode.
 - b. The first character of the WWNN is shown in reverse video. Change its value by using the up and down buttons. Move between characters using the left and right buttons. Change the value of each character by using the up and down buttons until the displayed value matches the value in the node VPD.
 - c. When all five characters are correct, press the select button to leave edit mode.
 - d. The front panel display shows WWNN on line one and the modified value on line two. If the displayed value correctly matches the WWNN in the node VPD, press the select button to accept the change. If the value is not correct, repeat steps 22a through 22c.

After you set the WWNN, check the front panel display. If the front panel shows **Cluster:** but does not show a cluster name, you must use the console application to delete the node from the cluster and add the node back into the cluster.

23. (from step 22 on page 275)

Is there a node that is not a member of a cluster? You can tell if a node is not a member of a cluster by checking the front panel cluster menu. If **Cluster:** is displayed but no cluster name is shown, the node is not a member of a cluster. (The cluster name is on the second line of the front panel display if the current language font allows a two-line display. Otherwise, you can press the select button to display the cluster name.)

NO Go to step 24 on page 277.

YES The node is not a member of a cluster. The node might have been deleted from the cluster during a maintenance procedure and has not been added back into the cluster. Make sure that each I/O group in the cluster contains two nodes. If an I/O group in the cluster has only one node, add the node back into that cluster and ensure that the node is restored to the same I/O group that it was deleted from.

24. (from step 23 on page 276)

Is the service display unreadable?

NO Go to step 25.

YES Perform the following steps:

- a. Check the language. The display might be set to another language.
- b. If the language is set correctly, go to “MAP 5400: Front panel” on page 307.

25. (from step 24)

No errors were detected by the SAN Volume Controller. If you suspect that the problem that is reported by the customer is a hardware problem, perform the following tasks:

- a. Perform Problem Determination procedures on your host systems, disk controllers, and fibre-channel switches.
- b. Ask your hardware support center for assistance.

If you suspect that the problem is a software problem, see the topic concerning installing and maintaining the SAN Volume Controller software.

Related concepts

Chapter 1, “SAN Volume Controller overview,” on page 1

The SAN Volume Controller combines hardware and software into a comprehensive, modular appliance that uses symmetric virtualization.

Related tasks

“Using directed maintenance procedures” on page 63

You can use directed maintenance procedures (DMP) to diagnose and resolve problems with the SAN Volume Controller.

“Determining a hardware boot failure” on page 133

If you see that the hardware boot display stays on the front panel for more than three minutes, the node cannot boot. The cause might be a hardware failure or the software on the hard disk drive is missing or damaged.

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5100: Power 2145-4F2” on page 283

MAP 5100: Power 2145-4F2 helps you to solve problems that have occurred on the SAN Volume Controller 2145-4F2 power. If you are using the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8G4, see the MAP for the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8G4 node.

“MAP 5150: 2145 UPS-1U” on page 286

MAP 5150: 2145 UPS-1U helps you solve problems that have occurred in the 2145 uninterruptible power supply-1U (2145 UPS-1U) systems used on a SAN Volume Controller.

“MAP 5200: 2145 UPS” on page 290

MAP 5200: 2145 UPS helps you solve problems that have occurred in the 2145 uninterruptible power supply (2145 UPS) systems used on a SAN Volume Controller 2145-4F2.

“MAP 5400: Front panel” on page 307

MAP 5400: Front panel helps you to solve problems that have occurred on the SAN Volume Controller front panel.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Viewing the vital product data” on page 13

You can view the vital product data for a node from the Viewing Vital Product Data panel.

Related reference

Chapter 4, “Installing and maintaining the software for the SAN Volume Controller,” on page 89

The software for the SAN Volume Controller is preinstalled on all nodes.

“Using the power control for the SAN Volume Controller” on page 62

SAN Volume Controllers are powered by an uninterruptible power supply (UPS) located in the same rack as the SAN Volume Controller.

“Select language? option” on page 111

The language displayed can be changed from the menu.

“Displaying the vital product data” on page 95

You can use the command-line interface (CLI) to display the SAN Volume Controller cluster or node vital product data (VPD).

Related information

“Understanding cluster error codes” on page 175

Every cluster error code includes an error code number, a description, action, and possible field replaceable units (FRUs).

“Understanding the boot codes” on page 133

The boot codes are displayed on the screen when a node is booting.

“Understanding the node error codes” on page 162

Node error codes are displayed on the display screen by node software.

MAP 5050: Power 2145-8F2, 2145-8F4, and 2145-8G4

MAP 5050: Power 2145-8F2, 2145-8F4, and 2145-8G4 helps you to solve problems that have occurred on the SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8G4 power. If you are using the SAN Volume Controller 2145-4F2, see the MAP for the SAN Volume Controller 2145-4F2 node.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here for one of the following reasons:

- A problem occurred during the installation of a SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, or SAN Volume Controller 2145-8G4 node.
- The power switch failed to turn the node on
- The power switch failed to turn the node off
- Another MAP sent you here

Perform the following steps:

1. Are you here because the node is not powered on?

NO Go to step 8 on page 281.

YES Go to step 2 on page 279.

2. (from step 1 on page 278)

Is the power light continuously illuminated? See Figure 44 or Figure 45.

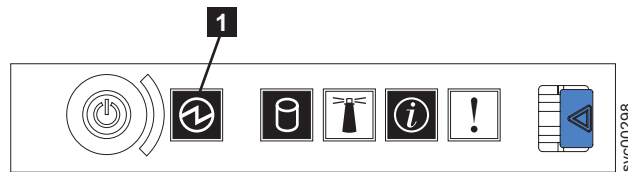


Figure 44. The SAN Volume Controller 2145-8G4 operator information panel

1 Power LED

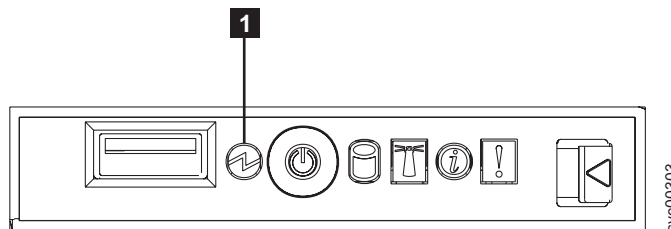


Figure 45. The SAN Volume Controller 2145-8F2 and the SAN Volume Controller 2145-8F4 operator information panel

NO Go to step 3.

YES The node is powered on correctly. Reassess the symptoms and return to “MAP 5000: Start” on page 270 or go to “MAP 5700: Repair verification” on page 319 to verify the correct operation.

3. (from step 2)

Is the power light on the node operator information panel flashing?

NO Go to step 5 on page 280.

YES The node is in standby mode. Input power is present. Go to step 4.

4. (from step 3)

Press the power-on button on the front panel of the node.

Is the Power On indicator on the front panel of the node illuminated a solid green?

NO Verify that the operator panel cable is correctly seated at both ends. If the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 node still fails to power on, replace parts in the following sequence:

- a. Operator information panel
- b. Cable, signal, front panel
- c. Frame assembly

If you are working on a SAN Volume Controller 2145-8G4, verify that the operator information panel cable is correctly seated on the system board. If the SAN Volume Controller 2145-8G4 still fails to power on, replace parts in the following sequence:

- a. Operator information panel assembly

b. Frame assembly

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES The power-on indicator on the front panel shows that the node has successfully powered on. Continue with “MAP 5700: Repair verification” on page 319 to verify the correct operation.

5. (from step 3 on page 279)

Is the rear panel power LED on or flashing? See Figure 46.

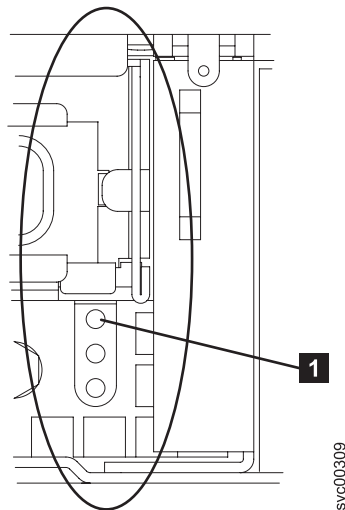


Figure 46. Power LED

1 Power LED

NO Go to step 6.

YES The operator panel is failing. Verify that the operator information panel cable is correctly seated at both ends. If the cable is correctly seated and the operator panel power light is still not on or blinking, replace SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 parts in the following sequence:

- a. Operator information panel
- b. Cable, signal, front panel
- c. Frame assembly

If you are working on a SAN Volume Controller 2145-8G4, verify that the operator information panel cable is correctly seated on the system board. If the SAN Volume Controller 2145-8G4 still fails to power on, replace parts in the following sequence:

- a. Operator information panel assembly
- b. Frame assembly

6. (from step 5)

Locate the 2145 uninterruptible power supply-1U (2145 UPS-1U) that is connected to this node.

Does the 2145 UPS-1U powering this node have its power on and load segment 2 indicators a solid green?

NO Go to “MAP 5150: 2145 UPS-1U” on page 286.

YES Go to step 7.

7. (from step 6 on page 280)

Is the ac indicator on the rear of the node power supply assembly illuminated? See Figure 47.

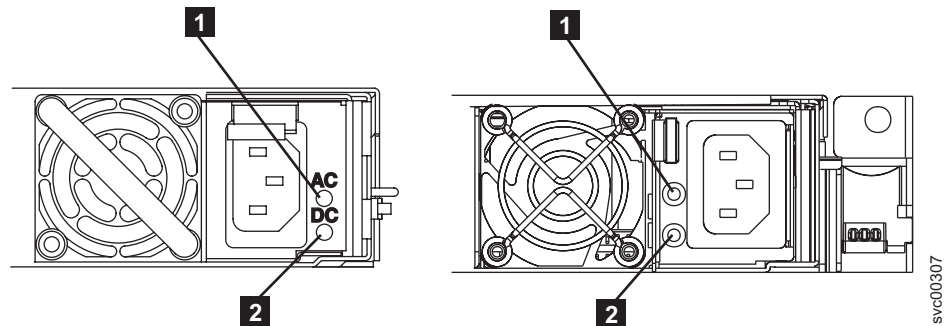


Figure 47. ac and dc LED indicators

1 ac LED

2 dc LED

NO Verify that the input power cable is securely connected at both ends and shows no sign of damage. If the cable is faulty or damaged, then replace it; otherwise, replace SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 parts in the following sequence:

- a. Power supply, 585 watt
- b. Power backplane

Replace the SAN Volume Controller 2145-8G4 parts in the following sequence:

- a. Power supply 670W
- b. Power backplane

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Go to step 8.

8. (from step 7)

Is the dc indicator on the rear of the node power supply assembly illuminated? See Figure 47.

NO Replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 parts in the following sequence:

- a. Power backplane
- b. Power supply, 585 watt
- c. Frame assembly

Replace the SAN Volume Controller 2145-8G4 parts in the following sequence:

- a. Power backplane
- b. Power supply 670W
- c. Power backplane

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Verify that the operator panel cable is correctly seated at both ends. If the node still fails to power on, replace parts in the following sequence:

- a. Operator information panel
- b. Cable, signal, front panel
- c. Frame assembly

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

9. (from step 1 on page 278)

The node will not power off when the power button is pressed. When the node is fully booted, power-off is performed under the control of the SAN Volume Controller software. The power-off operation can take up to five minutes to complete.

Is Powering Off displayed on the front panel?

NO Go to step 10.

YES Wait for the node to power off. If the node fails to power off after 5 minutes, go to step 10.

10. (from step 9)

Attention: Powering off the node by any means other than using the SAN Volume Controller Console might cause a loss of data in the node cache. If you are performing concurrent maintenance, this node must be deleted from the cluster before you proceed. Ask the customer to delete the node from the cluster now. If they are unable to delete the node, call your support center for assistance before you proceed.

The node cannot be powered off either because of a software fault or because of a hardware failure. Press and hold the power button. The node should power off within five seconds.

Did the node power off?

NO Power off the 2145 UPS-1U that is connected to this node.

Attention: Be sure that you are powering of the correct 2145 UPS-1U. If necessary, trace the cables back to the 2145 UPS-1U assembly. Powering off the wrong 2145 UPS-1U may cause customer data loss. Go to step 11.

YES Go to step 11.

11. (from step 10)

If necessary, power on the 2145 UPS-1U that is connected to this node then press the power button to power the node on.

Did the node power on and boot correctly?

NO Go to “MAP 5000: Start” on page 270 to resolve the problem.

YES Go to step 12.

12. (from step 11)

The node has probably suffered a software failure. Dump data might have been captured that will help resolve the problem. Call your support center for assistance.

Related tasks

“Using the maintenance analysis procedures” on page 269
SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5150: 2145 UPS-1U” on page 286

MAP 5150: 2145 UPS-1U helps you solve problems that have occurred in the 2145 uninterruptible power supply-1U (2145 UPS-1U) systems used on a SAN Volume Controller.

“MAP 5250: 2145 UPS-1U repair verification” on page 294

MAP 5250: 2145 UPS-1U repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs, or repair actions that were done, have solved all the problems on the SAN Volume Controller 2145 uninterruptible power supply-1U (2145 UPS-1U).

Related reference

“SAN Volume Controller controls and indicators” on page 30

The controls and indicators are located on the front panel of the SAN Volume Controller.

“SAN Volume Controller rear panel indicators” on page 37

The rear panel indicators for the SAN Volume Controller are contained on the back panel assembly.

“Understanding the fields for the node VPD” on page 96

You must be aware of the fields for the node vital product data (VPD).

MAP 5100: Power 2145-4F2

MAP 5100: Power 2145-4F2 helps you to solve problems that have occurred on the SAN Volume Controller 2145-4F2 power. If you are using the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8G4, see the MAP for the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8G4 node.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here for one of the following reasons:

- A problem occurred during the installation of a SAN Volume Controller 2145-4F2
- The power-on switch failed to turn the node on
- Another MAP sent you here

Perform the following steps:

1. Press the power-on switch on the SAN Volume Controller 2145-4F2 front panel.

Is the power-on indicator on the SAN Volume Controller 2145-4F2 front panel illuminated a solid green?

NO Go to step 2.

YES The Power-on indicator on the front panel shows that the SAN Volume Controller 2145-4F2 has successfully powered on. Continue with “MAP 5700: Repair verification” on page 319 to verify the correct operation.

2. **Is the system board power LED indicator on the SAN Volume Controller 2145-4F2 rear panel flashing green?**

NO Go to step 3 on page 284.

YES The System board power LED indicator on the node rear panel shows that power is present at the power supply but the power-on switch failed to turn the node on.

- Replace the parts in the following sequence:
 - Power supply unit
 - Service controller
 - Front panel assembly
 - System board assembly
- Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

3. Is the system board power LED indicator on the SAN Volume Controller 2145-4F2 rear panel illuminated a solid green?

NO Go to step 4.

YES The System board power LED indicator on the node rear panel shows that the power-on switch on the SAN Volume Controller 2145-4F2 is on, but is not being displayed on the front panel power-on indicator.

- Replace the parts in the following sequence:
 - Service controller
 - Front panel assembly
 - System board assembly
- Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

4. Determine the type of uninterruptible power supply (UPS) that you are using.

You can find out which UPS you are using by one of the following methods:

- Do a physical check of the UPS. The 2145 uninterruptible power supply (2145 UPS) is 2U high (3.5 in), while the 2145 uninterruptible power supply-1U (2145 UPS-1U) is 1U high (1.75 in).
- Through the user interface, look at the node vital product data (VPD). See the documentation on understanding the fields for the node VPD for more information.
- Through the command-line interface, look at the node VPD by issuing the following command:

```
svcinfo lsnodevpd nodeID
```

If your UPS is a 2145 UPS:

Go to step 5

If your UPS is a 2145 UPS-1U:

Go to step 9 on page 285.

5. (from step 4)

Does the 2145 UPS powering this SAN Volume Controller 2145-4F2 node have its mode indicator a solid green?

NO Refer to “MAP 5200: 2145 UPS” on page 290.

YES Go to step 6.

6. (from step 5)

Does the 2145 UPS powering this SAN Volume Controller 2145-4F2 node have all of its circuit breakers on?

NO Go to step 7 on page 285.

YES The input power to the SAN Volume Controller 2145-4F2 node is missing. Verify that the power cord assembly is correctly plugged in to the SAN Volume Controller 2145-4F2 and the 2145 UPS.

- Replace the parts in the following sequence:
 - Power supply assembly
 - Power cord assembly
 - Verify the repair by continuing with “MAP 5700: Repair verification” on page 319

7. (from step 6 on page 284)

One of the 2145 UPS’s circuit breakers has tripped. Reset the tripped circuit breaker to on.

Does the 2145 UPS’s circuit breaker remain on?

NO Go to step 8.

YES Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

8. (from step 7)

One of the 2145 UPS’s output loads caused a circuit breaker to trip. Remove each of up to eight SAN Volume Controller 2145-4F2 node power cables in turn and try to reset the circuit breakers to on.

Does the removal of any SAN Volume Controller 2145-4F2 node power cables enable the circuit breaker to remain on?

NO 2145 UPS output circuit breaker is faulty.

- a. Replace the 2145 UPS assembly.
- b. Go to “MAP 5300: 2145 UPS repair verification” on page 295.

YES The input power current to the SAN Volume Controller 2145-4F2 node is too high.

- a. Replace the parts in the following sequence
 - 1) Power supply assembly
 - 2) Power cord assembly
- b. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

9. (from step 4 on page 284)

Does the 2145 UPS-1U powering this SAN Volume Controller 2145-4F2 node have its power-on and load segment 2 indicators a solid green, with service, on-battery, and overload indicators off?

NO Refer to “MAP 5250: 2145 UPS-1U repair verification” on page 294.

YES The input power to the SAN Volume Controller 2145-4F2 node is missing. Verify that the power cord assembly is correctly plugged in to the SAN Volume Controller 2145-4F2 and the 2145 UPS-1U.

Related tasks

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5150: 2145 UPS-1U” on page 286

MAP 5150: 2145 UPS-1U helps you solve problems that have occurred in the 2145 uninterruptible power supply-1U (2145 UPS-1U) systems used on a SAN Volume Controller.

“MAP 5200: 2145 UPS” on page 290

MAP 5200: 2145 UPS helps you solve problems that have occurred in the 2145 uninterruptible power supply (2145 UPS) systems used on a SAN Volume Controller 2145-4F2.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the front panel from the SAN Volume Controller 2145-4F2” on page 465

You can remove the front panel to perform maintenance on the SAN Volume Controller 2145-4F2.

“Removing the service controller” on page 370

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

“Removing the power supply” on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
During routine maintenance, you may be required to remove and replace the system board.

“MAP 5300: 2145 UPS repair verification” on page 295

MAP 5300: 2145 UPS repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller 2145 uninterruptible power supply (2145 UPS).

“MAP 5250: 2145 UPS-1U repair verification” on page 294

MAP 5250: 2145 UPS-1U repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs, or repair actions that were done, have solved all the problems on the SAN Volume Controller 2145 uninterruptible power supply-1U (2145 UPS-1U).

Related reference

“Understanding the fields for the node VPD” on page 96

You must be aware of the fields for the node vital product data (VPD).

MAP 5150: 2145 UPS-1U

MAP 5150: 2145 UPS-1U helps you solve problems that have occurred in the 2145 uninterruptible power supply-1U (2145 UPS-1U) systems used on a SAN Volume Controller.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You may have been sent here for one of the following reasons:

- The system problem determination procedures sent you here
- A problem occurred during the installation of a SAN Volume Controller
- Another MAP sent you here
- A customer observed a problem that was not detected by the system problem determination procedures

Figure 48 on page 287 shows an illustration of the front of the panel for the 2145 UPS-1U.

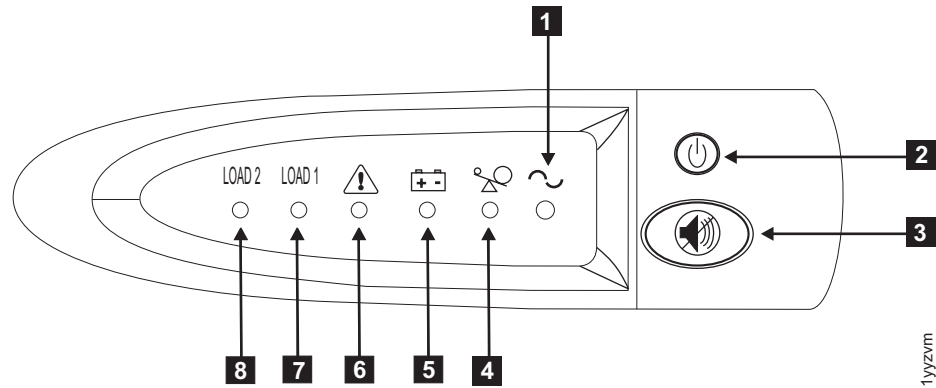


Figure 48. 2145-1U uninterruptible power supply front panel assembly

- 1** Power-on indicator
- 2** On/off button
- 3** Test and alarm reset button
- 4** Overload indicator
- 5** On-battery indicator
- 6** Service indicator
- 7** Load segment 1 indicator
- 8** Load segment 2 indicator

1. **Is the power-on indicator for the 2145 UPS-1U that is connected to the failing SAN Volume Controller off?**

NO Go to step 3.

YES Go to step 2.

2. (from step 1)

Are other 2145 UPS-1Us showing the power-on indicator as off?

NO The 2145 UPS-1U may be in standby mode. This can be because the on/off button on this 2145 UPS-1U was pressed, input power has been missing for more than five minutes, or because the SAN Volume Controller shut it down following a reported loss of input power. Press and hold the on/off button until the 2145 UPS-1U power-on indicator is illuminated (approximately five seconds).

Go to step 3.

YES Either main power is missing from the installation or a redundant ac power switch has failed. If the 2145 UPS-1Us are connected to a redundant ac power switch, go to “MAP 5320: Redundant ac power” on page 297. Otherwise, complete these steps:

- a. Restore main power to installation.
- b. Verify the repair by continuing with “MAP 5250: 2145 UPS-1U repair verification” on page 294.

3. (from step 1 and step 2)

Are the power-on and load segment 2 indicators for the 2145 UPS-1U illuminated solid green, with service, on-battery, and overload indicators off?

NO Go to step 4 on page 288.

YES The 2145 UPS-1U is no longer showing a fault. Verify the repair by continuing with “MAP 5250: 2145 UPS-1U repair verification” on page 294.

4. (from step 3 on page 287)

Is the 2145 UPS-1U on-battery indicator illuminated yellow (solid or flashing), with service and overload indicators off?

NO Go to step 5.

YES The input power supply to this 2145 UPS-1U is not working or is not correctly connected, or the 2145 UPS-1U is receiving input power that might be unstable or outside the specified voltage or frequency range. (The voltage should be between 200V and 240V and the frequency should be either 50 Hz or 60 Hz.) The SAN Volume Controller automatically adjusts the 2145 UPS-1U voltage range. If the input voltage has recently changed, the alarm condition might be present until the SAN Volume Controller has adjusted the alarm setting. Power on the SAN Volume Controller that is connected to the 2145 UPS-1U. If the SAN Volume Controller starts the on-battery indicator should go off within five minutes. If the SAN Volume Controller powers off again or if the condition persists for at least five minutes, do the following:

- a. Check the input circuit protector on the 2145 UPS-1U rear panel, and press it, if it is open.
- b. If redundant ac power is used for the 2145 UPS-1U, check the voltage and frequency at the redundant ac power switch output receptacle connected to this UPS-1U. If there is no power, go to “MAP 5340: Redundant ac power verification” on page 298. If the power is not within specification, ask the customer to resolve the issue. If redundant ac power is not used for this UPS, check the site power outlet for the 2145 UPS-1U providing power to this SAN Volume Controller. Check the connection, voltage, and frequency. If the power is not within specification, ask the customer to resolve the issue.
- c. If the input power is within specification and the input circuit protector is stable, replace the field replaceable units (FRUs) in the following sequence:
 - 1) 2145 UPS-1U power cord
 - 2) 2145 UPS-1U
- d. Verify the repair by continuing with “MAP 5250: 2145 UPS-1U repair verification” on page 294.

5. (from step 4)

Is the 2145 UPS-1U overload indicator illuminated solid red?

NO Go to step 6 on page 289.

YES The 2145 UPS-1U output power requirement has exceeded the 2145 UPS-1U capacity.

- a. Check that only one SAN Volume Controller node is connected to the 2145 UPS-1U.
- b. Check that no other loads are connected to the 2145 UPS-1U.
- c. After ensuring that the output loading is correct, turn off and unplug the input power from the 2145 UPS-1U. Wait at least five seconds until all LEDs are off and restart the 2145 UPS-1U by

reconnecting to input power and pressing the on/off button until the 2145 UPS-1U power-on indicator is illuminated (approximately five seconds).

- d. If the condition persists, replace the 2145 UPS-1U.
- e. Verify the repair by continuing with "MAP 5250: 2145 UPS-1U repair verification" on page 294.

6. (from step 5 on page 288)

Is the 2145 UPS-1U service indicator illuminated flashing red and the on-battery indicator illuminated solid yellow, with the power-on and overload indicators off?

NO Go to step 7.

YES The 2145 UPS-1U battery might be fully discharged or faulty.

- a. Check that the 2145 UPS-1U has been connected to a power outlet for at least two hours to charge the battery. After charging the battery, press and hold the test/alarm reset button for three seconds; and then check the service indicator.
- b. If the service indicator is still flashing, replace the 2145 UPS-1U.
- c. Verify the repair by continuing with "MAP 5250: 2145 UPS-1U repair verification" on page 294.

7. (from step 6)

Is the 2145 UPS-1U service indicator illuminated flashing red, the on-battery indicator illuminated solid yellow, and the power-on illuminated solid green, with the overload indicator off?

NO Go to step 8.

YES The 2145 UPS-1U internal temperature is too high.

- a. Turn off and unplug the 2145 UPS-1U. Clear vents at the front and rear of the 2145 UPS-1U. Remove any heat sources. Ensure the airflow around the 2145 UPS-1U is not restricted.
- b. Wait at least five minutes and restart the 2145 UPS-1U by reconnecting to input power and pressing the on/off button until the 2145 UPS-1U power-on indicator is illuminated (approximately five seconds).
- c. If the condition persists, replace the 2145 UPS-1U.
- d. Verify the repair by continuing with "MAP 5250: 2145 UPS-1U repair verification" on page 294.

8. (from step 7)

Is the 2145 UPS-1U, service, on-battery, overload, and power-on indicators illuminated and flashing?

NO The 2145 UPS-1U has an internal fault.

- a. Replace the 2145 UPS-1U.
- b. Verify the repair by continuing with "MAP 5250: 2145 UPS-1U repair verification" on page 294.

YES The 2145 UPS-1U battery might be fully discharged or faulty.

- a. Check that the 2145 UPS-1U has been connected to a power outlet for at least two hours to charge the battery. After charging the battery, press and hold the test/alarm reset button for three seconds and then check the service indicator.
- b. If the service indicator is still flashing, replace the 2145 UPS-1U.

- c. Verify the repair by continuing with “MAP 5250: 2145 UPS-1U repair verification” on page 294.

Related tasks

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5250: 2145 UPS-1U repair verification” on page 294

MAP 5250: 2145 UPS-1U repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs, or repair actions that were done, have solved all the problems on the SAN Volume Controller 2145 uninterruptible power supply-1U (2145 UPS-1U).

“Removing the power cable from the 2145 UPS-1U” on page 492

You can remove the power cable from the 2145 uninterruptible power supply-1U (2145 UPS-1U) if you are having problems with the power supply and suspect that the power cable is defective.

“Removing the 2145 UPS-1U” on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

MAP 5200: 2145 UPS

MAP 5200: 2145 UPS helps you solve problems that have occurred in the 2145 uninterruptible power supply (2145 UPS) systems used on a SAN Volume Controller 2145-4F2.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here for one of the following reasons:

- The system problem determination procedures sent you here
- A problem occurred during the installation of a SAN Volume Controller 2145-4F2
- Another MAP sent you here
- A customer observed a problem that was not detected by the system problem determination procedures

Figure 49 on page 291 shows an illustration of the front of the panel for the 2145 UPS.

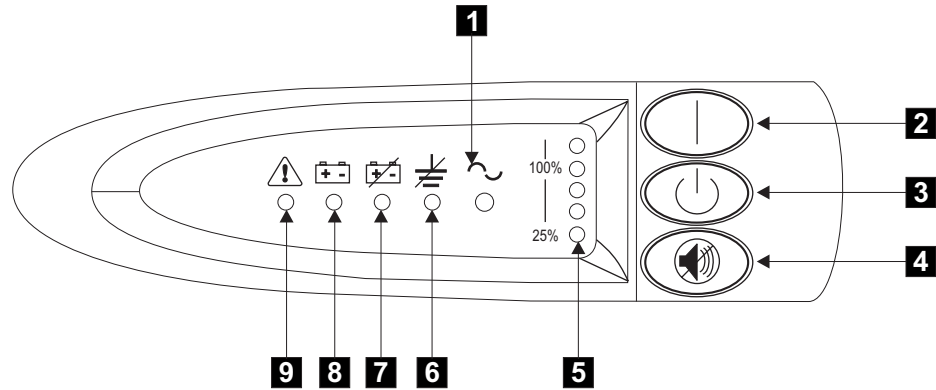


Figure 49. 2145 uninterruptible power supply front panel assembly

- 1** Mode indicator
- 2** On button
- 3** Off button
- 4** Test and alarm reset button
- 5** Load-level indicator
- 6** Site wiring fault indicator
- 7** Battery service indicator
- 8** Battery mode indicator
- 9** General alarm indicator

1. **Is the mode indicator for the 2145 UPS that is connected to the failing SAN Volume Controller 2145-4F2 off?**

NO Go to step 3.

YES Go to step 2.

2. (from step 1)

Are other 2145 UPSs showing mode indicator off?

NO The power supply to this 2145 UPS is faulty or not connected correctly.

a. Ask the customer to check the site power connection to this 2145 UPS.

b. If the input power connection is stable, replace the field replaceable units (FRUs) in the following sequence:

1) 2145 UPS power cord

2) 2145 UPS electronics assembly

3) 2145 UPS assembly

c. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

YES Main power is missing from installation.

a. Restore main power to installation.

b. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

3. (from step 1)

Is the 2145 UPS mode indicator illuminated and flashing green?

NO Go to step 4.

YES The 2145 UPS is in standby mode. This can be because the SAN Volume Controller 2145-4F2s powered by this 2145 UPS have been powered off for more than five minutes, or the off button on this 2145 UPS was pressed.

- a. Press and hold the on button until you hear the 2145 UPS beep (approximately one second) and the power-on indicator shows solid green. If the mode indicator does not change to solid green, replace the 2145 UPS electronics assembly.
- b. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

4. (from step 3 on page 291)

Is the mode indicator illuminated solid red?

NO Go to step 8 on page 293.

YES The 2145 UPS is in bypass mode. Go to step 5

5. (from step 4)

Is the 2145 UPS overload load level indicator illuminated red?

NO Go to step 6.

YES The 2145 UPS output power requirement exceeded the 2145 UPS capacity.

- a. Check that no more than four SAN Volume Controller 2145-4F2 nodes are connected to the 2145 UPS.
- b. Check that only SAN Volume Controller 2145-4F2 nodes are connected to the 2145 UPS.
- c. After ensuring output loading is correct, turn off and unplug the input power from the 2145 UPS. Wait at least five seconds until all LEDs are off and restart the 2145 UPS by reconnecting to input power and pressing the on button until you hear the 2145 UPS beep (approximately one second).
- d. If the condition persists, call the IBM Support Center.
- e. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

6. (from step 5)

Is the 2145 UPS general alarm indicator illuminated and flashing red (causing a continuous audible alarm)?

NO Go to step 7 on page 293.

YES The 2145 UPS internal temperature is too high.

- a. Turn off and unplug the 2145 UPS. Clear the vents at the front and rear of the 2145 UPS. Remove any heat sources. Ensure the airflow around the 2145 UPS is not restricted.
- b. Wait at least five minutes and restart the 2145 UPS by reconnecting to input power and pressing the on button until you hear the 2145 UPS beep (approximately one second).
- c. If the condition persists, replace the 2145 UPS electronics assembly.
- d. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

7. (from step 6 on page 292)

Is the 2145 UPS Battery Mode indicator illuminated and flashing red (causing an audible beep every five seconds)?

NO The 2145 UPS is in bypass mode because of an internal 2145 UPS fault.

a. Replace the following assemblies in turn:

- 2145 UPS electronics assembly
- 2145 UPS battery assembly
- 2145 UPS assembly

b. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

YES The 2145 UPS battery might be fully discharged or not connected correctly.

a. Check that the 2145 UPS battery assembly is installed correctly.

b. Check that the 2145 UPS has been connected to a power outlet for at least three hours to charge the battery. After charging the battery, press and hold the test/alarm reset button for three seconds; and then check the battery mode indicator.

c. If the battery mode indicator is still on, replace the 2145 UPS battery assembly.

d. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

8. (from step 4 on page 292)

Is the 2145 UPS wiring fault indicator illuminated and flashing red (causing an audible beep every five seconds)?

NO Go to step 9.

YES The 2145 UPS ground wire connection does not exist or the power input line and neutral wires are reversed.

a. Check the grounding of the 2145 UPS.

b. Ask the customer to check the 2145 UPS input power connection.

c. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

9. (from step 8)

Is the 2145 UPS mode indicator flashing red (causing an audible beep every five seconds)?

NO Go to step 10 on page 294.

YES The 2145 UPS is receiving input power that might be unstable or outside the specified voltage or frequency range. The SAN Volume Controller 2145-4F2 automatically adjusts the 2145 UPS voltage range. If the input voltage has recently changed, the alarm condition might be present until the SAN Volume Controller 2145-4F2 has adjusted the alarm setting. Ensure that an operational SAN Volume Controller 2145-4F2 is connected to the 2145 UPS. If the condition persists for at least five minutes, do the following:

a. Ask the customer to check the site power for the 2145 UPS that is providing power to this SAN Volume Controller 2145-4F2. Check the connection, voltage, and frequency.

- b. If input power is available, replace the 2145 UPS electronics assembly.
 - c. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.
10. (from step 9 on page 293)

Are the 2145 UPS general alarm, battery power, battery mode, wiring fault, and mode indicators illuminated and flashing red (causing a continuous audible alarm)?

NO The 2145 UPS is no longer showing a fault. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

YES The 2145 UPS is reporting a fault condition.

a. Replace the following assemblies in turn:

- 2145 UPS electronics assembly
- 2145 UPS battery assembly
- 2145 UPS assembly

b. Verify the repair by continuing with “MAP 5300: 2145 UPS repair verification” on page 295.

Related tasks

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5300: 2145 UPS repair verification” on page 295

MAP 5300: 2145 UPS repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller 2145 uninterruptible power supply (2145 UPS).

“Removing the power cable from the 2145 UPS” on page 509

You can replace the power cable from the 2145 uninterruptible power supply (2145 UPS) if you are having problems with the power supply and suspect that the power cable is defective.

“Removing the 2145 UPS” on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

MAP 5250: 2145 UPS-1U repair verification

MAP 5250: 2145 UPS-1U repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs, or repair actions that were done, have solved all the problems on the SAN Volume Controller 2145 uninterruptible power supply-1U (2145 UPS-1U).

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You may have been sent here because you have performed a repair and want to confirm that no other problems exist on the machine.

Perform the following steps:

1. **Are the power-on and load segment 2 indicators for the repaired 2145 UPS-1U illuminated solid green, with service, on-battery, and overload indicators off?**

NO Continue with “MAP 5000: Start” on page 270.

YES Go to step 2.

2. (from step 1)

Is the SAN Volume Controller node powered by this 2145 UPS-1U powered on?

NO Press power-on on the SAN Volume Controller node that is connected to this 2145 UPS-1U and is powered off. Go to step 3.

YES Go to step 3.

3. (from step 2)

Is the node that is connected to this 2145 UPS-1U still not powered on or showing error codes in the front panel display?

NO Go to step 4.

YES Continue with “MAP 5000: Start” on page 270.

4. (from step 3)

Does the SAN Volume Controller node that is connected to this 2145 UPS-1U show “Charging” on the front panel display?

NO Go to step 5.

YES Wait for the “Charging” display to finish (this might take up to 60 minutes). Go to step 5.

5. (from step 4)

Press and hold the test/alarm reset button on the repaired 2145 UPS-1U for three seconds to initiate a self-test. During the test, individual indicators illuminate as various parts of the 2145 UPS-1U are checked.

Does the 2145 UPS-1U service, on-battery, or overload indicator stay on?

NO 2145 UPS-1U repair verification has completed successfully. Continue with “MAP 5700: Repair verification” on page 319.

YES Continue with “MAP 5000: Start” on page 270.

Related tasks

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

MAP 5300: 2145 UPS repair verification

MAP 5300: 2145 UPS repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller 2145 uninterruptible power supply (2145 UPS).

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here because you have performed a repair and want to confirm that no other problems exist on the machine.

Attention: If a SAN Volume Controller 2145-4F2 is powered off for more than five minutes and it is the only SAN Volume Controller 2145-4F2 that is connected to this 2145 UPS, the 2145 UPS also powers off. To power on the 2145 UPS, press and hold the on button until you hear the 2145 UPS beep (approximately one second) and the mode indicator shows solid green.

Perform the following steps to verify your repair to the 2145 UPS:

1. **Is the mode indicator for the repaired 2145 UPS illuminated solid green and the Load level indicators showing an output load level between 25% and 100%?**

NO Continue with "MAP 5000: Start" on page 270.

YES Go to step 2.

2. (from step 1)

Are all SAN Volume Controller 2145-4F2 nodes powered by repaired 2145 UPS powered on?

NO Press power-on on all SAN Volume Controller 2145-4F2 nodes that are powered off. Go to step 3.

YES Go to step 3.

3. (from step 2)

Are any nodes still not powered on or showing error codes on the front panel display?

NO Go to step 4.

YES Continue with "MAP 5000: Start" on page 270.

4. (from step 3)

Do SAN Volume Controller 2145-4F2 nodes show "charging" on the front panel display?

NO Go to step 5.

YES Wait for the charging display to finish. (This might take up to 60 minutes). Go to step 5.

5. (from step 4)

Press and hold the test/alarm reset button on the repaired 2145 UPS for three seconds to initiate a self-test. During the test, individual indicators illuminate as various parts of the 2145 UPS are checked.

Does the alarm beep or a 2145 UPS alarm indicator stay on?

NO 2145 UPS repair verification has been successfully completed. Continue with "MAP 5700: Repair verification" on page 319.

YES Continue with "MAP 5000: Start" on page 270.

Related tasks

"Using the maintenance analysis procedures" on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

MAP 5320: Redundant ac power

MAP 5320: Redundant ac power helps you solve problems that have occurred in the redundant ac power switches used on a SAN Volume Controller. Use this MAP when a 2145 uninterruptible power supply-1U (2145 UPS-1U) that is connected to a redundant ac power switch does not appear to have input power.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here for one of the following reasons:

- A problem occurred during the installation of a SAN Volume Controller.
- “MAP 5150: 2145 UPS-1U” on page 286 sent you here.

Perform the following steps to solve problems that have occurred in the redundant ac power switches:

1. One or two 2145 UPS-1Us might be connected to the redundant ac power switch. **Is the power-on indicator on any of the connected 2145 UPS-1Us on?**

NO Go to step 3.

YES The redundant ac power switch is powered. Go to step 2.

2. (from step 1)

Measure the voltage at the redundant ac power switch output socket connected to the 2145 UPS-1U that is not showing power-on.

CAUTION:

Ensure that you do not remove the power cable of any powered UPSs

Is there power at the output socket?

NO One redundant ac power switch output is working while the other is not. Replace the redundant ac power switch.

CAUTION:

You might need to power-off an operational node to replace the redundant ac power switch assembly. If this is the case, consult with the customer to determine a suitable time to perform the replacement. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300. After you replace the redundant ac power switch, continue with “MAP 5340: Redundant ac power verification” on page 298.

YES The redundant ac power switch is working. There is a problem with the 2145 UPS-1U power cord or the 2145 UPS-1U. Return to the procedure that called this MAP and continue from where you were within that procedure. It will help you analyze the problem with the 2145 UPS-1U power cord or the 2145 UPS-1U.

3. (from step 1)

None of the used redundant ac power switch outputs appears to have power.

Are the two input power cables for the redundant ac power switches correctly connected to the redundant ac power switch and to different mains circuits?

NO Correctly connect the cables. Go to “MAP 5340: Redundant ac power verification.”

YES Verify that there is main power at both the site’s power distribution units that are providing power to this redundant ac power switch. Go to step 4.

4. (from step 3 on page 297)

Is power available at one or more of the site’s power distribution units that are providing power to this redundant ac power switch?

NO Have the customer fix the mains circuits. Return to the procedure that called this MAP and continue from where you were within that procedure.

YES The redundant ac power switch should operate in this situation. Replace the redundant ac power switch assembly. After you replace the redundant ac power switch, continue with “MAP 5340: Redundant ac power verification.”

MAP 5340: Redundant ac power verification

MAP 5340: Redundant ac power verification helps you verify that a redundant ac power switch is functioning correctly.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here because you have replaced a redundant ac power switch or corrected the cabling of a redundant ac power switch. You can also use this MAP if you think a redundant ac power switch might not be working correctly, because it is connected to nodes that have lost power when only one ac power circuit lost power.

In this MAP, you will be asked to confirm that power is available at the redundant ac power switch output sockets 1 and 2. If the redundant ac power switch is connected to nodes that are not powered on, use a voltage meter to confirm that power is available.

If the redundant ac power switch is powering nodes that are powered on (so the nodes are operational), take some precautions before continuing with these tests. Although you do not have to power off the nodes to conduct the test, the nodes will power off if the redundant ac power switch is not functioning correctly.

For each of the powered-on nodes connected to this redundant ac power switch, perform the following steps:

1. Use the graphical user interface (GUI) or the command-line interface (CLI) to confirm that the other node in the same I/O group as this node is online.
2. Use the GUI or the CLI to confirm that all virtual disks connected to this I/O group are online.

3. Check the redundant ac power switch output cables to confirm that the redundant ac power switch is not connected to two nodes in the same I/O group.

If any of these tests fail, correct any failures before continuing with this MAP. If you are performing the verification using powered-on nodes, understand that power is no longer available if the following is true:

- The on-battery indicator on the 2145 UPS-1U that connects the redundant ac power switch to the node lights for more than five seconds.
- The SAN Volume Controller node display shows Power Failure.

When the instructions say “remove power,” you can switch the power off if the sitepower distribution unit has outputs that are individually switched; otherwise, remove the specified redundant ac power switch power cable from the site power distribution unit’s outlet.

Perform the following steps:

1. Are the two site power distribution units providing power to this redundant ac power switch connected to different power circuits?
NO Correct the problem and then return to this MAP.
YES Go to step 2.
2. (from step 1)
Are both of the site power distribution units providing power to this redundant ac power switch powered?
NO Correct the problem and then return to the start of this MAP.
YES Go to step 3.
3. (from step 2)
Are the two cables that are connecting the site power distribution units to the redundant ac power switch connected?
NO Correct the problem and then return to the start of this MAP.
YES Go to step 4.
4. (from step 3)
Is there power at the redundant ac power switch output socket 2?
NO Go to step 8 on page 300.
YES Go to step 5.
5. (from step 4)
Is there power at the redundant ac power switch output socket 1?
NO Go to step 8 on page 300.
YES Go to step 6.
6. (from step 5)
Remove power from the Main power cable to the redundant ac power switch.
Is there power at the redundant ac power switch output socket 1?
NO Go to step 8 on page 300.
YES Go to step 7.
7. (from step 6)

Reconnect the Main power cable. Remove power from the Backup power cable to the redundant ac power switch. Is there power at the redundant ac power switch output socket 1?

NO Go to step 8.

YES Reconnect the Backup power cable. The redundant ac power verification has been successfully completed. Continue with “MAP 5700: Repair verification” on page 319.

8. (from steps 4 on page 299, 5 on page 299, 6 on page 299, and 7 on page 299)
The redundant ac power switch has not functioned as expected. Replace the redundant ac power switch assembly. Return to the start of this MAP.

MAP 5350: Powering off a SAN Volume Controller node

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host's access to disks.

Powering off a single node will not normally disrupt the operation of a SAN Volume Controller cluster. This is because, within a SAN Volume Controller cluster, nodes operate in pairs called an I/O group. An I/O group will continue to handle I/O to the disks it manages with only a single node powered on. There will, however, be degraded performance and reduced resilience to error.

Care must be taken when powering off a node to ensure the cluster is not impacted more than it need be. If the procedures outlined here are not followed, it is possible your application hosts will lose access to their data or, in the worst case, data will be lost.

There are two preferred methods that you can use to power off a node that is a member of a cluster and not offline:

1. Use the **Shut Down a Node** option on the SAN Volume Controller Console
2. Use the CLI command `svctask stopcluster -node <name>`

It is preferable to use either the SAN Volume Controller Console or the command-line interface (CLI) to power off a node, as these methods provide a controlled handover to the partner node and provide better resilience to other faults in the system.

If a node is offline or not a member of a cluster, it must be powered off using the power button.

To provide the least disruption when powering off a node, the following should all apply:

- The other node in the I/O group should be powered on and active in the cluster.
- The other node in the I/O group should have SAN fibre channel connections to all the hosts and disk controllers managed by the I/O group.
- All the virtual disks handled by this I/O group should be online.
- The host multipathing is online to the other node in the I/O group.

In some circumstances, the reason you are powering off the node might make meeting these conditions impossible; for instance, if you are replacing a broken fibre channel card, the virtual disks will not be showing an online status. You

should use your judgment to decide when it is safe to proceed when a condition has not been met. Always check with the system administrator before proceeding with a power off that you know will disrupt I/O access, as they might prefer to either wait until a more suitable time or suspend the host applications

To ensure a smooth restart, a node must save the data structures it cannot recreate to its local, internal, disk drive. The amount of data it saves to local disk can be high, so this operation might take several minutes. Do not attempt to interrupt the controlled power off.

Attention: The following actions do not allow the node to save data to its local disk. Therefore you should NOT power off a node using these methods:

- Removing the power cable between the node and the uninterruptible power supply. Normally the UPS provides sufficient power to allow the write to local disk in the event of a power failure, but obviously it is unable to provide power in this case.
- Holding down the node's power button. When the power button is pressed and released, the SAN Volume Controller indicates this to the software and the node can write its data to local disk before it powers off. If the power button is held down, the SAN Volume Controller hardware interprets this as an emergency power off and shuts down immediately without giving you the opportunity to save the data to a local disk. The emergency power off occurs approximately four seconds after the power button is pressed and held down.
- Pressing the reset button on the light path diagnostic panel.

The following topics describe the methods for powering off a node:

- "Using the SAN Volume Controller Console to power off a node"
- "Using the SAN Volume Controller CLI to power off a node" on page 303
- "Using the SAN Volume Controller Power button" on page 305

Related tasks

"Removing the redundant ac power switch" on page 473

Use this topic when you need to remove a redundant ac power switch.

"Removing the fibre-channel adapter assembly" on page 427

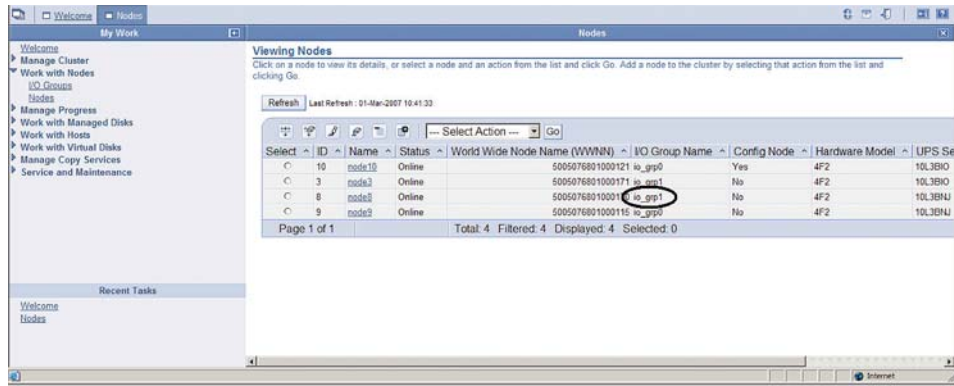
Use the information in this topic when you need to remove a fibre channel adapter or fibre channel adapter assemblies.

Using the SAN Volume Controller Console to power off a node

This topic describes how to use the SAN Volume Controller Console to power off a node.

Perform the following steps to use the SAN Volume Controller Console to power off a node:

1. Sign on to the master console as an administrator and then launch the SAN Volume Controller Console for the cluster that you are servicing.
2. Click **Work with Nodes** → **Nodes** in the My Work pane and click on the submenu that opens. The Viewing Nodes panel is displayed. Find the node that you are about to shut down and write down the name of the I/O group it belongs to. Confirm that the other node in the I/O group is `Online`.

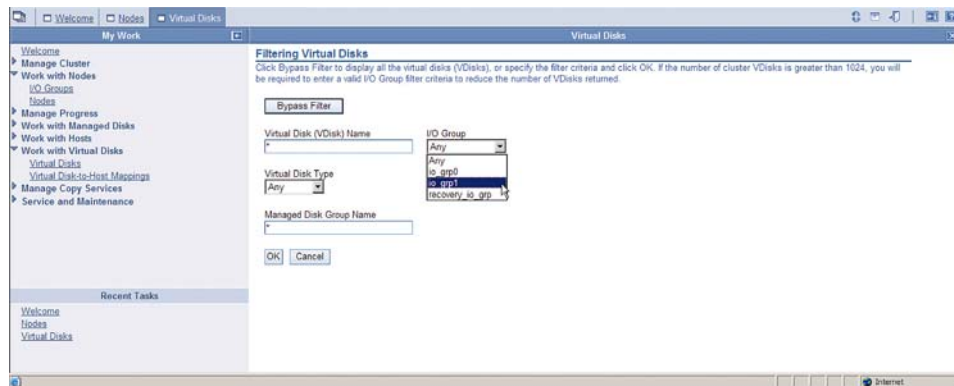


svc00268

If the node that you want to power off is shown as `Offline`, then the node is not participating in the cluster and is not processing I/O requests. In these circumstances, you must use the power button on the node to power off the node.

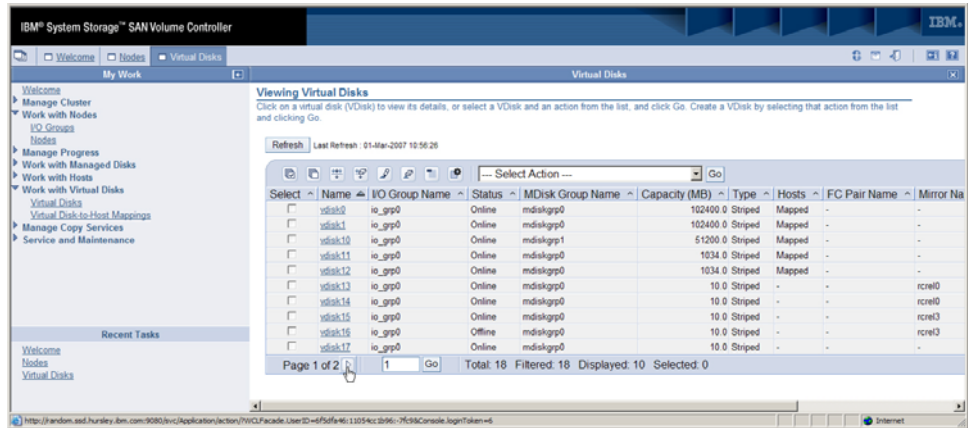
If the node that you want to power off is shown as `Online` but the other node in the I/O group is not online, powering off the node impacts all the hosts that are submitting I/O requests to the VDisks that are managed by the I/O group. Ensure that the other node in the I/O group is online before you continue.

3. Click **Work with Virtual Disks** → **Virtual Disks** in the My Work pane and then click in the submenu that opens. The filtering virtual disks panel is displayed.



svc00266

4. Open the **I/O Group** drop-down menu and select the I/O group that you wrote down in step 2 on page 301 for the node. Then click **OK**. The list of virtual disks in the I/O group is displayed. Make sure that the status of each virtual disk in the I/O group is `Online`. You might need to view more than one page.



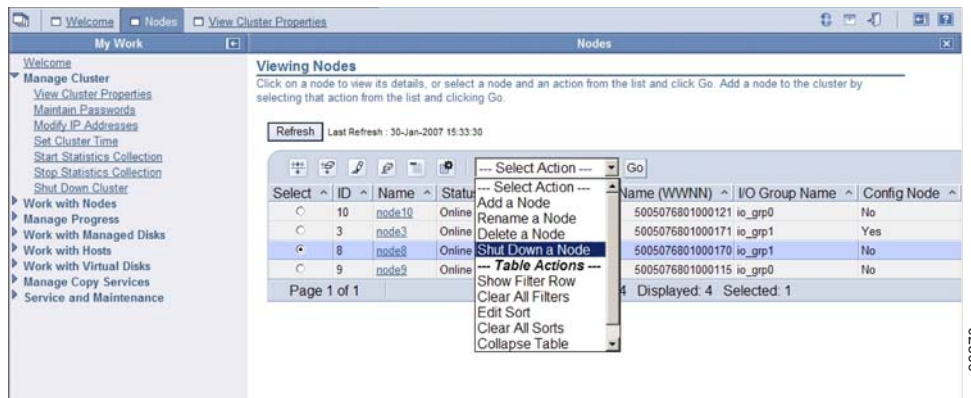
svc00264

If any VDisks are shown as degraded, only one node in the I/O is processing I/O requests for that VDisk. If that node is powered off, it impacts all the hosts that are submitting I/O requests to the degraded VDisks.

If any virtual disks are degraded and you believe this might be because the partner node in the I/O group has been powered off recently, wait until a refresh of the screen shows all the virtual disks online. All the virtual disks should be online within thirty minutes of the partner node being powered off.

Ensure that all VDisks that are being used by hosts are online before you continue.

- If you have decided it is okay to continue and power off the node, click **Work with Nodes** → **Nodes** in the My Work pane. The list of nodes in the cluster is displayed. Select the node that you are connecting to the redundant ac power switch, and select **Shut Down a Node** from the drop-down menu.



svc00270

During the shut down, the node saves its data structures to its local disk and destages all the write data held in cache to the SAN disks; this processing can take several minutes.

At the end of this process, the node powers off.

Using the SAN Volume Controller CLI to power off a node

This topic describes how to use the SAN Volume Controller CLI to power off a node.

1. Issue the **svcinfolnode** CLI command to display a list of nodes in the cluster and their properties. Find the node that you are about to shut down and write down the name of the I/O group it belongs to. Confirm that the other node in the I/O group is online.

```
svcinfolnode -delim :
```

```
id:name:UPS_serial_number:WWNN:status:IO_group_id: IO_group_name:config_node:
UPS_unique_id
1:group1node1:10L3ASH:500507680100002C:online:0:io_grp0:yes:202378101C0D18D8
2:group1node2:10L3ANF:5005076801000009:online:0:io_grp0:no:202378101C0D1796
3:group2node1:10L3ASH:5005076801000001:online:1:io_grp1:no:202378101C0D18D8
4:group2node2:10L3ANF:50050768010000F4:online:1:io_grp1:no:202378101C0D1796
```

If the node that you want to power off is shown as `Offline`, the node is not participating in the cluster and is not processing I/O requests. In these circumstances, you must use the power button on the node to power off the node.

If the node that you want to power off is shown as `Online` but the other node in the I/O group is not online, powering off the node impacts all the hosts that are submitting I/O requests to the VDisks that are managed by the I/O group. Ensure that the other node in the I/O group is online before you continue.

2. Issue the **svcinfolsvdisk** CLI command to list the Vdisks managed by the I/O Group that you wrote down for the node in step 1.

```
svcinfolsvdisk -filtervalue IO_group_name=io_grp0 -delim :
```

```
0:mainvdisk1:0:io_grp0:online:0:mainmdiskgroup: 512.0GB:striped::::
1:bkpvdisk1:1:io_grp0:online:1:bkpmdiskgroup: 512.0GB:striped::::
```

The list of virtual disks in the I/O group is displayed. Ensure that the status of each virtual disk in the I/O group is online.

If the node you want to power off is shown as `Offline`, the node is not participating in the cluster and is not processing I/O requests. In these circumstances, you must use the power button on the node to power off the node.

If the node you want to power off is shown as `Online`, but the other node in the I/O group is not `Online`, powering off the node impacts all the hosts that are submitting I/O requests to the VDisks that are managed by the I/O group.

If any VDisks are shown as degraded, only one node in the I/O is processing I/O requests for that VDisk. If that node is powered off, it affects all the hosts that are submitting I/O requests to the degraded VDisks.

If any virtual disks are degraded and you believe this might be because the partner node in the I/O group has recently been powered off, wait until a refresh of the screen shows all the virtual disks online. All the virtual disks should be online within 30 minutes of the partner node being powered on.

Ensure that all VDisks that are being used by hosts are online before you continue.

3. If you have decided that it is okay to continue and that you can power off the node, issue the **svctask stopcluster -node <name>** CLI command to power off the node. Ensure that you use the **-node** parameter, because you do not want to power off the whole cluster:

```
svctask stopcluster -node group1node2
```

```
Are you sure that you want to continue with the shut down? yes
```

During the shut down, the node saves its data structures to its local disk and destages all the write data held in the cache to the SAN disks; this process can take several minutes.

At the end of this process, the node powers off.

Using the SAN Volume Controller Power button

Do not use the power button to power off a node unless it is an emergency.

With this method, you cannot check the cluster status from the front panel, so you cannot tell if the power off is liable to cause excessive disruption to the cluster. Instead, use the SAN Volume Controller Console or the CLI commands, described in the previous topics, to power off an active node.

If you must use this method, notice in Figure 50, Figure 51, and Figure 52 on page 306 that each SAN Volume Controller model type has a power button on the front.

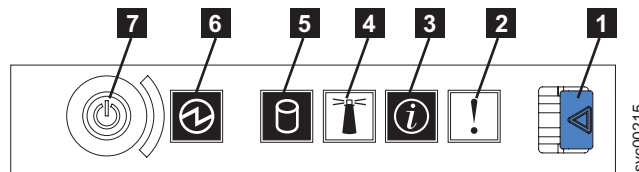


Figure 50. SAN Volume Controller 2145-8G4 operator information panel

- 1** Release latch for light path diagnostics panel
- 2** System-error LED (amber)
- 3** System-information LED (amber)
- 4** Location LED (blue)
- 5** Hard disk drive activity LED (green)
- 6** Power LED (green)
- 7** Power-control button

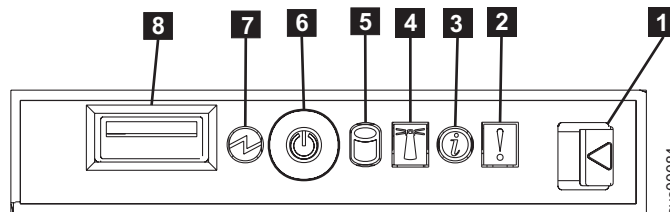


Figure 51. SAN Volume Controller 2145-8F2 and SAN Volume Controller 2145-8F4 operator information panel

- 1** Release latch for light path diagnostics panel
- 2** System-error LED (amber)
- 3** Information LED (amber)
- 4** Location LED (blue)
- 5** Hard disk drive activity LED (green)
- 6** Power control button
- 7** Power LED (green)

8 USB connector

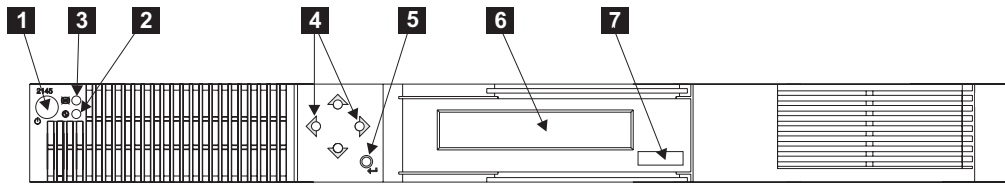


Figure 52. SAN Volume Controller 2145-4F2 controls and indicators

- 1** Power button
- 2** Power LED
- 3** Check LED
- 4** Navigation buttons
- 5** Select button
- 6** Front panel display
- 7** Node identification label

When you have determined it is safe to do so, press and immediately release the power button. The front panel display changes to display *Powering Off*, and a progress bar is displayed.

If you press the power button for too long, the node cannot write all the data to its local disk. An extended service procedure is required to restart the node, which involves deleting the node from the cluster and adding it back into the cluster.

Powering Off



The node saves its data structures to disk while powering off. The power off process can take up to five minutes.

When a node is powered off by using the power button (or because of a power failure), the partner node in its I/O group immediately stops using its cache for new write data and destages any write data already in its cache to the SAN attached disks. The time taken by this destage depends on the speed and utilization of the disk controllers; it should complete in less than 15 minutes, but it could be longer, and it cannot complete if there is data waiting to be written to a disk that is offline.

If a node powers off and restarts while its partner node continues to process I/O, it might not be able to become an active member of the I/O group immediately. It has to wait until the partner node completes its destage of the cache. If the partner node is powered off during this period, access to the SAN storage that is managed by this I/O group is lost. During the period when a 2145 node is destaging its cache data, the VDisks managed by the I/O group have a status of *Degraded*.

MAP 5400: Front panel

MAP 5400: Front panel helps you to solve problems that have occurred on the SAN Volume Controller front panel.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

This MAP is used for SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, SAN Volume Controller 2145-8F2, and the SAN Volume Controller 2145-4F2. Be sure that you know which model you are using before you start this procedure. To determine which model you are working with, see the SAN Volume Controller overview.

You might have been sent here because:

- A problem occurred during the installation of a SAN Volume Controller system, the front panel display test failed, or the correct node number failed to be displayed
- Another MAP sent you here

Perform the following steps:

1. **Is the power-on indicator on the SAN Volume Controller front panel illuminated and showing a solid green?**

NO Continue with the power MAP.

YES Go to step 2.

2. (from step 1)

Is the service controller check indicator on the SAN Volume Controller front panel illuminated and showing a solid amber? See Figure 53.

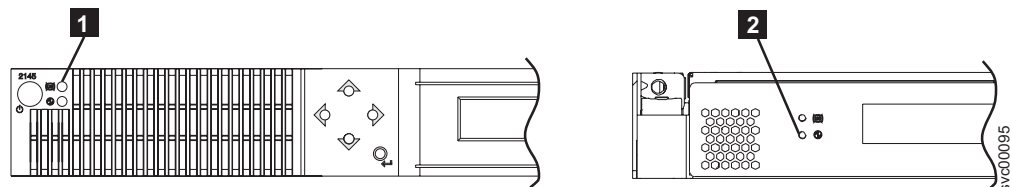


Figure 53. Service controller check lights

1 SAN Volume Controller 2145-4F2 service controller check light

2 SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2 service controller check light

NO Start the front panel tests by pressing and holding the select button for five seconds. Go to step 3 on page 308.

Attention: Do not start this test until the node is powered on for at least two minutes. You may receive unexpected results.

YES The SAN Volume Controller service controller has failed. Replace the parts in the following sequence:

SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2	Service controller
--	--------------------

SAN Volume Controller 2145-4F2	<ol style="list-style-type: none"> 1. Service controller 2. Front panel assembly
--------------------------------	--

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

3. (from step 2 on page 307)

The front panel check light illuminates and the display test of all display bits turns on for 3 seconds and then turns off for 3 seconds, then a vertical line travels from left to right, followed by a horizontal line travelling from top to bottom. The test completes with the switch test display of a single rectangle in the center of the display.

Did the front panel lights and display behave as described?

NO SAN Volume Controller front panel has failed its display test.

- Replace the parts in the following sequence:

SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2	Service controller
SAN Volume Controller 2145-4F2	<ol style="list-style-type: none"> 1. Service controller 2. Front panel assembly

- Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Go to step 4.

4. (from step 3)

Figure 54 provides four examples of what the front panel display shows before you press any button and then when you press the up button, the left and right buttons, and the select button. To perform the front panel switch test, press any button in any sequence or any combination. The display indicates which buttons you pressed.

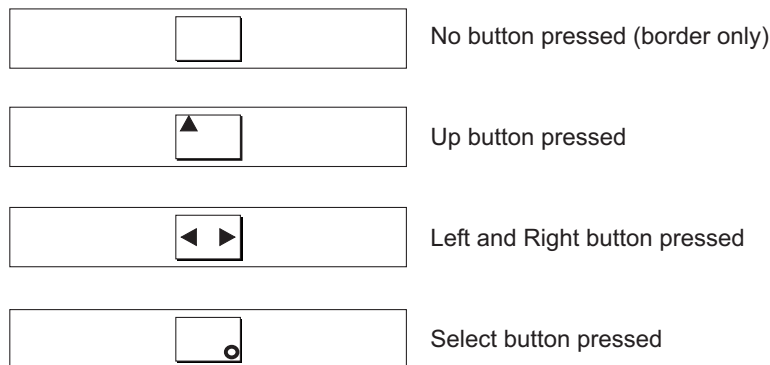


Figure 54. Sequence in which to push buttons on front panel display

Check each switch in turn. Did the service panel switches and display behave as described in Figure 54?

NO The SAN Volume Controller front panel has failed its switch test.

- Replace the parts in the following sequence:

SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4SAN Volume Controller 2145-8F2	Service controller
SAN Volume Controller 2145-4F2	1. Front panel assembly 2. Service controller

- Verify the repair by continuing with the repair verification MAP.

YES Press and hold the select button for five seconds to exit the test. Go to step 5.

5. (from step 4 on page 296)

Is front panel display showing: Charging, Cluster Error, or Node Error?

NO Go to step 6.

YES Press down. Go to step 6.

6. **Is front panel display now showing its Default Menu?**

NO Continue with “MAP 5000: Start” on page 270.

YES Keep pressing and releasing the down button until Node is displayed in line 1 of the menu screen. Go to step 7.

7. (from step 6)

Is this MAP being used as part of the installation of a new node?

NO Front panel tests have completed with no fault found. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Go to step 8.

8. (from step 7)

Is the node number that is displayed in line 2 of the menu screen the same as the node number that is printed on the front panel of the node?

NO Node number stored in front panel electronics is not the same as that printed on the front panel.

SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2	Service controller
SAN Volume Controller 2145-4F2	Front panel assembly

YES Front panel tests have completed with no fault found. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

Related concepts

“SAN Volume Controller menu options” on page 104

Menu options are available on the front panel display on the SAN Volume Controller.

Related tasks

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5100: Power 2145-4F2” on page 283

MAP 5100: Power 2145-4F2 helps you to solve problems that have occurred on the SAN Volume Controller 2145-4F2 power. If you are using the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8G4, see the MAP for the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8G4 node.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

Chapter 9, “Removing and replacing parts,” on page 335

You can remove and replace field replaceable units (FRUs) from the SAN Volume Controller, redundant ac power switch, and uninterruptible power supply.

MAP 5500: Ethernet

MAP 5500: Ethernet helps you solve problems that have occurred on the SAN Volume Controller Ethernet.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

This MAP is used for the SAN Volume Controller 2145-4F2, SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4 and the SAN Volume Controller 2145-8G4. Be sure that you know which model you are using before you start this procedure. To determine which model you are working with, see the SAN Volume Controller overview.

You might have been sent here for one of the following reasons:

- A problem occurred during the installation of a SAN Volume Controller system and the Ethernet checks failed
- Another MAP sent you here

Perform the following steps:

Note: If the Ethernet connection to the configuration node has failed, the cluster is unable to report failure conditions and the SAN Volume Controller Console is unable to access the cluster to perform administrative or service tasks. If this is the case and the customer needs immediate access to the cluster, you can make the cluster use an alternate configuration node. If only one node is displaying Node Error 540 on the front panel, perform the following steps:

1. Press and release the power button on the node that is displaying Node Error 540.
2. When Powering off is displayed on the front panel display, press the power button again.

Restarting is displayed. The cluster will select a new configuration node. The SAN Volume Controller Console is able to access the cluster again.

1. Is the front panel of any node in the cluster displaying **Node Error** with error code 540?

NO Go to step 2.

YES Go to step 4.

2. (from step 1)

Is the front panel displaying **Cluster Error** with error code 1400?

NO Go to step 3.

YES Go to step 6 on page 312.

3. (from step 2)

Using the front panel, display the Ethernet port status. Check the Ethernet status on every node in the cluster.

Is the display showing an **Ethernet port status of Failed**?

NO Go to step 6 on page 312.

YES Go to step 4.

4. (from steps 1 and 3)

On the node showing the error, move the Ethernet cable to Ethernet Port 2. For SAN Volume Controller 2145-8G4 nodes, press the blue tab downward to remove the Ethernet cable.

Note: This Ethernet port is not functional for normal operations. It is being moved to this location to test the cable. It must be returned to Port 1 when the problem is resolved.

Is the **green LED on the Ethernet port assembly illuminated**? Figure 55 shows the location of the port 2 Ethernet link LED.

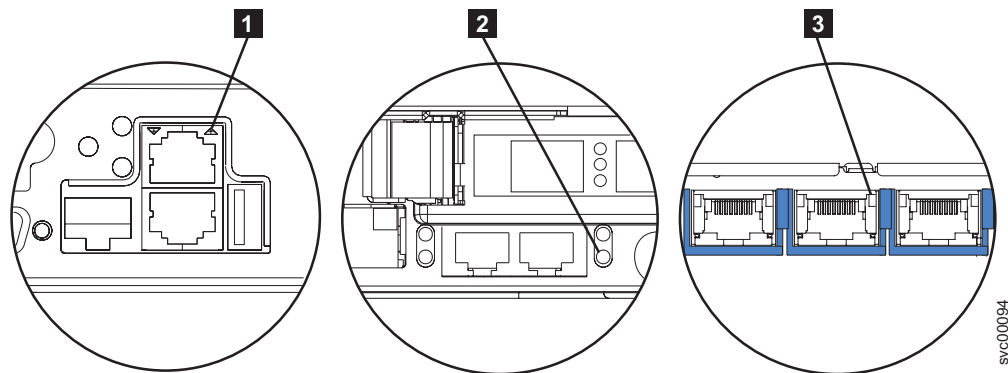


Figure 55. SAN Volume Controller port 2 Ethernet link LEDs

1 SAN Volume Controller 2145-4F2 port 2 (upper) Ethernet link LED

2 SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 port 2 (lower right) Ethernet link LED

3 SAN Volume Controller 2145-8G4 port 2 (center) Ethernet link LED

NO Go to step 5 on page 312.

YES Ethernet interfaces on the system board assembly are not working correctly.

Perform the following tasks:

- For the SAN Volume Controller 2145-4F2, replace the system board assembly.
 - For the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2, replace the frame assembly.
 - Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.
5. (from step 4 on page 311)
Move the Ethernet cable to Ethernet Port 2 on any other node. For SAN Volume Controller 2145-8G4 nodes, press the blue tab downward to remove the Ethernet cable.

Note: This Ethernet port is not functional for normal operations. It is being moved to this location to test the cable. It must be returned to Port 1 when the problem is resolved.

Is the green link LED on Ethernet port 2 illuminated? See Figure 55 on page 311.

NO The Ethernet connection between the SAN Volume Controller and the Ethernet network is faulty.

- Perform the following tasks:
 - Replace the Ethernet cable with a new cable.
 - If the port 2 link LED is not illuminated, perform the following steps:
 - a. Use the problem determination procedures for your Ethernet hub to resolve an Ethernet network connection problem.
 - b. When a working Ethernet port is detected, the port 2 link LED is illuminated.
 - c. Restore the Ethernet cable to its original Port 1 location.
 - d. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Ethernet interfaces on the system board assembly are not working correctly.

Perform the following tasks:

- Replace the following part:

SAN Volume Controller 2145-4F2	System board assembly
SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8G4	Frame assembly

- Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.
6. (from steps 2 on page 311 and 3 on page 311)
A previously reported fault with the Ethernet interface is no longer present. A problem with the Ethernet might have been fixed, or there might be an intermittent problem. Check with the customer to determine that the Ethernet interface has not been intentionally disconnected. Also check that there is no recent history of fixed Ethernet problems with other components of the Ethernet network.

Is the Ethernet failure explained by the previous checks?

- NO** There might be an intermittent Ethernet error. Perform these steps in the following sequence until the problem is resolved:
- a. Use the Ethernet hub problem determination procedure to check for and resolve an Ethernet network connection problem. If you resolve a problem continue with “MAP 5700: Repair verification” on page 319.
 - b. Determine if similar Ethernet connection problems have occurred recently on this node. If they have, replace the following part:

SAN Volume Controller 2145-4F2	System board assembly
SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8G4	Frame assembly

- c. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

Related tasks

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
 During routine maintenance, you may be required to remove and replace the system board.

MAP 5600: Fibre channel

MAP 5600: Fibre channel helps you to solve problems that have occurred on the SAN Volume Controller fibre-channel ports.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

This MAP is used for SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, SAN Volume Controller 2145-8F2, and the SAN Volume Controller 2145-4F2. Be sure that you know which model you are using before you start this procedure. To determine which model you are working with, see the SAN Volume Controller overview.

You might have been sent here for one of the following reasons:

- A problem occurred during the installation of a SAN Volume Controller system and the fibre-channel checks failed
- Another MAP sent you here

Perform the following steps to solve problems caused by the fibre-channel ports:

1. **Are you here to diagnose a problem on a SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-4F2?**

NO Go to step 2 on page 314.

YES Go to step 3.

2. **Are you trying to resolve a fibre-channel port speed problem?**

NO Go to step 3.

YES Go to step 12 on page 318.

3. Display fibre-channel port 1 status on the SAN Volume Controller front panel display. See the topic concerning SAN Volume Controller menu options.

Is the front panel display on the SAN Volume Controller showing fibre-channel port-1 active?

NO A fibre-channel port is not working correctly. Check the port status on the second line of the display.

- **Inactive:** The port is operational but cannot access the fibre-channel fabric. The fibre-channel adapter is not configured correctly, or the fibre-channel cable has failed, is not installed, or the device at the other end of the cable has failed. Make a note of port-1. Go to step 8 on page 316.
- **Failed:** The port is not operational because of a hardware failure. Make a note of port-1. Go to step 10 on page 316.
- **Not installed:** This port is not installed. Make a note of port-1. Go to step 11 on page 317.

YES Press and release the right button to display fibre-channel port-2 . Go to step 4.

4. (from step 3)

Is the front panel display on the SAN Volume Controller showing fibre-channel port-2 active?

NO A fibre-channel port is not working correctly. Check port status on the second line of the display.

- **Inactive:** The port is operational but cannot access the fibre-channel fabric. The fibre-channel adapter is not configured correctly, or the fibre-channel cable has failed, is not installed, or the device at the other end of the cable has failed. Make a note of port-2. Go to step 8 on page 316.
- **Failed:** The port is not operational because of a hardware failure. Make a note of port-2. Go to step 10 on page 316.
- **Not installed:** This port is not installed. Make a note of port-2. Go to step 11 on page 317.

YES Press and release the right button to display fibre-channel port-3. Go to step 5.

5. (from step 4)

Is the front panel display on the SAN Volume Controller showing fibre-channel port-3 active?

NO A fibre-channel port is not working correctly. Check the port status on the second line of the display.

- **Inactive:** The port is operational but cannot access the fibre-channel fabric. The fibre-channel adapter is not configured correctly, or the fibre-channel cable has failed, is not installed, or the device at the other end of the cable has failed. Make a note of port-3. Go to step 8 on page 316.
- **Failed:** The port is not operational because of a hardware failure. Make a note of port-3. Go to step 10 on page 316.

- **Not installed:** This port is not installed. Make a note of port-3. Go to step 11 on page 317.

YES Press and release the right button to display fibre-channel port-4. Go to step 6.

6. (from step 5 on page 314)

Is the front panel display on the SAN Volume Controller showing fibre-channel port-4 active?

NO A fibre-channel port is not working correctly. Check port status on the second line of the display.

- **Inactive:** The port is operational but cannot access the fibre-channel fabric. The fibre-channel adapter is not configured correctly, or the fibre-channel cable has failed, is not installed, or the device at the other end of the cable has failed. Make a note of port-4. Go to step 8 on page 316.
- **Failed:** The port is not operational because of a hardware failure. Make a note of port-4. Go to step 9 on page 316.
- **Not installed:** This port is not installed. Make a note of port-4. Go to step 10 on page 316.

YES Go to step 7.

7. (from step 6)

A previously reported fault with a fibre-channel port is no longer being shown. A problem with the SAN fibre-channel fabric might have been fixed or there might be an intermittent problem.

Check with the customer to see if any fibre-channel ports have been disconnected or if any component of the SAN fibre-channel fabric has failed and has been fixed recently.

Is the fibre-channel port failure explained by the previous checks?

NO There might be an intermittent fibre-channel error.

- Use the SAN problem determination procedure to check for and resolve any fibre-channel fabric connection problems. If you resolve a problem, continue with “MAP 5700: Repair verification” on page 319.
- Check if similar fibre-channel errors have occurred recently on the same port on this SAN Volume Controller node. If they have, replace the fibre-channel cable, unless it has already been replaced. If it has been replaced, replace the fibre-channel adapter assembly shown in the following table.

SAN Volume Controller 2145-4F2 port 1, 2, 3 or 4	Fibre-channel adapter
SAN Volume Controller 2145-8F2 port 1 or 2	Dual port fibre-channel host bus adapter (HBA) - Low profile
SAN Volume Controller 2145-8F2 port 3 or 4	Dual port fibre-channel HBA - Full height
SAN Volume Controller 2145-8F4 port 1, 2, 3, or 4	4-port fibre channel HBA
SAN Volume Controller 2145-8G4 port 1, 2, 3, or 4	4-port fibre channel HBA

- Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

8. (from steps 3 on page 314, 4 on page 314, 5 on page 314, and 6 on page 315)
The noted port on the SAN Volume Controller is showing a status of inactive. For certain models, this might occur when the fibre-channel speed is not set correctly.

Are you diagnosing a problem on a SAN Volume Controller 2145-8F2 or a SAN Volume Controller 2145-4F2?

NO Go to step 9.

YES Check that the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-4F2 is set to the correct speed for the SAN. Obtain the SAN speed of all the SANs connected to the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-4F2 from the SAN administrator. Check that all the SANs are able to run at either 1 Gbps or 2 Gbps. On the front panel, navigate to the fibre-channel port status that shows inactive. Now perform the following steps:

- Press and hold the down button.
- Press and release the select button.
- Release the down button.
The fibre-channel speed setting is shown on the display. If this value does not match the speed of the SAN, use the down and up buttons to set it correctly.
- Press the select button to accept any changes and return to the fibre-channel status display.
- If the status shows active, continue with “MAP 5700: Repair verification” on page 319. Otherwise, go to step 9.

9. (from step 8)
The noted port on the SAN Volume Controller is displaying a status of inactive. If the noted port still displays a status of inactive, replace the parts that are associated with the noted port in the following order:

- a. Fibre-channel cables from the SAN Volume Controller to fibre-channel network.
- b. Faulty fibre-channel fabric connections. Use the SAN problem determination procedure to resolve any fibre-channel fabric connection problem.
- c. Fibre-channel adapter assemblies.

SAN Volume Controller 2145-4F2 port 1, 2, 3 or 4	Fibre-channel adapter
SAN Volume Controller 2145-8F2 port 1 or 2	Dual port fibre-channel host bus adapter (HBA) - Low profile
SAN Volume Controller 2145-8F2 port 3 or 4	Dual port fibre-channel HBA - Full height
SAN Volume Controller 2145-8F4 port 1, 2, 3, or 4	4-port fibre channel HBA
SAN Volume Controller 2145-8G4 port 1, 2, 3, or 4	4-port fibre channel HBA

d. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

10. (from steps 3 on page 314, 4 on page 314, 5 on page 314, and 6 on page 315)

The noted port on the SAN Volume Controller is displaying a status of failed. Replace the parts that are associated with the noted port in the following order:

- a. Fibre-channel adapter assemblies.

SAN Volume Controller 2145-4F2 port 1, 2, 3 or 4	Fibre-channel adapter
SAN Volume Controller 2145-8F2 port 1 or 2	Dual port fibre-channel host bus adapter (HBA) - Low profile
SAN Volume Controller 2145-8F2 port 3 or 4	Dual port fibre-channel HBA - Full height
SAN Volume Controller 2145-8F4 port 1, 2, 3 or 4	4-port fibre channel HBA
SAN Volume Controller 2145-8G4 port 1, 2, 3, or 4	4-port fibre channel HBA

- b. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

11. (from steps 3 on page 314, 4 on page 314, 5 on page 314, and 6 on page 315)

The noted port on the SAN Volume Controller is displaying a status of not installed. If you have just replaced the fibre-channel adapter, make sure that it is installed correctly. If you have replaced any other system board components, make sure that the fibre-channel adapter has not been disturbed.

Is the Fibre Channel adapter failure explained by the previous checks?

NO

- a. Fibre-channel adapter assemblies.

SAN Volume Controller 2145-4F2 port 1, 2, 3 or 4	Fibre-channel adapter
SAN Volume Controller 2145-8F2 port 1 or 2	Dual port fibre-channel host bus adapter (HBA) - Low profile
SAN Volume Controller 2145-8F2 port 3 or 4	Dual port fibre-channel HBA - Full height
SAN Volume Controller 2145-8F4 port 1, 2, 3, or 4	4-port fibre channel HBA
SAN Volume Controller 2145-8G4 port 1, 2, 3, or 4	4-port fibre channel HBA

- b. Fibre-channel adapter connection hardware:

SAN Volume Controller 2145-4F2	System board assembly
SAN Volume Controller 2145-8F2 port 1 or 2	1. Riser card, PCI Low profile 2. Frame assembly
SAN Volume Controller 2145-8F2 port 3 or 4	1. Riser card, PCI 2. Frame assembly
SAN Volume Controller 2145-8F4 port 1, 2, 3, or 4	1. Riser card, PCI Express 2. Frame assembly
SAN Volume Controller 2145-8G4 port 1, 2, 3, or 4	1. Riser card, PCI Express 2. Frame assembly

- c. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

12. (from step 2 on page 314) For the SAN Volume Controller 2145-8F4 and the SAN Volume Controller 2145-8G4, each fibre-channel port autonegotiates its operating speed with the switch to which it is connected. If the speed at which it is operating is lower than the operating speed that is supported by the switch, this indicates that a high number of link errors are being detected. To display the current speed of the link, perform the following steps:
 - a. Press the up or down button on the front panel until FC Port-1: is displayed on the first line of the service panel.
 - b. Press the left or right button until the required port is displayed.
 - c. Press and hold the down button.
 - d. Press and release the select button.
 - e. Release the down button.

The second line of the front-panel display shows the current fibre-channel speed of the port.

Is the port operating at lower than the expected speed?

NO Repeat the check with the other fibre-channel ports until the failing port is located. If no failing port is located, the problem no longer exists. Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

- YES** Perform the following steps:
- a. Check the routing of the fibre-channel cable to ensure that no damage exists and that the cable route contains no tight bends. Any bend should have no less than a 3-inch radius. Either reroute or replace the fibre-channel cable.
 - b. Remove the fibre-channel cable for 2 seconds and then reinsert it. This will cause the fibre-channel adapter to renegotiate its operating speed.
 - c. Recheck the speed of the fibre-channel port. If it is now correct, you have resolved the problem. Otherwise, the problem might be caused by one of the following:
 - 4-port fibre channel HBA
 - Fibre-channel switch GBIC
 - Fibre-channel switch

Recheck the speed after changing any component until the problem is resolved and then verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

Related concepts

“SAN Volume Controller menu options” on page 104

Menu options are available on the front panel display on the SAN Volume Controller.

Related tasks

“SAN problem determination” on page 264

The procedures to service the SAN Volume Controller that are provided here help you solve problems on the SAN Volume Controller and its connection to the storage area network (SAN).

“Using the maintenance analysis procedures” on page 269
SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5700: Repair verification”

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

Related reference

“Fibre channel port-1 through 4 option” on page 111

The fibre channel port-1 through 4 options display the operational status of the fibre-channel ports.

MAP 5700: Repair verification

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here because you performed a repair and want to confirm that no other problems exists on the machine.

Perform the following steps to verify your repair:

1. **Are the Power LEDs on all the SAN Volume Controllers on?** See the power LED topic.

NO Go to “MAP 5000: Start” on page 270.

YES Go to step 2.

2. (from step 1)

Are the Check LEDs on all SAN Volume Controllers off? See the check LED topic.

NO Go to “MAP 5000: Start” on page 270.

YES Go to step 3.

3. (from step 2)

Are all the SAN Volume Controllers displaying cluster on the top line of the front panel display with the second line blank or displaying a cluster name?

NO Go to “MAP 5000: Start” on page 270.

YES Go to step 4.

4. (from step 3)

Using the SAN Volume Controller application for the cluster you have just repaired, check the status of all configured managed disks (MDisks).

Do all MDisks have a status of online?

NO If any MDisks have a status of offline, repair the MDisks. See the topic about how to determine the failing enclosure or disk controller to locate the disk controller with the offline MDisk. Use the problem determination procedure for the disk controller to repair the MDisk faults before returning to this MAP.

If any MDisks have a status of degraded, repair any storage area network (SAN) and MDisk faults before returning to this MAP.

If any MDisks show a status of excluded, include MDisks before returning to this MAP.

Go to “MAP 5000: Start” on page 270.

YES Go to step 5.

5. (from step 4 on page 319)

Using the SAN Volume Controller application for the cluster you have just repaired, check the status of all configured virtual disks (VDisks). **Do all vdisks have a status of online?**

NO Go to step 6.

YES Go to step 7.

6. (from step 5)

Following a repair of the SAN Volume Controller, a number of VDisks are showing a status of offline. VDisks will be held offline if SAN Volume Controller cannot confirm the integrity of the data. The VDisk might be the target of a copy that did not complete, or cache write data that was not written back to disk might have been lost. Determine why the VDisk is offline. If the VDisk was the target of a copy that did not complete, you can start the copy again. Otherwise, write data might not have been written to the disk, so its state cannot be verified. Your site procedures will determine how data is restored to a known state. To bring the VDisks online, you will need to move all the offline disks to the recovery I/O group and then move them back to an active I/O group. Go to “MAP 5000: Start” on page 270.

7. (from step 5)

You have successfully repaired the SAN Volume Controller.

Related tasks

“SAN problem determination” on page 264

The procedures to service the SAN Volume Controller that are provided here help you solve problems on the SAN Volume Controller and its connection to the storage area network (SAN).

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

Related reference

“Determining the failing enclosure or disk controller using the CLI” on page 29
You can use the command-line interface (CLI) to determine the failing enclosure or disk controller.

“Power LED” on page 35

The green power LED indicates the power status of the SAN Volume Controller.

“Check LED” on page 37

The amber check LED is used to indicate critical failures on the service controller.

Chapter 7, “Diagnosing problems with the SAN Volume Controller, the uninterruptible power supply, and the master console,” on page 117

You can diagnose problems with SAN Volume Controller, the uninterruptible

power supply, and the master console using either the command-line interface (CLI) or the SAN Volume Controller Console. For the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2 users, you can also use the light path diagnostics to help find the cause of errors.

Related information

“Understanding cluster error codes” on page 175

Every cluster error code includes an error code number, a description, action, and possible field replaceable units (FRUs).

MAP 5800: Light path

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

You might have been sent here because of the following:

- The Error LED on the operator panel is on or flashing
- Another MAP sent you here

Related tasks

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Removing the fibre-channel adapter assembly” on page 427

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

“Replacing the fibre-channel adapter assembly” on page 433

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

Light path for SAN Volume Controller 2145-8G4

Ensure the node is powered on and then perform the following steps to enable the node to boot:

1. **Is the Error LED on the SAN Volume Controller 2145-8G4 operator panel illuminated or flashing?** See Figure 56.



Figure 56. SAN Volume Controller 2145-8G4 operator information panel

1 Release latch

2 Error LED

NO Reassess your symptoms and return to “MAP 5000: Start” on page 270.

YES Go to step 2.

2. (from step 1 on page 321)

Press the release latch and open the light path diagnostics panel, which is shown in Figure 57.

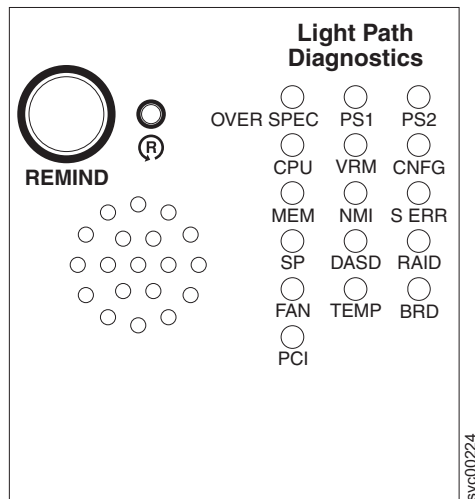


Figure 57. SAN Volume Controller 2145-8G4 light path diagnostics panel

Are one or more LEDs on the light path diagnostic panel on or flashing?

NO Verify that the operator panel cable is correctly seated at both ends. If the error LED is still illuminated but no LEDs are illuminated on the light path diagnostics panel, replace parts in the following sequence:

- Operator information panel
- Frame assembly

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Refer to Table 21 on page 324 and perform the action specified for the specific light path diagnostic LEDs, then go to step 3 on page 325. Some actions will require that you observe the state of LEDs on the system board. The location of the system board LEDs are shown in Figure 58 on page 323. The fan LEDs are located adjacent to each FAN. To view the LEDs you will need to do the following:

- Remove power from the SAN Volume Controller 2145-8G4.
- Remove the SAN Volume Controller 2145-8G4 from the rack.
- Remove the top cover and open the fan doors.
- Press the light path diagnostic button (**7** in Figure 58 on page 323).

Note: The light path diagnostic button is used to illuminate the light path diagnostic LEDs when power is disconnected from the SAN Volume Controller 2145-8G4.

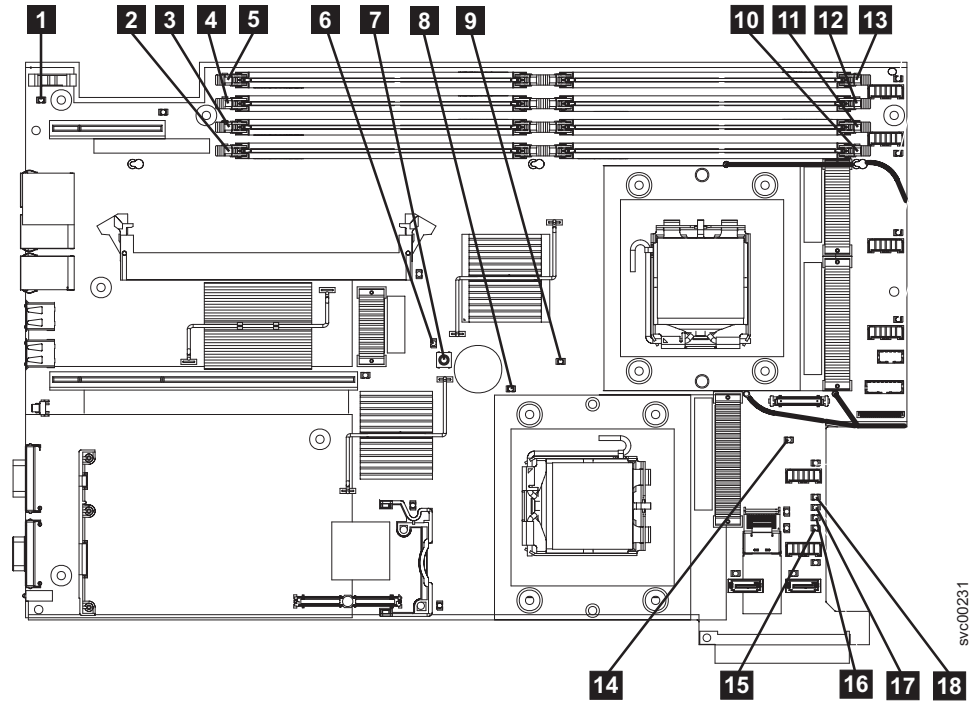


Figure 58. The SAN Volume Controller 2145-8G4 system board

- 1** System-board battery error LED
- 2** DIMM 5 error LED
- 3** DIMM 6 error LED
- 4** DIMM 7 error LED
- 5** DIMM 8 error LED
- 6** Light path diagnostics active LED
- 7** Light path diagnostics button
- 8** Microprocessor 2 error LED
- 9** Microprocessor 1 error LED
- 10** DIMM 1 error LED
- 11** DIMM 2 error LED
- 12** DIMM 3 error LED
- 13** DIMM 4 error LED
- 14** System-board fault LED
- 15** Power B error LED
- 16** Power A error LED
- 17** Power C error LED
- 18** Power D error LED

Table 21. Diagnostics panel LED prescribed actions

Diagnostics panel LED	Action
OVER SPEC	Replace the power supply
PS1	If you have just replaced the power supply, check that it is correctly installed. If it is correctly installed, replace parts in the following sequence: <ol style="list-style-type: none"> 1. Power supply 2. Power backplane
PS2	This is not used on the SAN Volume Controller 2145-8G4. This is a false indication. A sensor has failed or the system board service processor firmware is not functioning correctly. Contact your support center to see if a firmware update is available. If not, replace parts in the following sequence: <ol style="list-style-type: none"> 1. Power backplane 2. Operator information panel 3. Frame assembly
CPU	A microprocessor has failed. Make sure that the failing microprocessor, which is indicated by a lit LED on the system board, is installed correctly. If it is installed correctly, replace the microprocessor.
VRM	This is not used on the SAN Volume Controller 2145-8G4.
CNFG	Microprocessor configuration error. Check the installed microprocessors for compatibility.
MEM	Observe the DIMM LEDs on the system board. If any DIMM LED is flashing, make sure that the correct type of DIMM is installed in every slot. Replace parts in the following sequence: <ol style="list-style-type: none"> 1. Failing DIMM 2. Frame assembly <p>Note: 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 the diagnostics indicated.</p>
NMI	A non-maskable interrupt occurred. Call your support center and check if any software updates need to be applied to this SAN Volume Controller 2145-8G4. If this node will not join the cluster, run node recovery. If node recovery does not resolve the problem, replace the frame assembly.
S ERR	A soft error occurred. Call your support center and check if any software updates need to be applied to this SAN Volume Controller 2145-8G4. If this node will not join the cluster, run node recovery. If node recovery does not resolve the problem, replace the frame assembly.
SP™	The Service processor has failed. Replace the frame assembly.
DASD	This is not used on the SAN Volume Controller 2145-8G4. A sensor has failed or the system board service processor firmware is not functioning correctly. Contact your support center to see if a firmware update is available. If not, replace parts in the following sequence: <ol style="list-style-type: none"> 1. Operator information panel 2. Frame assembly
BRD	Observe the battery LED and the system board LED. If the battery LED is illuminated, replace the battery. If the system board LED is illuminated, replace the frame assembly.

Table 21. Diagnostics panel LED prescribed actions (continued)

Diagnostics panel LED	Action
FAN	A fan has failed, is operating too slowly, or has been removed. A failing fan can also cause the TEMP LED to be lit. Replace the failing fan, which is indicated by a lit LED near the fan connector on the system board.
TEMP	If any fan failures exist, repair those before attempting this procedure. Verify that the ambient temperature is within normal operating specifications. Make sure that airflow in and around the SAN Volume Controller 2145-8G4 is not obstructed. If the error persists, replace the frame assembly.
RAID	This is not used on the SAN Volume Controller 2145-8G4.
PCI	The fibre-channel card might be failing. Ensure the fibre-channel card and the riser card are correctly installed. If the error persists, replace the fibre-channel card.

- Continue with “MAP 5700: Repair verification” on page 319 to verify the correct operation.

Light path for SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2

Ensure the node is powered on and then perform the following steps to enable the node to boot:

- Is the Error LED on the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 operator panel illuminated or flashing? See Figure 59.

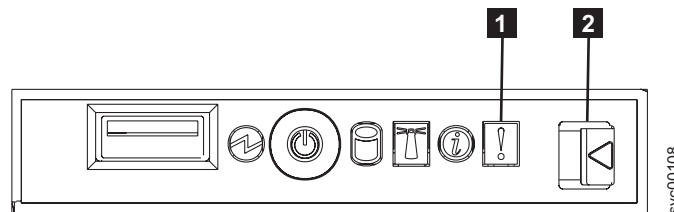


Figure 59. SAN Volume Controller 2145-8F4 operator information panel

1 Release latch

2 Error LED

NO Reassess your symptoms and return to “MAP 5000: Start” on page 270.

YES Go to step 2.

- (from step 1)

Press the release latch and open the light path diagnostics panel, which is shown in Figure 60 on page 326.

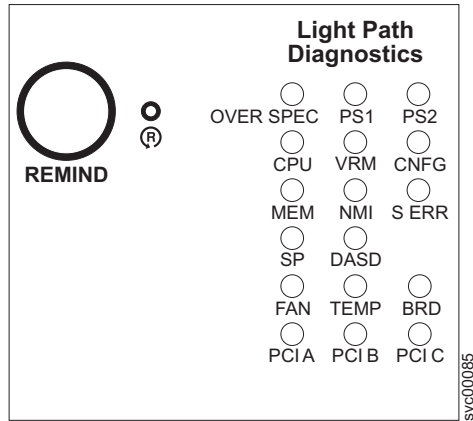


Figure 60. SAN Volume Controller 2145-8F4 and the SAN Volume Controller 2145-8F2 light path diagnostics panel

Are one or more LEDs on the light path diagnostic panel on or flashing?

- NO** Verify that the operator panel cable is correctly seated at both ends. If the error LED is still illuminated but no LEDs are illuminated on the light path diagnostics panel, replace parts in the following sequence:
- a. Operator information panel
 - b. Cable, signal, front panel
 - c. Frame assembly

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

- YES** Refer to Table 22 on page 327 and perform the action specified for the specific light path diagnostic LEDs, then go to step 3 on page 329. Some actions will require that you observe the state of LEDs on the system board or on the fan backplanes. The location of the system board LEDs are shown in Figure 61 on page 327. The fan LEDs are located adjacent to each FAN. To view the LEDs you will need to do the following:
- a. Remove power from the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
 - b. Remove the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 from the rack.
 - c. Remove the top cover and open the fan doors.
 - d. Press the light path diagnostic button **1**. See Figure 61 on page 327.

Note: The light path diagnostic button is used to illuminate the light path diagnostic LEDs when power is disconnected from the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2.

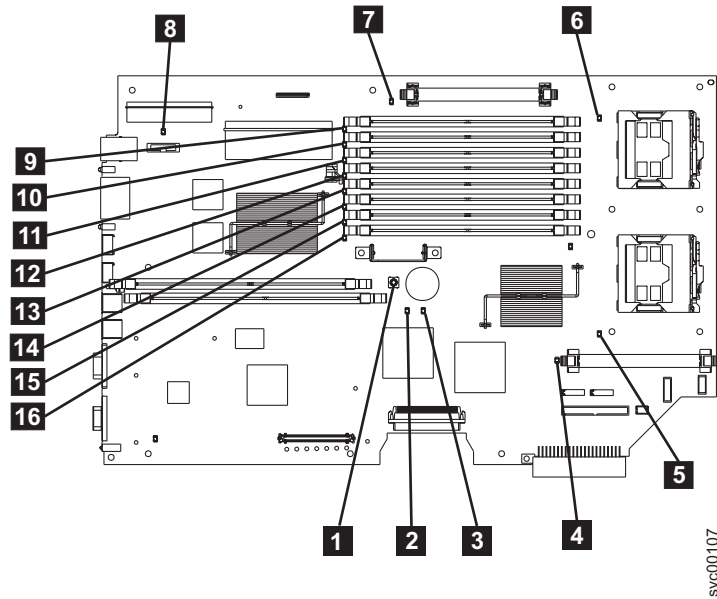


Figure 61. The SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 system board

- 1** Light path diagnostic button
- 2** System board fault LED
- 3** Light path activity LED
- 4** VRM 2 Error LED
- 5** CPU 2 Error LED
- 6** CPU 1 Error LED
- 7** VRM 1 Error LED
- 8** Battery LED
- 9** DIMM 1 error LED
- 10** DIMM 2 error LED
- 11** DIMM 3 error LED
- 12** DIMM 4 error LED
- 13** DIMM 5 error LED
- 14** DIMM 6 error LED
- 15** DIMM 7 error LED
- 16** DIMM 8 error LED

Table 22. Diagnostics panel LED prescribed actions

Diagnostics panel LED	Action
OVER SPEC	Replace the power supply

Table 22. Diagnostics panel LED prescribed actions (continued)

Diagnostics panel LED	Action
PS1	<p>If you have just replaced the power supply, check that it is correctly installed. If it is correctly installed, replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Power supply 2. Power backplane
PS2	<p>This is not used on the SAN Volume Controller 2145-8F4 nor the SAN Volume Controller 2145-8F2. A sensor has failed or the system board service processor firmware is not functioning correctly. Contact your support center to see if a firmware update is available. If not, replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Power backplane 2. Operator information panel 3. Frame assembly
CPU	<p>Observe the CPU indicators on the system board. The microprocessor adjacent to the illuminated LED is failing. If you have installed the incorrect type of microprocessor, the LED will be flashing. Replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Microprocessor 2. Frame assembly
VRM	<p>Observe the VRM indicators on the system board. The VRM adjacent to the illuminated LED is failing. Verify that the VRM is correctly installed. Replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. VRM 2. Frame assembly
CNFG	<p>Observe all system board LEDs. Make sure that DIMMs, microprocessors, and VRMs are installed correctly and are of the correct type. Replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Component adjacent to the illuminated LED 2. Frame assembly
MEM	<p>Observe the DIMM LEDs on the system board. If any DIMM LED is flashing, make sure that the correct type of DIMM is installed in every slot. Replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Failing DIMM 2. Frame assembly <p>Note: 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 the diagnostics indicated.</p>
NMI	<p>A non-maskable interrupt occurred. Call your support center and check if any software updates need to be applied to this SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4. If this node will not join the cluster, run node recovery. If node recovery does not resolve the problem, replace the frame assembly.</p>
S ERR	<p>A soft error occurred. Call your support center and check if any software updates need to be applied to this SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4. If this node will not join the cluster, run node recovery. If node recovery does not resolve the problem, replace the frame assembly.</p>
SP	<p>The Service processor has failed. Replace the frame assembly.</p>

Table 22. Diagnostics panel LED prescribed actions (continued)

Diagnostics panel LED	Action
DASD	<p>This is not used on the SAN Volume Controller 2145-8F2 or the SAN Volume Controller 2145-8F4. This is a false indication. A sensor has failed or the system board service processor firmware is not functioning correctly. Contact your support center to see if a firmware update is available. If not, replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Operator information panel 2. Frame assembly
FAN	<p>Observe the LEDs on the fan backplanes. The fan adjacent to the failing LED is failing. Replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Fan 2. Fan backplane
TEMP	<p>If any fan failures exist, repair those before attempting this procedure. Verify that the ambient temperature is within normal operating specifications. Make sure that airflow in and around the SAN Volume Controller 2145-8F2 or the SAN Volume Controller 2145-8F4 is not obstructed. Replace the frame assembly.</p>
BRD	<p>Observe the battery LED and the system board LED. If the battery LED is illuminated, replace the battery. If the system board LED is illuminated, replace the frame assembly.</p>
PCI A	<p>This is not used on the SAN Volume Controller 2145-8F4 nor the SAN Volume Controller 2145-8F2. This is a false indication. A sensor has failed or the system board service processor firmware is not functioning correctly. Contact your support center to see if a firmware update is available. If not, replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Operator information panel 2. Frame assembly
PCI B	<p>One of the fibre-channel adapter cards connected to this bus may be failing. Ensure that both adapters are correctly installed and that the riser card latches are fully closed. If possible, display the fibre-channel card status on the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 front panel to determine the failing card. Otherwise, remove the fibre-channel cards one-at-a-time to determine the failing card. Replace parts in the following sequence:</p> <ol style="list-style-type: none"> 1. Fibre-channel adapter card 2. Frame assembly
PCI C	<p>Replace the frame assembly.</p>

3. Continue with “MAP 5700: Repair verification” on page 319 to verify the correct operation.

MAP 5900: Hardware boot

MAP 5900: Hardware boot helps you solve problems that are preventing the node from starting its boot sequence.

If you are not familiar with these maintenance analysis procedures (MAPs), first read the topic concerning using the MAPs.

This MAP is applicable to the SAN Volume Controller 2145-4F2, the SAN Volume Controller 2145-8F2, the SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8G4. Be aware of which model you are using before you start this procedure.

You might have been sent here for one of the following reasons:

- The hardware boot display is displayed continuously. See Figure 62.



Figure 62. Hardware boot display

- The node rescue display is displayed continuously. See Figure 63.



Figure 63. Node rescue display

- The boot progress is hung and Booting 100 is displayed on the front panel
- Another MAP sent you here

Perform the following steps to allow the node to start its boot sequence:

1. **Is this a SAN Volume Controller 2145-4F2?**

NO Go to step 2.

YES Go to step 3.

2. (From step 1)

Is the Error LED on the operator panel illuminated or flashing?

NO Go to step 3.

YES Go to “MAP 5800: Light path” on page 321 to resolve the problem.

3. (From steps 1 and 2)

If you have just installed the SAN Volume Controller node or have just replaced a field replaceable unit (FRU) inside the node, perform the following steps:

- a. Turn off power to the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
- b. Remove the node from the rack. See “Removing the SAN Volume Controller from a rack” on page 339.
- c. Remove the top cover from the node. See “Removing the top cover” on page 364.
- d. If you have just replaced a FRU, ensure that the FRU is correctly placed and that all connections to the FRU are secure.
- e. Ensure that all memory modules are correctly installed and that the latches are fully closed. See “Replacing the memory modules (DIMM)” on page 390.
- f. Ensure that the fibre-channel adapter cards are correctly installed. See “Replacing the fibre-channel adapter assembly” on page 433.

- g. Ensure that the disk drive and its connectors are correctly installed. See “Replacing the disk drive” on page 398
- h. Ensure that the service controller is correctly installed. See “Replacing the service controller” on page 378.
- i. If it is not a SAN Volume Controller 2145-4F2, ensure the operator information panel cable is correctly installed on the system board.
- j. Replace the top cover to the node. See “Replacing the top cover” on page 368.
- k. Replace the node in the rack. See “Replacing the SAN Volume Controller in a rack” on page 346.
- l. Return power to the node.

Does the boot operation still hang?

NO Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Go to step 4.

- 4. (from step 3 on page 330)

Check if the system BIOS is reporting any errors. You need to attach a display and keyboard to see the BIOS output. The customer should be able to supply a suitable display and keyboard. If this is a SAN Volume Controller 2145-4F2, you need a special cable to connect the display and keyboard. If you do not have this cable, go to the next step.

- a. Turn off the power to the SAN Volume Controller.
- b. Connect the keyboard **1** and the display **2**. See Figure 64

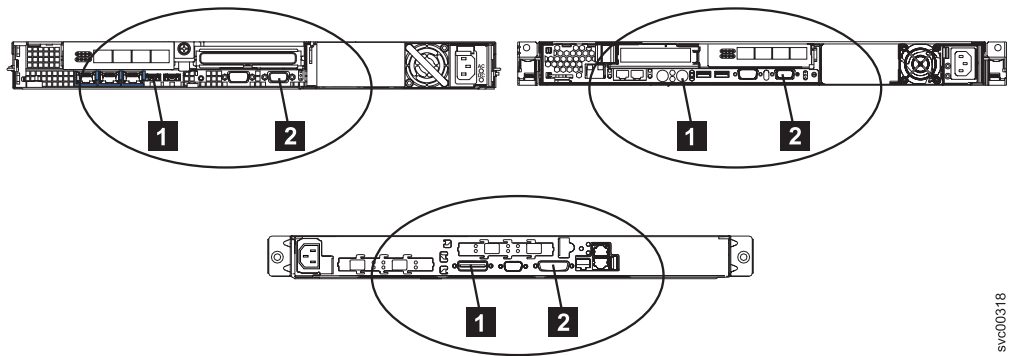


Figure 64. Keyboard and monitor ports on the SAN Volume Controller 2145-8G4 and the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2, and the SAN Volume Controller 2145-4F2

- c. Return power to the SAN Volume Controller.
- d. Watch the display.
 - If the POST sequence indicates an error, or if the BIOS Configuration/Setup Utility program indicates an error during startup, you need to resolve the error.
 - If it indicates an error with a specific hardware item, power off the node and remove it from the rack. Ensure the item specified is correctly installed, replace the node, and then restart the node. If the error is still reported, replace the specified item.
 - If a configuration error is reported, run the Configuration/Setup Utility program option to reset the BIOS to its default (factory) settings.

- e. Turn off power to the node and remove the keyboard and display.
- f. Return power to the node.

Does the boot operation still hang?

NO Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Go to step 5.

5. (from step 4 on page 331)
 - a. Turn off power to the node.
 - b. Remove the node from the rack.
 - c. Remove the top cover from the node.
 - d. Remove some of the memory modules:
 - If you are using the SAN Volume Controller 2145-4F2, remove all memory modules in Bank 1.
 - If you are using the SAN Volume Controller 2145-8F2 or the SAN Volume Controller 2145-8F4, remove the memory modules in slots 3 through 8.
 - If you are using the SAN Volume Controller 2145-8G4, remove the memory modules in slots 2 and 4 through 8.
 - e. Remove all installed fibre-channel cards.
 - f. Remove the disk drive.
 - g. Replace the top cover to the node.
 - h. Replace the node in the rack.
 - i. Return power to the node.

Does the boot operation still hang with the booting display or is Booting 100 displayed on the front panel?

Note: With the FRUs removed, the boot will hang with a different boot failure code.

NO Replace the FRUs, one-at-a-time, until the failing FRU is isolated.

YES Go to step 6.

6. (from step 5)
 - a. Turn off power to the node.
 - b. Remove the node from the rack.
 - c. Remove the top cover from the node.
 - d. Replace the fibre-channel cards and the disk drive.
 - e. Replace the memory modules:
 - If you are using the SAN Volume Controller 2145-4F2, replace all memory modules in Bank 1 and remove the memory modules in Bank 2.
 - If you are using the SAN Volume Controller 2145-8F2 or the SAN Volume Controller 2145-8F4, replace the memory modules in slots 1 and 2 with any two of the removed memory modules from slots 3 through 8.
 - If you are using the SAN Volume Controller 2145-8G4, replace the memory modules in slots 1 and 3 with any two of the removed memory modules from slots 2 and 4 through 8.
 - f. Replace the top cover to the node.
 - g. Replace the node in the rack.
 - h. Return power to the node.

Does the boot operation still hang with the booting display or is Booting 100 displayed on the front panel?

NO Exchange the failing memory modules for new FRUs and verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

YES Replace the parts in the following sequence:

- For the SAN Volume Controller 2145-4F2:
 - a. Service controller
 - b. System board
- For the SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8G4:
 - a. Service controller
 - b. Frame assembly

Verify the repair by continuing with “MAP 5700: Repair verification” on page 319.

Related tasks

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Removing the memory modules (DIMM)” on page 387

You might need to remove one or more faulty memory modules.

“Replacing the memory modules (DIMM)” on page 390

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

“Removing the fibre-channel adapter assembly” on page 427

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

“Removing the service controller” on page 370

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

“Replacing the frame assembly” on page 425

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

“Replacing the fibre-channel adapter assembly” on page 433

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

“Removing the disk drive” on page 391

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

“Removing the SAN Volume Controller from a rack” on page 339

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

“Replacing the top cover” on page 368

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

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Using the maintenance analysis procedures” on page 269

SAN Volume Controllers must be configured in pairs. This allows concurrent maintenance to be done.

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

“MAP 5700: Repair verification” on page 319

MAP 5700: Repair verification helps you to verify that field replaceable units (FRUs) that you have exchanged for new FRUs or repair actions that have been done have solved all the problems on the SAN Volume Controller.

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
During routine maintenance, you may be required to remove and replace the system board.

“Replacing the SAN Volume Controller 2145-4F2 system board” on page 470
During routine maintenance, you may be required to replace the system board.

Related reference

“Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385

When you replace a service controller at the same time that you replace the disk drive, you cannot perform a node rescue because the nonvolatile memory in the “new” service controller does not contain the operating system software required to do so.

Related information

“Understanding the boot codes” on page 133

The boot codes are displayed on the screen when a node is booting.

Chapter 9. Removing and replacing parts

You can remove and replace field replaceable units (FRUs) from the SAN Volume Controller, redundant ac power switch, and uninterruptible power supply.

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

Only remove or replace parts when you are directed to do so by the maintenance analysis procedures (MAPs). Start all problem determination and repair procedures with “MAP 5000: Start” on page 270.

Related tasks

“MAP 5000: Start” on page 270

MAP 5000: Start is an entry point to the maintenance analysis procedures (MAPs) for the SAN Volume Controller.

“MAP 5800: Light path” on page 321

MAP 5800: Light path helps you to solve hardware problems on the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or the SAN Volume Controller 2145-8F2 that are preventing the node from booting.

Enabling concurrent maintenance

To allow concurrent maintenance, SAN Volume Controllers must be configured in pairs.

While one SAN Volume Controller is being serviced, the other 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 while the SAN and host systems are powered on and doing productive work.

Attention: Do not remove the power from both SAN Volume Controllers unless the procedures instruct you to do so.

Preparing to remove and replace parts

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

First, read the safety precautions in the *IBM Systems Safety Notices*. These guidelines help you safely work with the SAN Volume Controller, redundant ac power switch, and uninterruptible power supply.

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.

Removing and replacing the SAN Volume Controller 2145-8G4 cable retention bracket

The cable retention bracket ensures that the SAN Volume Controller 2145-8G4 node does not mistakenly become unplugged from the uninterruptible power supply (UPS).

The SAN Volume Controller 2145-8G4 comes with one of two different cable retention brackets. Depending on which bracket you have, use the appropriate instructions to remove and replace the cable retention bracket.

- If your cable retention bracket looks like the following, go to “Removing and replacing the cable retention bracket - option A” on page 337.



svc00363

- If your cable retention bracket looks like the following, go to “Removing and replacing the cable retention bracket - option B” on page 339.



svc00362

Removing and replacing the cable retention bracket - option A

The cable retention bracket attaches to the back of the SAN Volume Controller 2145-8G4 node. It is connected with the screws that already hold the rear plate of the power supply in place.

Removing the cable retention bracket

Remove the cable retention bracket before you remove the SAN Volume Controller 2145-8G4 from the rack.

1. Carefully remove the two retaining screws on the right side of the power supply rear plate.
2. Remove the bracket.
3. Replace the screws in the power supply rear plate.

Replacing the cable retention bracket

Replace the SAN Volume Controller 2145-8G4 cable retention bracket after you replace the node in the rack.

To attach the bracket to the rack rail, perform the following steps:

1. With the node powered off and the power cable removed, loosen and remove the two screws **1** on the right side of the rear plate that covers the power supply fan unit, as shown in Figure 65 on page 338.

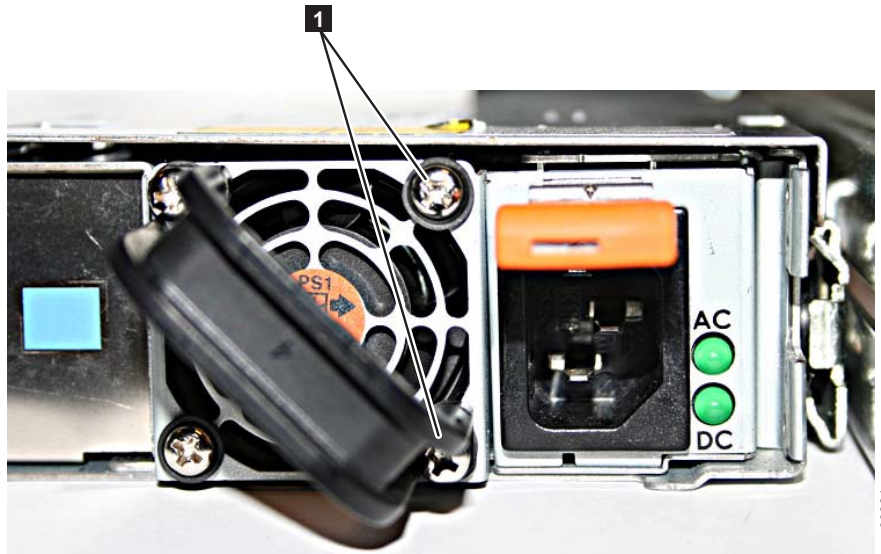


Figure 65. The SAN Volume Controller 2145-8G4 before you attach the cable retention bracket

2. Insert the power cable.
3. Position the cable retention bracket so that the power cable runs through the slot in the bracket, as shown in Figure 66. Align the screw holes in the bracket with the holes that are in the rear plate where you removed the two screws.
4. Replace the top screw.
5. Move the power supply handle back into place over the retention bracket, and replace the lower screw so that it holds the power supply handle, cable retention bracket, and power supply rear plate in place.



Figure 66. The SAN Volume Controller 2145-8G4 with cable retention bracket option A attached

Removing and replacing the cable retention bracket - option B

Removing the cable retention bracket

Remove the cable retention bracket before you remove the SAN Volume Controller 2145-8G4 from the rack.

1. Remove the securing bolt from the node side rail (shown in Figure 67) next to the power supply.
2. Remove the bracket.
3. Replace the bolt in the node side rail.

Replacing the cable retention bracket

Replace the SAN Volume Controller 2145-8G4 cable retention bracket after you replace the node in the rack.

Install the SAN Volume Controller 2145-8G4 cable retention bracket after you install the node in the rack.

To attach the bracket to the rack rail, perform the following steps:

1. Install the power cable into the power supply.
2. At the back of the cabinet, remove the securing bolt from the node side rail next to the power supply, as shown in Figure 67.

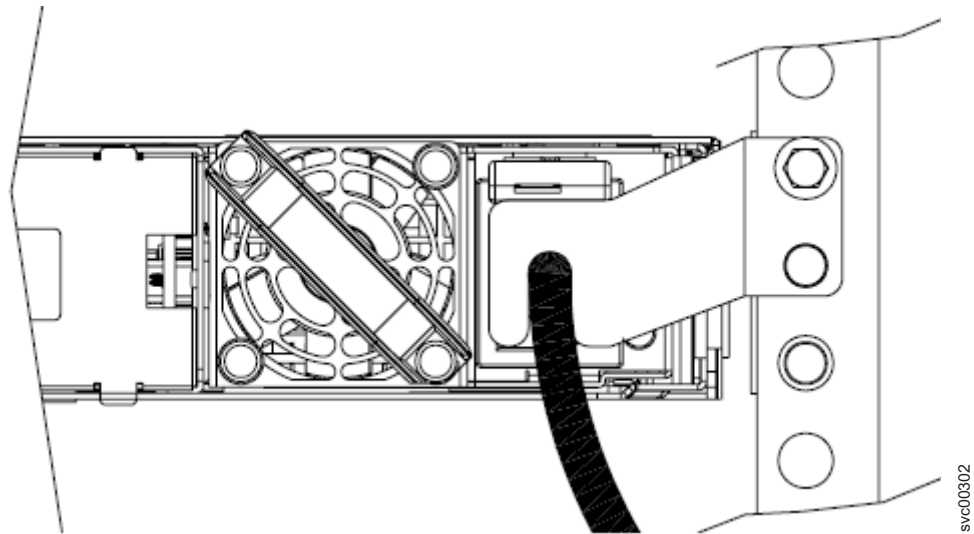


Figure 67. The SAN Volume Controller 2145-8G4 with cable retention bracket option B attached

3. Slide the cable retention bracket over the cable and position it over the side rail. Secure it in place using the original bolt.

Removing the SAN Volume Controller from a rack

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

Related tasks

“Accessing the CLI from the master console” on page 18

If you must enter and run command-line instructions, you can access the SAN Volume Controller command-line interface (CLI) from the master console.

“Deleting a node from the cluster using the CLI” on page 22

You can use the command-line interface (CLI) to delete a node from the cluster.

“Adding a node to the cluster using the CLI” on page 23

You can use the command-line interface (CLI) to add a node that has either been removed or rejected by a cluster, into the cluster.

“Removing the fibre-channel adapter assembly” on page 427

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

Related reference

“Handling static-sensitive devices” on page xliii

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

Powering off the SAN Volume Controller

When instructed to do so, shut down and power off the SAN Volume Controller before you remove and replace parts.

For more information about how to power off the SAN Volume Controller, see “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

Attention: Unless host systems or fibre-channel switches must be switched off for some other 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.

After you have powered off the SAN Volume Controller node, perform the following steps:

1. Make a note of the positions of all the external cables that are connected at the back of the SAN Volume Controller.
2. Disconnect all the external cables from the back of the SAN Volume Controller. If you are using the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8G4 and have installed the power cable retainer, remove it before removing any cables.

Removing the SAN Volume Controller 2145-8G4 from a rack

Use these instructions when you are prompted to remove a SAN Volume Controller 2145-8G4 from a rack.

If the SAN Volume Controller is not already powered off, see “Powering off the SAN Volume Controller.”

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

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

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

- 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)

1. Disconnect the cables from the SAN Volume Controller 2145-8G4.
2. Slide the SAN Volume Controller 2145-8G4 forward until it latches in the service position.
3. Position yourself to support the weight of the node when it is no longer held by the slides and then press the rear slide release latches (**1** in Figure 68) on both sides of the SAN Volume Controller 2145-8G4.
4. Pull the SAN Volume Controller 2145-8G4 completely out of the slides.

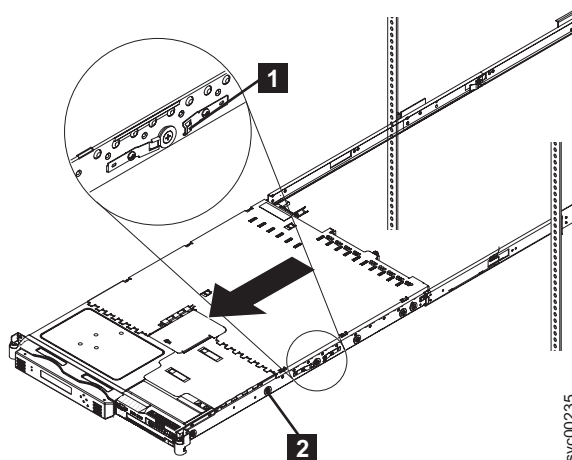


Figure 68. Removing the SAN Volume Controller 2145-8G4 from the rack

Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 from a rack

Use these instructions when you are directed to remove a SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 from a rack.

If the SAN Volume Controller is not already powered off, see “Powering off the SAN Volume Controller” on page 340.

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

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

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

- 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)

To remove the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 from a rack, complete these steps:

1. Unlatch the two latches on the front of the rack.
2. Pull the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 forward and remove it from the rack.

Removing the SAN Volume Controller 2145-4F2 from a rack

Use these instructions when you are directed to remove a SAN Volume Controller 2145-4F2 from a rack.

If the SAN Volume Controller is not already powered off, see "Powering off the SAN Volume Controller" on page 340.

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

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

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)

To remove the SAN Volume Controller 2145-8F2 from a rack, complete these steps:

1. Unscrew the two front screws (**1** in Figure 69 on page 346).

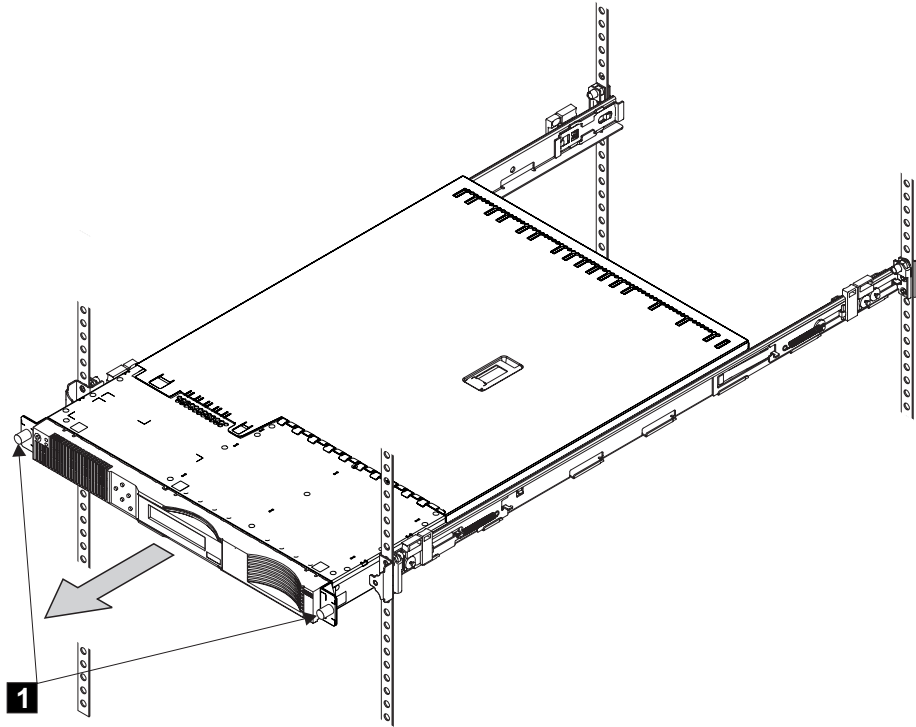


Figure 69. Loosening the front screws to remove the SAN Volume Controller 2145-4F2

2. Pull the SAN Volume Controller 2145-4F2 forward and remove it from the rack.

Replacing the SAN Volume Controller in a rack

You must use caution when you replace the SAN Volume Controller in a rack.

Note: If you have 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 has completed its self-tests. There are some exceptions to this, such as when a disk drive has been 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 directed maintenance procedures, those procedures will automatically restore the node to the cluster. If you are not performing the repair under directed maintenance 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)

DANGER

- 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)

Related tasks

"Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate" on page 402

You might have to replace the SATA backplate for a service action.

Replacing the SAN Volume Controller 2145-8G4 in a rack

Follow these instructions when you are prompted to replace the SAN Volume Controller 2145-8G4.

Perform the following steps to replace the SAN Volume Controller 2145-8G4 in a rack:

1. Extend the slides approximately 150mm (6 inches) from the front of the rack cabinet.
2. Align the two rear wheels on the node with the opening in the slides and then push the node into the slides until the rear slide release latches (**2** in Figure 70 on page 349) click into place, locking the node in the slides.

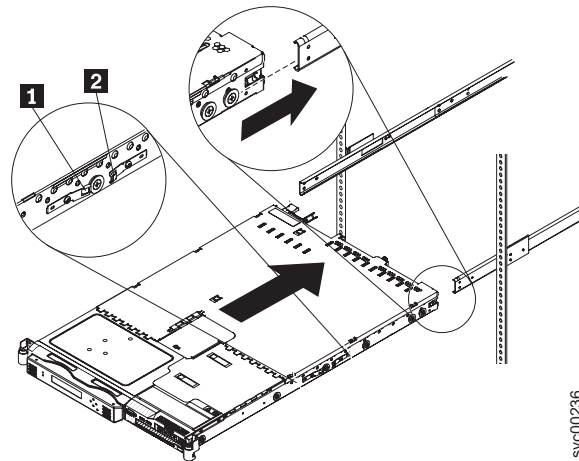


Figure 70. Aligning the SAN Volume Controller 2145-8G4 with the rack slides

3. Pull the node out of the rack so the slides are fully extended.
4. Press the front slide release latches (**1** in Figure 70) on both sides of the node and move the node into the rack cabinet and back out to verify that the node moves freely.
5. Connect all the external cables on the back of the SAN Volume Controller 2145-8G4.

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

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

6. Restore all power to the SAN Volume Controller.

Replacing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 in a rack

Follow these instructions when you are prompted to replace the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 in a rack.

Perform the following steps to replace the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 in the rack:

1. Slide the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 into the rack.
2. Latch the two latches on the front of the rack to attach the SAN Volume Controller to the rack. (**1** in Figure 71 on page 350).

Note: The front of the rail assembly looks different from the front, as you can see in Figure 71 on page 350.

3. Connect all the external cables on the back of the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2.

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

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

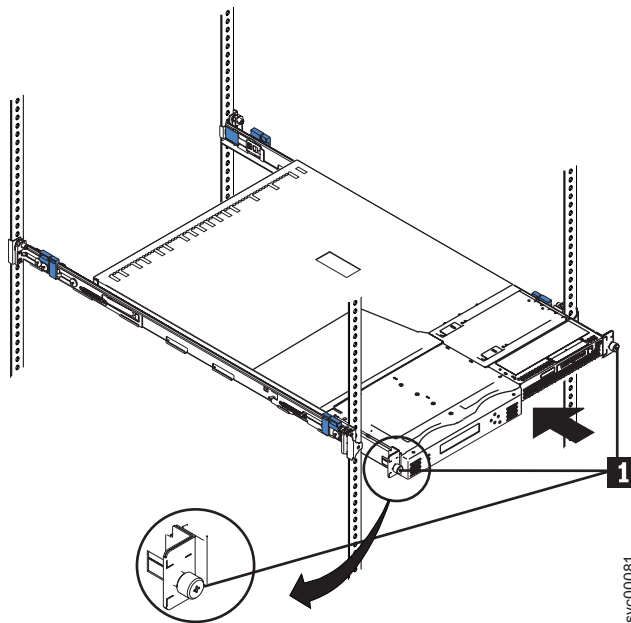


Figure 71. Sliding the SAN Volume Controller 2145-8F4 into the rack

4. Restore all power to the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2.

Replacing the SAN Volume Controller 2145-4F2 in a rack

Follow these instructions when you are prompted to replace the SAN Volume Controller 2145-4F2 in a rack.

Perform the following steps to replace the SAN Volume Controller 2145-4F2 in the rack:

1. Slide the SAN Volume Controller 2145-4F2 into the rack.
2. Screw in the two front screws (**1** in Figure 72 on page 351).

Note: The front of the rail assembly looks different from the front, as you can see in Figure 72 on page 351.

3. Connect all the external cables on the back of the SAN Volume Controller 2145-4F2.

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

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

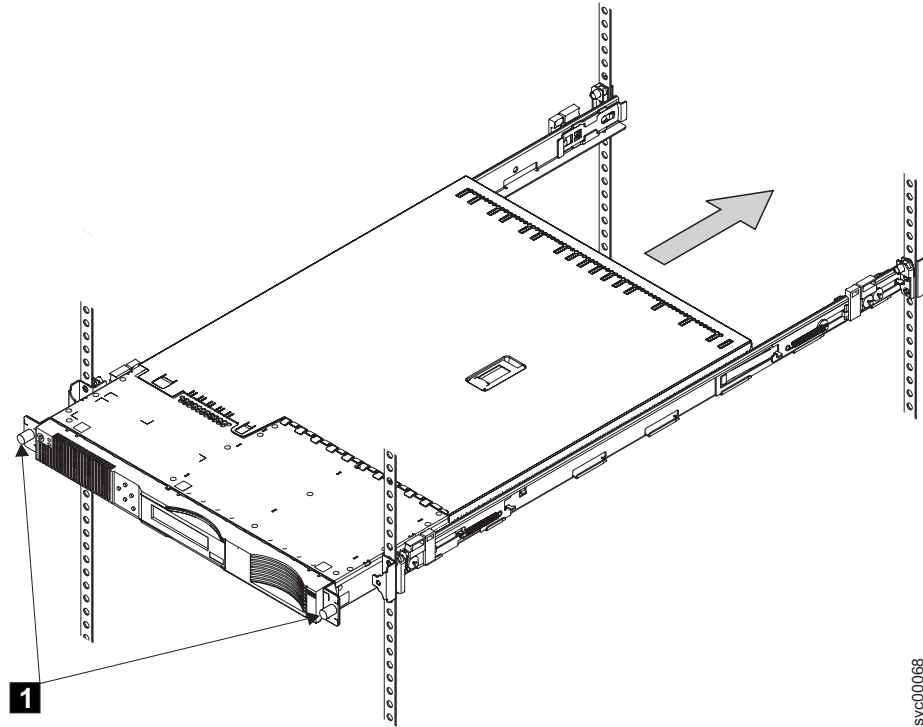


Figure 72. Attaching the SAN Volume Controller 2145-4F2 with the front screws

4. Restore all power to the SAN Volume Controller 2145-4F2.

Removing the support rails for a SAN Volume Controller

The SAN Volume Controller support rails can be removed if you need to move the SAN Volume Controller.

The following topics describe how to remove the SAN Volume Controller support rails:

- “Removing the SAN Volume Controller 2145-8G4 support rails”
- “Removing SAN Volume Controller 2145-4F2, SAN Volume Controller 2145-8F2, or SAN Volume Controller 2145-8F4 support rails” on page 353

Related tasks

“Installing the support rails for a SAN Volume Controller” on page 354

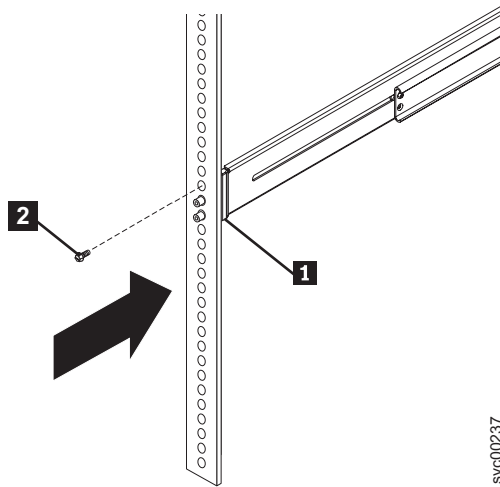
You must install the support rails that hold the SAN Volume Controller.

Removing the SAN Volume Controller 2145-8G4 support rails

This topic describes how to remove the SAN Volume Controller 2145-8G4 support rails.

Perform the following steps to remove the SAN Volume Controller 2145-8G4 support rails:

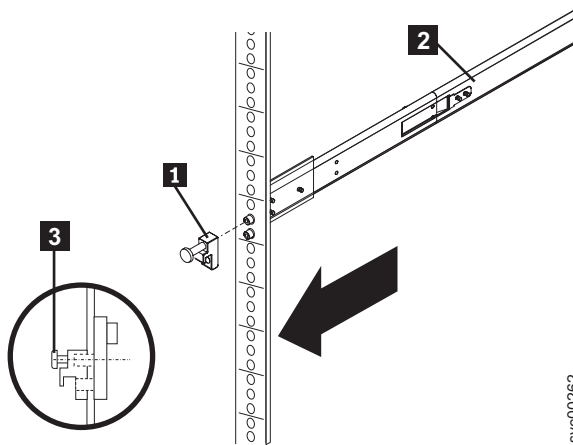
1. Loosen and remove the screw **2** from the left rear mounting flange **1**, as shown in Figure 73 on page 352, to release the slide rail. Loosen and remove the screw from the right rear mounting flange and release the other slide rail in the same way.



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Figure 73. Removing the slide rail from the rear mounting flange

- Loosen and remove the captive screw **3** from the front of the right rail **2** and then remove the latch strike **1**, as shown in Figure 74. Remove the other latch strike from the front of the left rail in the same way.



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Figure 74. Removing the latch strike from the front of the rail

- Push the rail pins **1** out of the front rack mounting flange, as shown in Figure 75 on page 353, to shorten the right slide rail and remove it from the front flange. Then pull the right slide rail forward to remove the slide rail from the rear rack mounting flange. Remove the left slide rail in the same way.

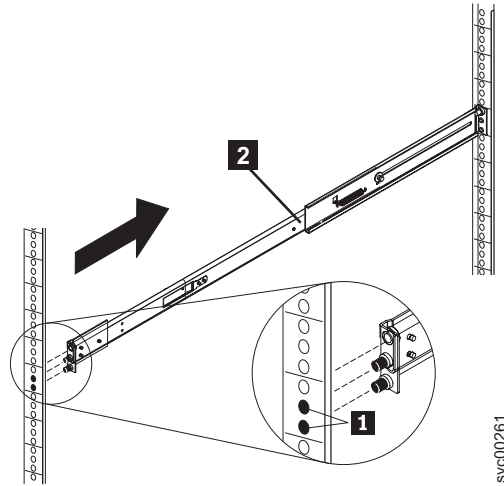


Figure 75. Removing the slide rail from the front of the rack

Removing SAN Volume Controller 2145-4F2, SAN Volume Controller 2145-8F2, or SAN Volume Controller 2145-8F4 support rails

This topic describes how to remove the SAN Volume Controller 2145-4F2SAN Volume Controller 2145-8F2, or SAN Volume Controller 2145-8F4 support rails.

Perform the following steps to remove the SAN Volume Controller support rails:

1. Go to the front of the left support rail.
2. Put your left index finger onto the back edge of the latch lever **2** and your left thumb on the front edge of the latch lock **1**, as shown in Figure 76 on page 354.

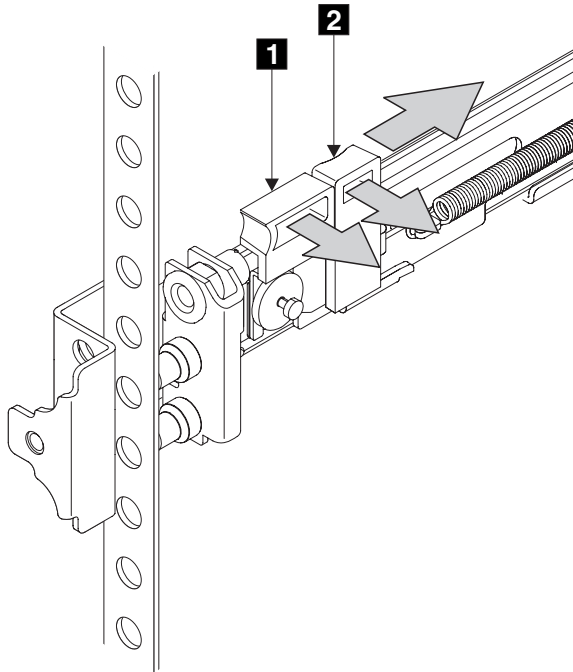


Figure 76. The left support rail for the SAN Volume Controller

3. Gently move the latch lock inward and push the latch-lock carrier toward the back of the rack until it latches onto the rail.
4. Pull the rail out from the front rack-mounting flange.
5. Repeat the action at the back of the rail.
6. Remove the rail from the rack.
7. Repeat steps 2 on page 353 through 6 for the right support rail.

Installing the support rails for a SAN Volume Controller

You must install the support rails that hold the SAN Volume Controller.

The instructions for installing the SAN Volume Controller are found in the topics that follow.

Related tasks

“Removing the support rails for a SAN Volume Controller” on page 351

The SAN Volume Controller support rails can be removed if you need to move the SAN Volume Controller.

Installing the support rails for the SAN Volume Controller 2145-8G4

You must install the support rails that hold the SAN Volume Controller 2145-8G4.

When you are ready to install the support rails, perform the following tasks:

- Refer to the Hardware Location Chart to determine where the SAN Volume Controller is to be installed in the rack.
- Refer to the Electronic Industries Alliance (EIA) markings on the rack and decide where you are going to install the support rails.

Perform the following steps to install the support rails (shown in Figure 77 on page 355) for the SAN Volume Controller 2145-8G4:

1. Make sure you have all the items that you need for installing the support rails.

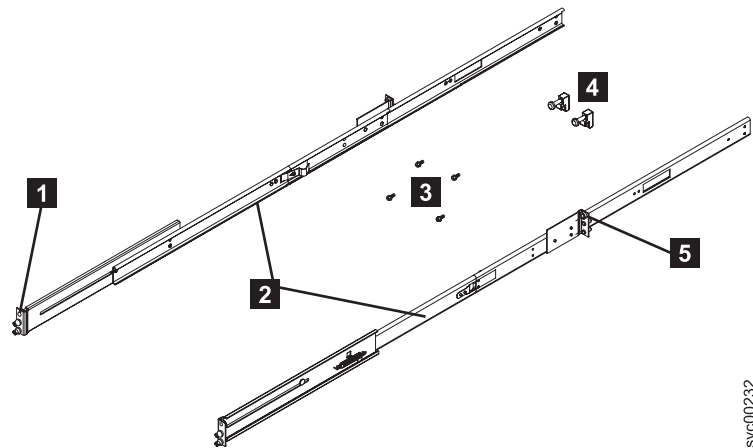


Figure 77. SAN Volume Controller 2145-8G4 support rails installation kit

- 1** Rear of rail
- 2** Rack mounting rails
- 3** M6 screws
- 4** Latches
- 5** Front of rail

Note: If possible, you might find that it helps to remove the rack doors and side panels to provide easier access during installation.

2. Check the labels on the support rails. Each rail has a label that indicates which is the front end of the rail and whether the rail is for the left or right side of the rack. Perform this procedure for both rails.
3. Insert the right slide rail **2** into the rear rack mounting flange, as shown in Figure 78, with the rail pins **1** protruding through the flange.

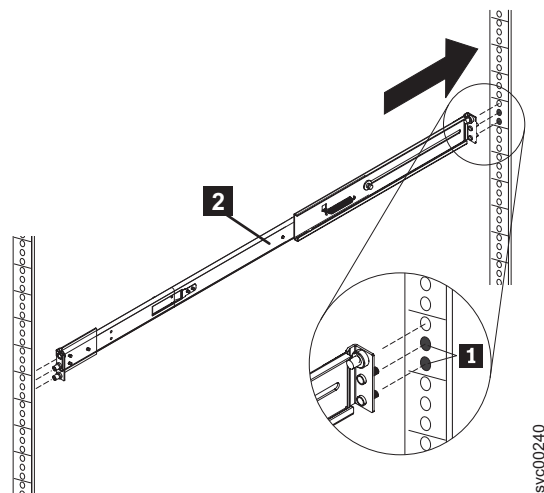


Figure 78. Inserting the right slide rail into the rear rack mounting flange

4. Extend the right slide rail **2** and insert it into the front rack mounting flange, as shown in Figure 79, with the rail pins **1** protruding through the flange. Insert the left slide rail in the same way.

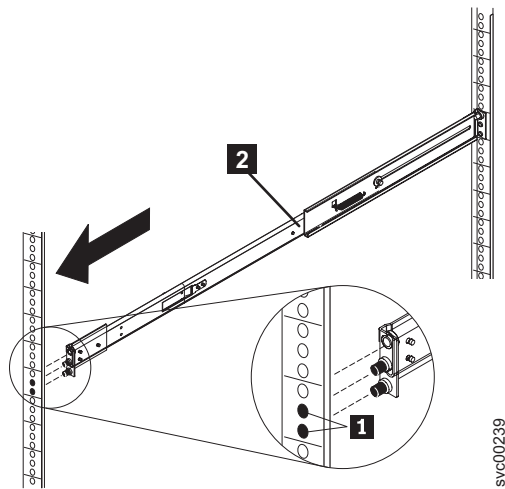


Figure 79. Extending the right slide rail

5. Attach one latch strike **1** to the front of the right rail **2**, as shown in Figure 80, using the captive screw **3**. The screw should be only finger tight. Attach the other latch strike to the front of the left rail in the same way.

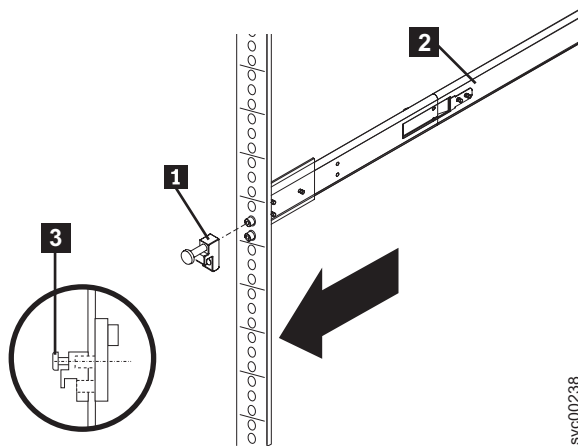


Figure 80. Attaching the latch strike to the front of the rail

6. Attach the slide rail to the left rear mounting flange **1** with a single screw **2**, as shown in Figure 81 on page 357. The screw should be only finger tight. Likewise, attach the other slide rail to the right rear mounting flange.

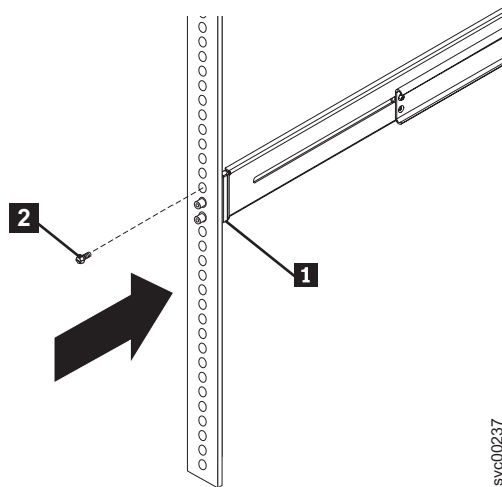


Figure 81. Attaching the slide rail to the rear mounting flange

The installation of the support rails for the SAN Volume Controller 2145-8G4 is complete.

Installing the support rails for the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2

You must install the support rails that hold the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2.

When you are ready to install the support rails, perform the following tasks:

- Refer to the Hardware Location Chart to determine where the SAN Volume Controller is to be installed in the rack.
- Refer to the Electronic Industries Alliance (EIA) markings on the rack and decide where you are going to install the support rails.

Perform the following steps to install the support rails:

1. Check the labels on the support rails. Each rail has a label that indicates which is the front end of the rail and whether the rail is for the left or right side of the rack. Perform this procedure for both rails.
2. Put your index finger against the side of the latch-lever, **1** in Figure 82 on page 358, and put your thumb against the front of the latch-lock **2**.

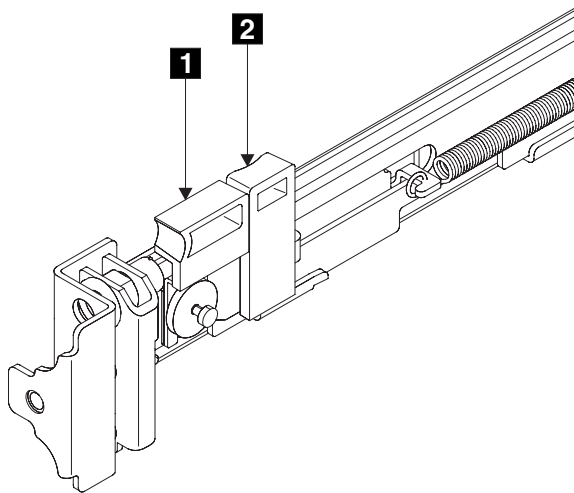
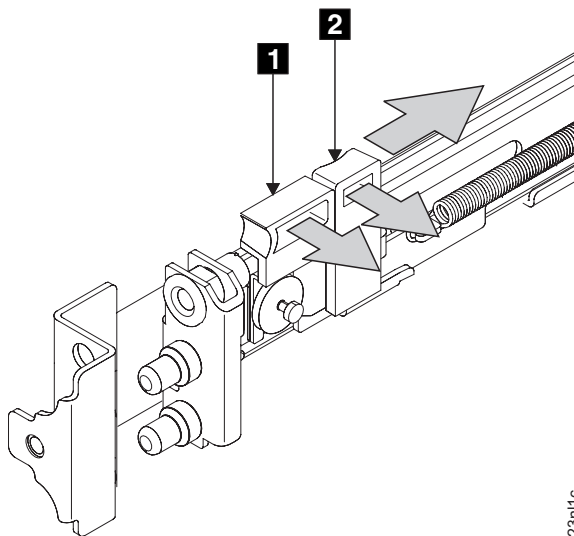


Figure 82. Retracting the latch lock carrier

1 Latch-lever

2 Latch-lock

3. Gently push the latch lock **2** away from the rail as you move the latch lever **1** toward the far end of the rail (Figure 83). The latch-lock carrier assembly slides against the spring tension.



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Figure 83. Opening the front latch-lock carrier assembly

1 Latch-lever

2 Latch-lock

4. Continue to slide the latch-lock carrier for approximately 13 mm (0.5 in). The latch-lever engages a hole in the back bracket assembly and holds the latch-lock carrier in the retracted position.
5. Push the back rail bracket **1** (Figure 84 on page 359) toward the front of the rail until it stops. The rail is now at its shortest adjustment.

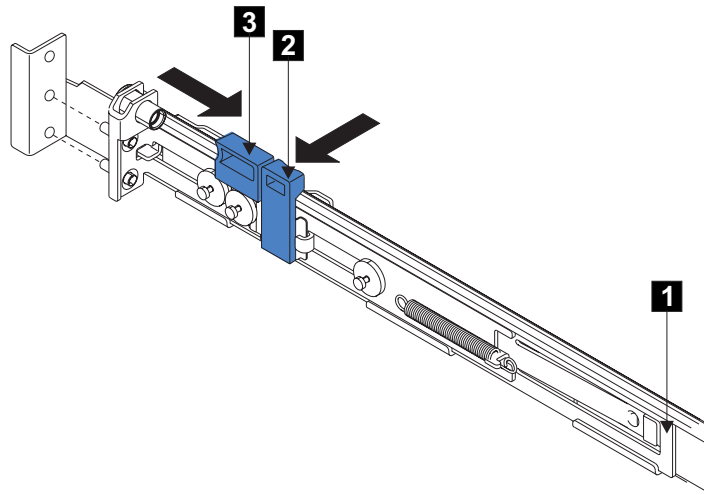


Figure 84. Opening the back latch-lock carrier assembly

- 1** Back rail bracket
- 2** Latch-lock
- 3** Latch-lever

6. Place the front end of the left rail in the rack cabinet. Align the top of the front bracket **1** (Figure 85) with the required EIA marking that is on the rack.

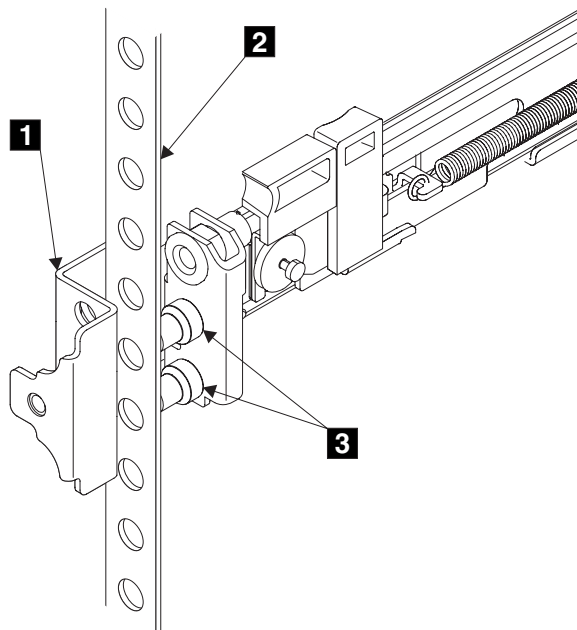


Figure 85. Installing the front end of the rail

- 1** Front bracket
- 2** Rack-mounting flange
- 3** Locating pins

7. Align the locating pins **3** with the holes that are in the rack-mounting flange.
8. Push the latch lock **2** (Figure 86) away from the rail to release the carrier. The latch-lock carrier slides toward the front of the rack and the locating pins project through the holes that are in the front flange and in the front rail bracket.

Important: Ensure that the locating pins are fully extended through the front rail bracket.

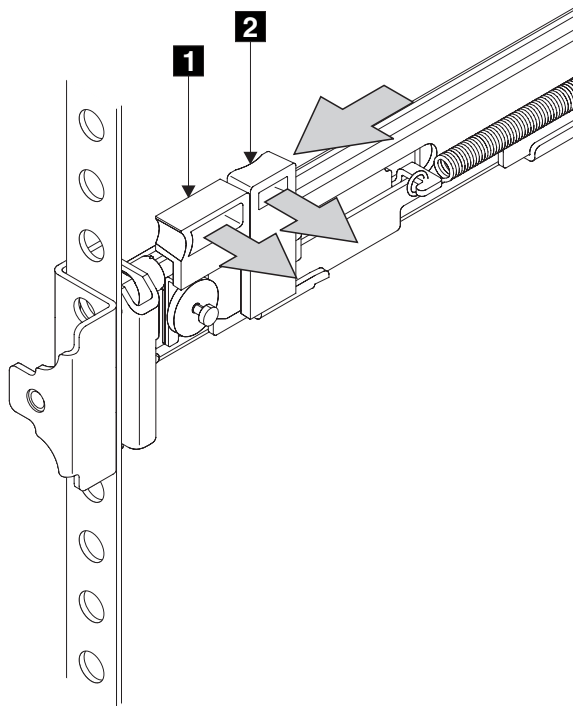


Figure 86. Closing the latch-lock carrier assembly

1 Latch-lever

2 Latch-lock

9. Push the back rail bracket toward the rear of the rack and align the locating pins with the rack-mounting flange.
10. Push the latch lock **2** away from the rail to release the carrier. The latch-lock carrier slides toward the rear of the rack, and the locating pins project through the holes that are in the rear flange and in the rear rail bracket.

Important: Ensure that the locating pins are fully extended through the rear rail bracket.

11. On the rear of each rail, press the blue release tab and slide the shipping bracket off the slide rail. Store the shipping bracket for further use.

You must perform this procedure for both rails.

Installing the support rails for the SAN Volume Controller 2145-4F2

You must install the support rails that hold the SAN Volume Controller 2145-4F2.

When you are ready to install the support rails, perform the following tasks:

- Refer to the Hardware Location Chart to determine where the SAN Volume Controller 2145-4F2 is to be installed in the rack.
- Refer to the Electronic Industries Alliance (EIA) markings on the rack and decide where you are going to install the support rails.

Perform the following steps to install the support rails:

1. Check the labels on the support rails. Each rail has a label that indicates which is the front end of the rail and whether the rail is for the left or right side of the rack. Perform this procedure for both rails.
2. Put your index finger against the side of the latch-lever, **1** in Figure 87, and put your thumb against the front of the latch-lock **2**.

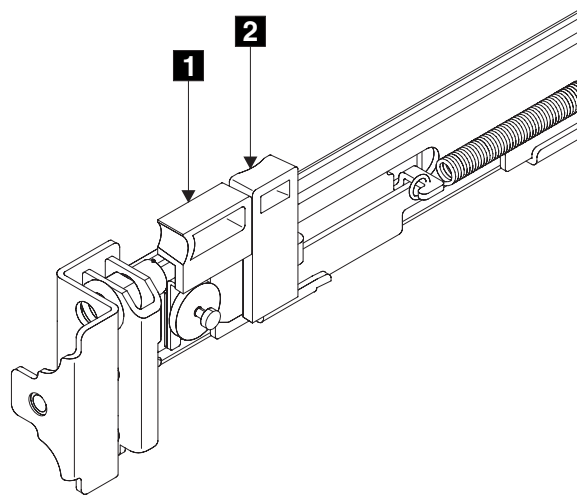


Figure 87. Retracting the latch lock carrier

1 Latch-lever

2 Latch-lock

3. Gently push the latch lock **2** away from the rail as you move the latch lever **1** toward the far end of the rail (Figure 88 on page 362). The latch-lock carrier assembly slides against the spring tension.

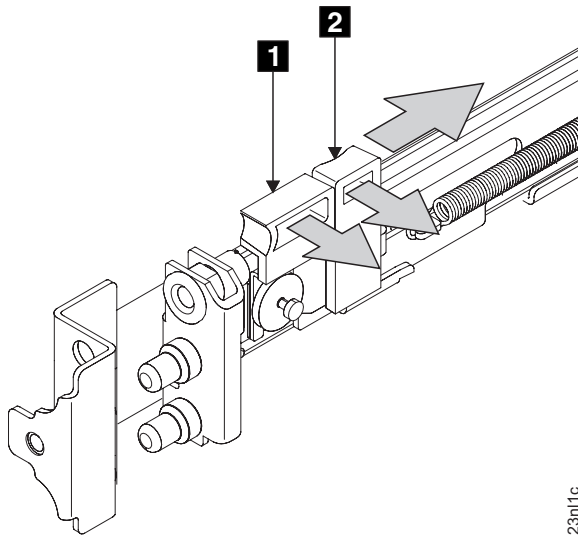


Figure 88. Opening the front latch-lock carrier assembly

1 Latch-lever

2 Latch-lock

4. Continue to slide the latch-lock carrier for approximately 13 mm (0.5 in). The latch-lever engages a hole in the back bracket assembly and holds the latch-lock carrier in the retracted position.
5. Push the back rail bracket **1** (Figure 89) toward the front of the rail until it stops. The rail is now at its shortest adjustment.

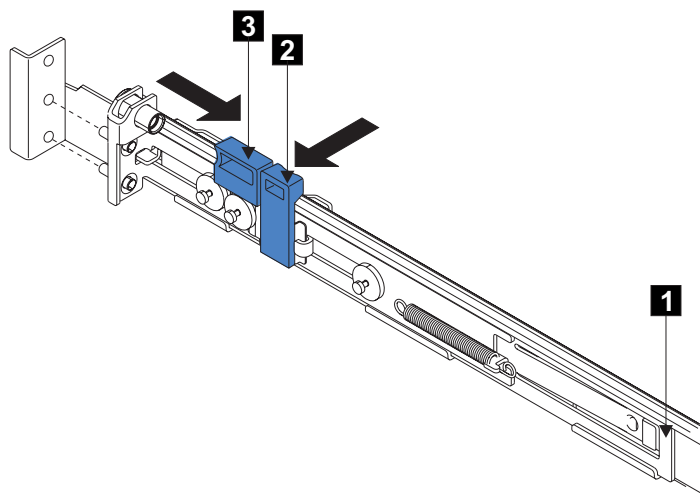


Figure 89. Opening the back latch-lock carrier assembly

1 Back rail bracket

2 Latch-lock

3 Latch-lever

6. Place the front end of the left rail in the rack cabinet. Align the top of the front bracket **1** (Figure 90 on page 363) with the required EIA marking that

is on the rack.

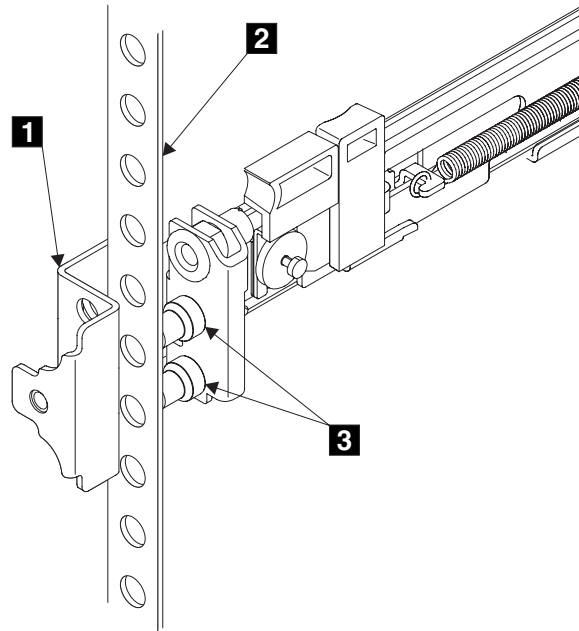


Figure 90. Installing the front end of the rail

- 1 Front bracket
- 2 Rack-mounting flange
- 3 Locating pins

7. Align the locating pins **3** with the holes that are in the rack-mounting flange.
8. Push the latch lock **2** (Figure 91 on page 364) away from the rail to release the carrier. The latch-lock carrier slides toward the front of the rack and the locating pins project through the holes that are in the front flange and in the front rail bracket.

Important: Ensure that the locating pins are fully extended through the front rail bracket.

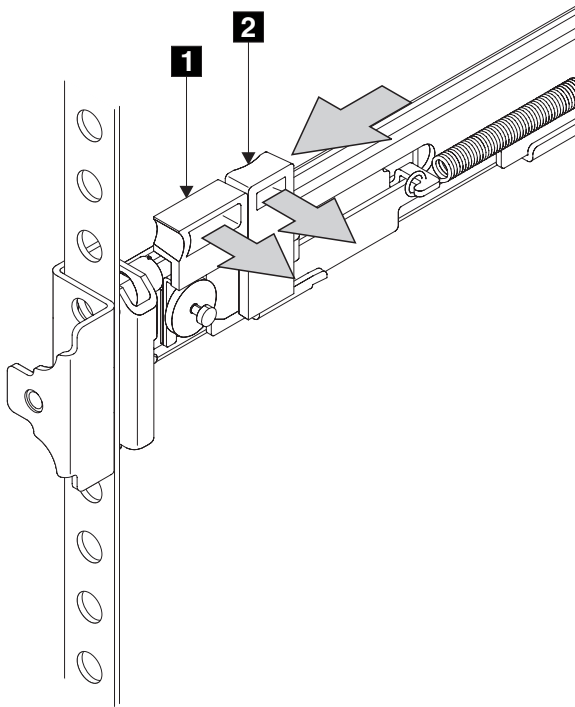


Figure 91. Closing the latch-lock carrier assembly

1 Latch-lever

2 Latch-lock

9. Push the back rail bracket toward the rear of the rack and align the locating pins with the rack-mounting flange.
10. Push the latch lock **2** away from the rail to release the carrier. The latch-lock carrier slides toward the rear of the rack, and the locating pins project through the holes that are in the rear flange and in the rear rail bracket.

Important: Ensure that the locating pins are fully extended through the rear rail bracket.

11. On the rear of each rail, press the blue release tab and slide the shipping bracket off the slide rail. Store the shipping bracket for further use.

You must perform this procedure for both rails.

Removing the top cover

You can remove the SAN Volume Controller's top cover if maintenance is necessary.

Related tasks

"MAP 5350: Powering off a SAN Volume Controller node" on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host's access to disks.

"Removing the SAN Volume Controller from a rack" on page 339

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

“Removing the power cable from the 2145 UPS-1U” on page 492
You can remove the power cable from the 2145 uninterruptible power supply-1U (2145 UPS-1U) if you are having problems with the power supply and suspect that the power cable is defective.

“Replacing the top cover” on page 368
You must replace the top cover on the SAN Volume Controller after maintenance is completed.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the fibre-channel adapter assembly” on page 427
Use the information in this topic when you need to remove a fibre channel adapter or fibre channel adapter assemblies.

Removing the SAN Volume Controller 2145-8G4 top cover

This topic describes how to remove the SAN Volume Controller 2145-8G4 top cover.

To remove the SAN Volume Controller 2145-8G4 cover, complete the following steps.

Attention: Never remove the SAN Volume Controller 2145-8G4 cover with power applied.

1. Read the safety information that is referenced in “Preparing to remove and replace parts” on page 335.
2. Remove the node from the rack. See “Removing the SAN Volume Controller 2145-8G4 from a rack” on page 340.
3. Loosen the thumbscrew (1 in Figure 92) that secures the cover at the rear of the SAN Volume Controller 2145-8G4.

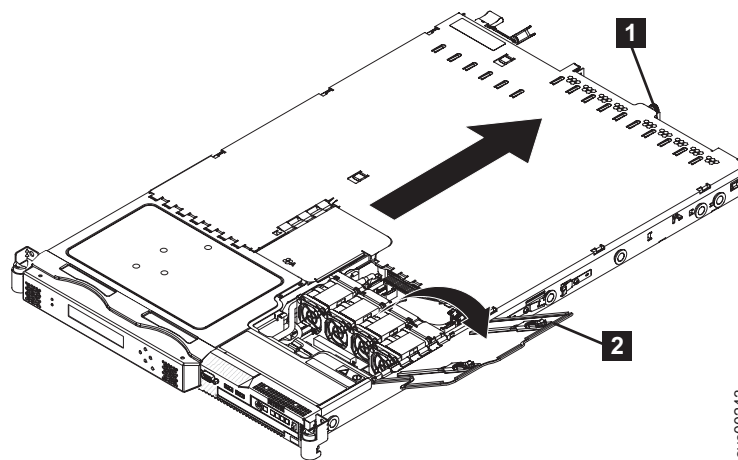


Figure 92. The SAN Volume Controller 2145-8G4 with fan door open

4. Open the fan door (2). To open the fan door, slide the two latches to the right, and raise the door panel.
5. Remove the SAN Volume Controller 2145-8G4 cover:

- a. Slide the cover slightly toward the rear of the SAN Volume Controller 2145-8G4 until it comes free. Make sure that the cover tabs all slide away from the insets that are on the front, rear, and sides of the SAN Volume Controller 2145-8G4.
- b. Lift the cover off the SAN Volume Controller 2145-8G4 and set the cover aside.

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.

Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 top cover

This topic describes how to remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 top cover.

Before you remove the cover, you must remove the node from the rack and open the two fan doors, as shown in Figure 93. See “Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 from a rack” on page 342.

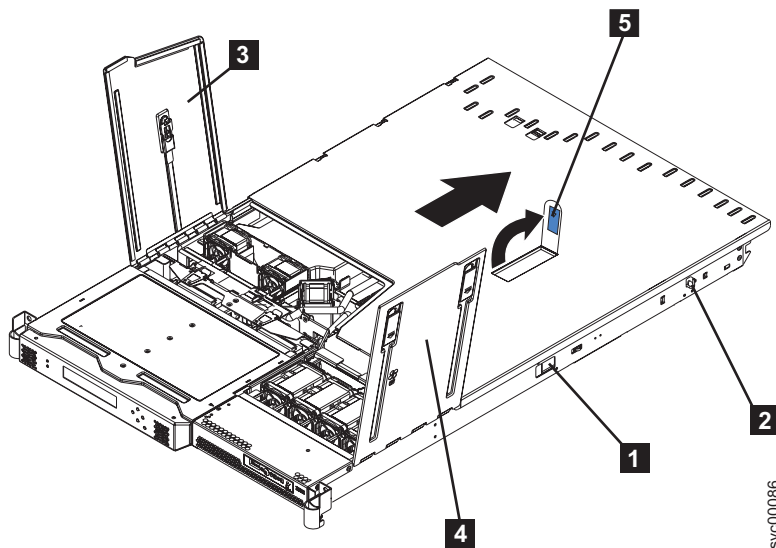


Figure 93. SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 with fan doors open

- 1** Side release latch
- 2** Rail lock pin
- 3** Fan door A
- 4** Fan door B
- 5** Cover release latch

Perform the following steps to remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 top cover:

1. Remove the server from the rack:
 - a. Pull the node out, about a third of the way, until it stops.

- b. Slide both side release latches (left and right) toward the front of the node. Make sure that both rail-lock pins **2** are in a vertical position, pull the node out, and remove it from the rack.
 2. Open fan door A **3** and fan door B **4**. To open fan door A slide the slide latch to the left and lift up the door panel. To open fan door B slide the two slide latches to the right, and lift up the door panel.
 3. Perform the following steps to remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 cover:
 - a. Lift up the cover release latch **5** and slide the cover to the rear of the node.
 - b. Make sure that the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 cover slides away from the insets that are on the front, rear, and sides of the SAN Volume Controller 2145-8F2 cover.
 - c. Lift the cover off the node and set the cover aside.

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.

Removing the SAN Volume Controller 2145-4F2 top cover

Before you can replace the top cover, you must remove it.

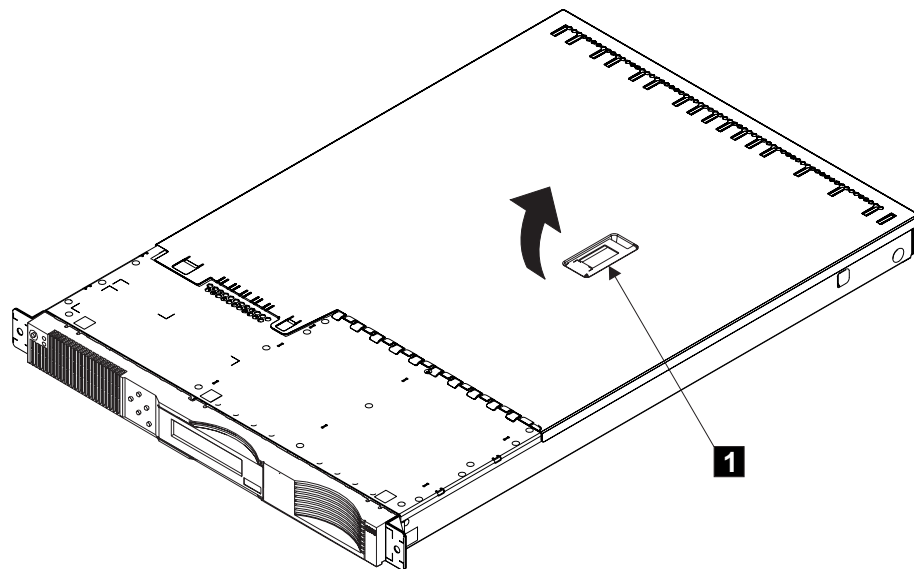


Figure 94. Removing the top cover

- 1** Top cover lever

Perform the following steps to remove the top cover from the SAN Volume Controller 2145-4F2:

1. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the SAN Volume Controller 2145-4F2 from the rack. See “Removing the SAN Volume Controller 2145-4F2 from a rack” on page 344.

3. Lift the lever (1 in Figure 94 on page 367). This action moves the top cover rearward approximately 13 mm (0.5 in).
4. Lift the front of the cover, and lift the cover away from the SAN Volume Controller 2145-4F2 and set it aside.

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.

Replacing the top cover

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

Related tasks

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

Replacing the SAN Volume Controller 2145-8G4 top cover

This topic describes how to replace the SAN Volume Controller 2145-8G4 top cover.

1. Position the internal cables so that they do not interfere with the cover installation.

Important: Before sliding 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 very difficult to remove the cover later.

2. Position the cover on top of the SAN Volume Controller 2145-8G4 and open the fan door.
3. Tighten the thumbscrew (1), which is shown in Figure 95, until the cover correctly engages all the inset tabs on the SAN Volume Controller 2145-8G4.

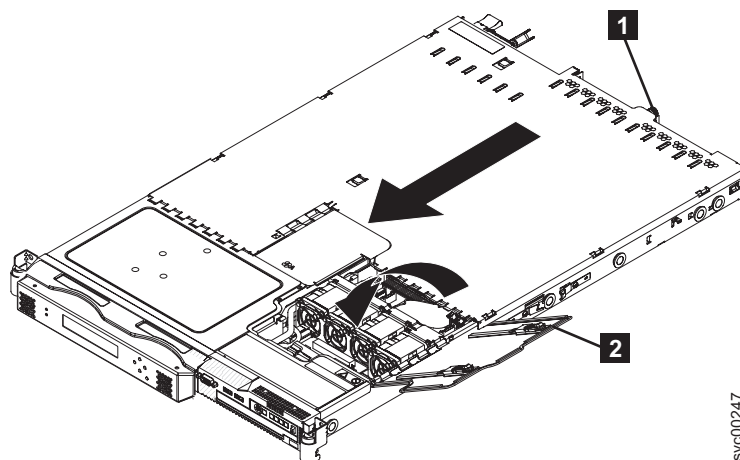


Figure 95. The SAN Volume Controller 2145-8G4 with fan door open

4. Close the fan door (2).

5. Replace the SAN Volume Controller 2145-8G4 in the rack. See “Replacing the SAN Volume Controller in a rack” on page 346.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 top cover

This topic describes how to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 top cover.

Before you turn on the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4, replace the node 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.

Perform the following steps to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 top cover:

1. Position the internal cables so that they do not interfere with the cover installation.

Important: Before you slide the cover forward, make sure that all 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, you might have difficulty when removing the cover.

2. Position the cover on top of the node and slide it forward.
3. Press down on the cover release latch **3**, which is shown in Figure 96, until the cover properly engages all the inset tabs on the SAN Volume Controller 2145-8F2.

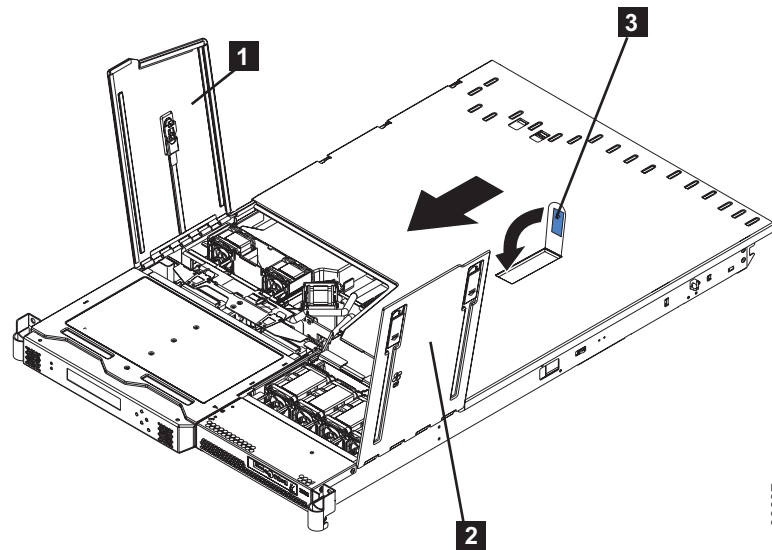


Figure 96. The SAN Volume Controller 2145-8F2 with fan doors open

- 1** Fan door A
- 2** Fan door B
- 3** Cover release latch

4. Close the fan doors.
5. Install the node in the rack.

Note: See the related topic for information on how to install the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 in the rack.

Replacing the SAN Volume Controller 2145-4F2 top cover

Before moving the top cover into place, position the internal cables so that they do not interfere with the cover.

Important: Before sliding 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 very difficult to later remove the cover.

Perform the following steps to replace the top cover on the SAN Volume Controller 2145-4F2:

1. Ensure that the lever **1** is fully up, as shown in Figure 97.

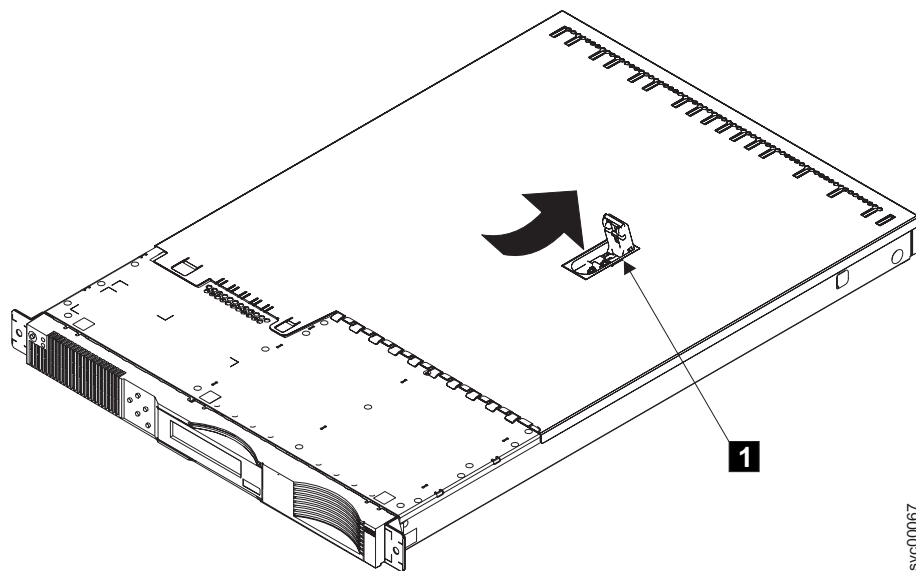


Figure 97. Installing the Top Cover

- 1** Top cover lever
2. Place the cover onto the SAN Volume Controller 2145-4F2 so that about 13 mm (0.5 in.) of the cover protrudes over the back edge of the SAN Volume Controller 2145-4F2 frame.
3. Press the lever downward. The top cover moves toward the front of the SAN Volume Controller 2145-4F2.
4. Ensure that top fingers and back lugs of the cover correctly engage the frame of the SAN Volume Controller 2145-4F2.
5. Press the lever until it fully engages.

Removing the service controller

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

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.

Related concepts

“SAN Volume Controller menu options” on page 104

Menu options are available on the front panel display on the SAN Volume Controller.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the front panel from the SAN Volume Controller 2145-4F2” on page 465

You can remove the front panel to perform maintenance on the SAN Volume Controller 2145-4F2.

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

Related reference

“Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385

When you replace a service controller at the same time that you replace the disk drive, you cannot perform a node rescue because the nonvolatile memory in the “new” service controller does not contain the operating system software required to do so.

“Displaying the vital product data” on page 95

You can use the command-line interface (CLI) to display the SAN Volume Controller cluster or node vital product data (VPD).

Removing the SAN Volume Controller 2145-8G4 service controller

Perform the following steps to remove the service controller:

1. Power off the SAN Volume Controller 2145-8G4. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. When the power off has fully completed, remove the main power cable retention bracket and remove the power cable from the rear of the SAN Volume Controller 2145-8G4.
3. After ensuring that there is enough slack in the cables connected to the rear of the SAN Volume Controller 2145-8G4, slide the SAN Volume Controller 2145-8G4 forward in the rack by approximately 10cm (4in).
4. Locate the recessed service controller release button on the left side of the controller; it is marked by a blue circle, as shown in Figure 98 on page 372.



Figure 98. SAN Volume Controller 2145-8G4 service controller release button

5. Press and hold the release button while pulling gently forward on the service controller. The service controller will move slightly forward.
6. You can stop pressing the release button and pull the service controller fully out of the frame, as shown in Figure 99 on page 373

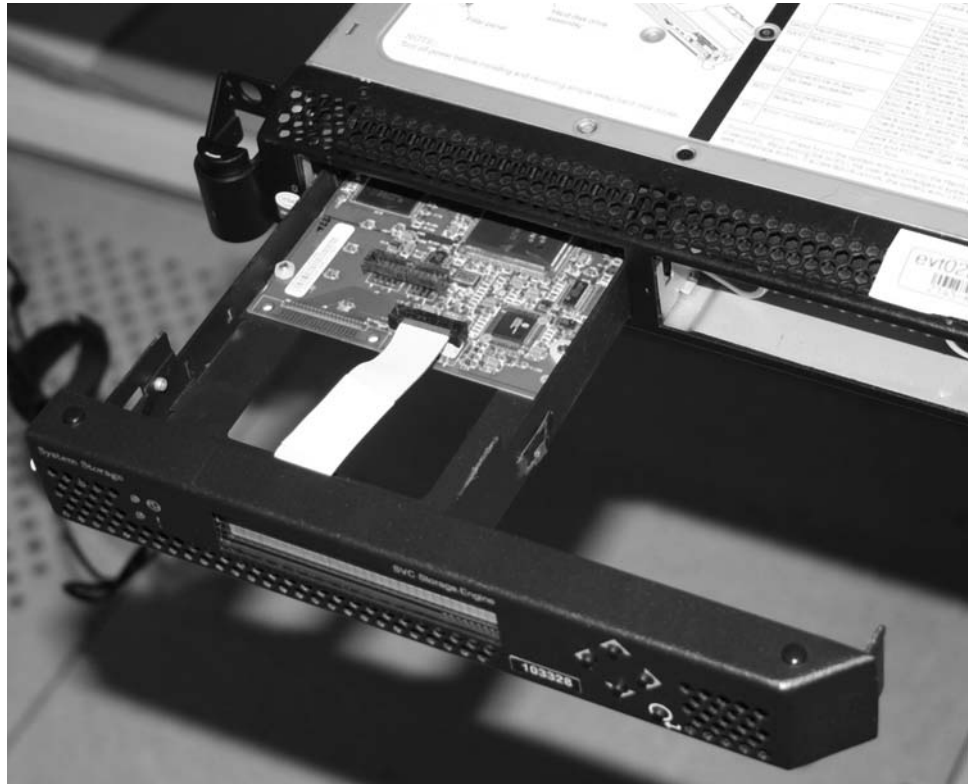
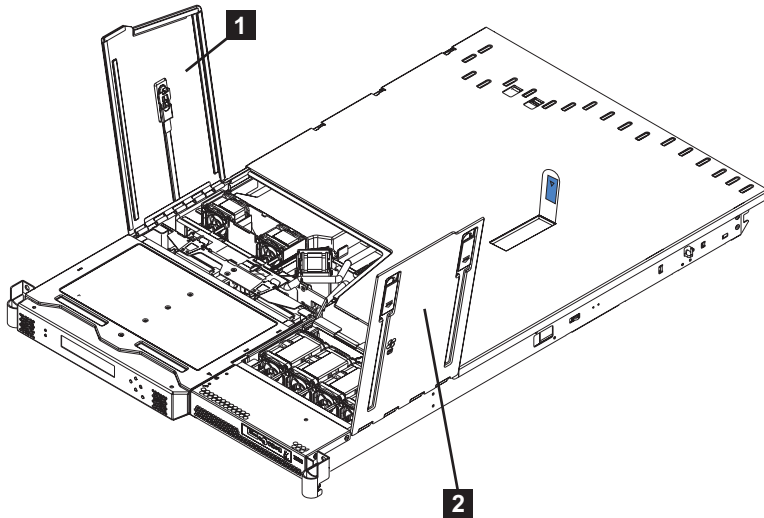


Figure 99. Removing the service controller from the SAN Volume Controller 2145-8G4

Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 service controller

Perform the following steps to remove the service controller:

1. Remove all power from the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the node from the rack.
3. Open fan door A (1 in Figure 100 on page 374) of the node.



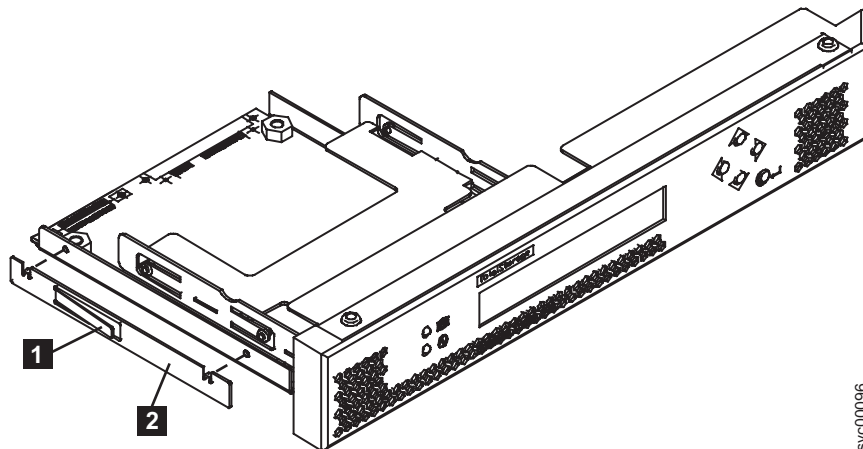
svc00097

Figure 100. The SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 with fan doors open

1 Fan door A

2 Fan door B

4. Lift the two blue levers on the rear of the cage assembly to release it from the frame.
5. Lift the cage assembly until the blue release latch (**1** in Figure 101) on the left side of the service controller assembly is accessible.



svc00096

Figure 101. The SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 service controller

1 Release latch

2 Retention clip

6. Press the release latch **1**, then pull the service controller forward and out of the cage assembly.
7. Remove the retention clip **2**. Make sure to save the retention clip for when you reinstall the node.

Removing the SAN Volume Controller 2145-4F2 service controller

Attention: If you are replacing the service controller and the disk drive as part of the same repair operation, see the related documentation.

Perform the following steps to remove the service controller:

1. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the SAN Volume Controller 2145-4F2 from the rack.
3. Remove the top cover of the SAN Volume Controller 2145-4F2.
4. Remove the front panel of the SAN Volume Controller 2145-4F2.
5. Pull the two handles (**2** in Figure 102) to release the latches.

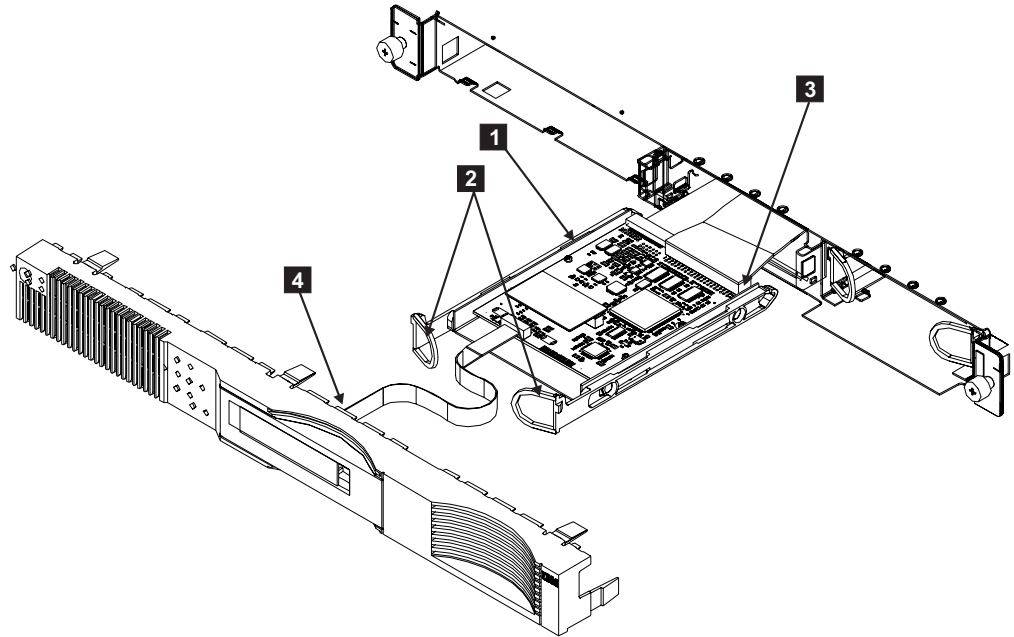
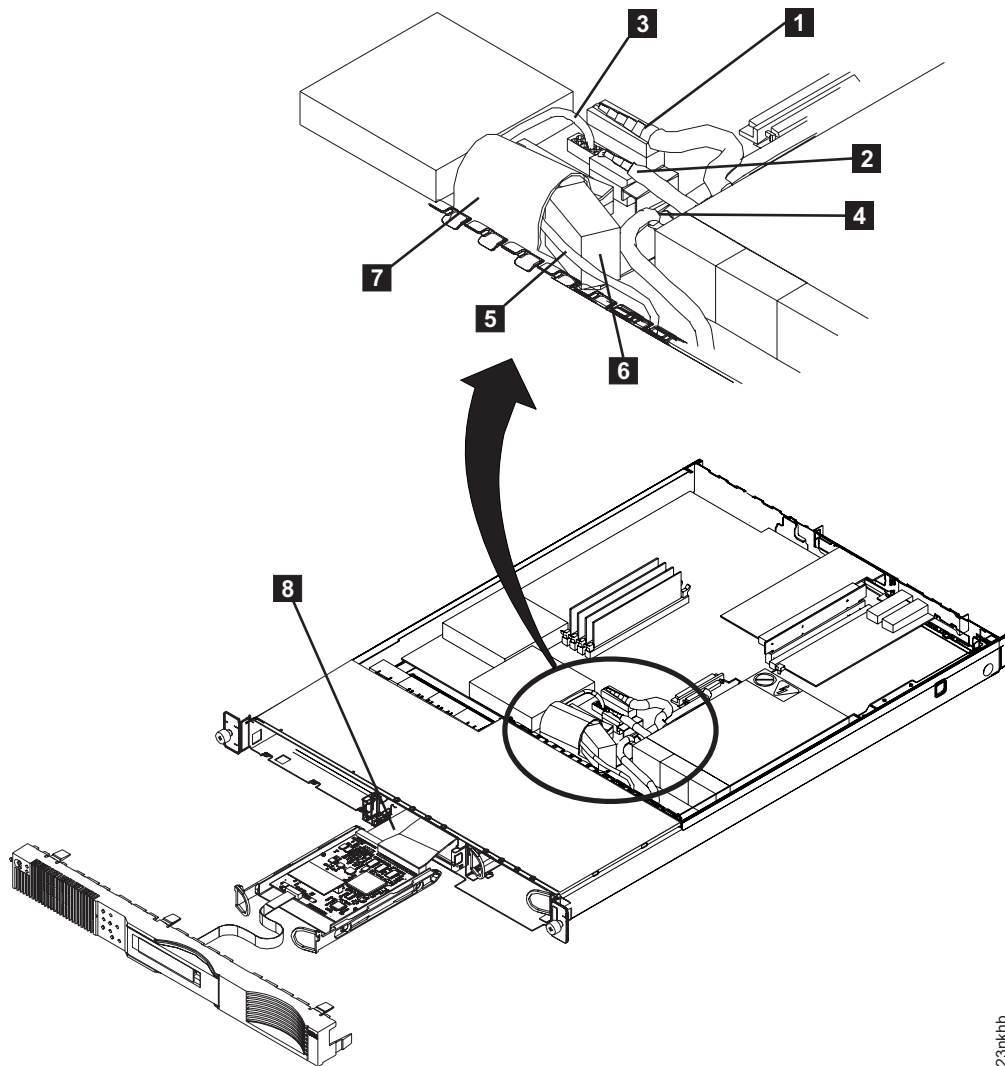


Figure 102. The SAN Volume Controller 2145-4F2 service controller

6. Carefully pull the service controller **1** out of the SAN Volume Controller 2145-4F2 to avoid damaging the attached cables.

Removing and replacing the SAN Volume Controller 2145-4F2 service controller cables

You can remove the SAN Volume Controller 2145-4F2 service controller cables from the SAN Volume Controller 2145-4F2.



23mkhtb

Figure 103. Service controller cables for the SAN Volume Controller 2145-4F2

- 1** Power connector P1
- 2** Power connector P2
- 3** Fan cable
- 4** SCSI signal cable
- 5** ATA (Advanced Technology Attachment) cable
- 6** Fan
- 7** Fan clip
- 8** Ribbon cable

Perform the following steps to remove the service controller cables:

1. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the SAN Volume Controller 2145-4F2 from the rack.
3. Remove the top cover of the SAN Volume Controller 2145-4F2.

4. Remove the service controller and the front panel cable from the front of the service controller.
5. Press the latch on power connector P1 **1** and power connector P2 **2** , and disconnect them from the system board. See Figure 103 on page 376.
6. Disconnect the fan cable **3** .
7. Disconnect the ATA cable **5** .
8. Lift the SCSI signal cable **4** away from the fan bracket.
9. Slide the right-hand side of the fan **6** forward, and pull the fan away from the clip **7** .
10. Lift the ribbon cable **8** out from the connector.

Notes:

- a. The ribbon cable is labeled System Planar.
 - b. The ribbon cable is pre-folded so that it automatically follows the correct route inside the SAN Volume Controller 2145-4F2.
11. To reinstall the cables, *carefully* install the one end of the ribbon cable (marked System Planar) to the system board being sure to install the cable straight in. See Figure 104.
 12. Route the flat cable and feed it through the opening where the service controller is to be installed and bring the other end of the cable (marked Controller Card) out of the front end of the SAN Volume Controller 2145-4F2 chassis. *Carefully* install this other end of the cable to the rear of the service controller, being sure to install the cable straight in with no rocking or twisting during installation.
 13. Install the ATA cable to the rear of the service controller.
 14. Carefully install the service controller while ensuring the cables do not get damaged as they slide into the chassis.
 15. Verify that the blue line on each of the cable connector ends is not visible. This ensures that it is fully seated. For more information, see the documentation on removing the service controller from the SAN Volume Controller 2145-4F2.

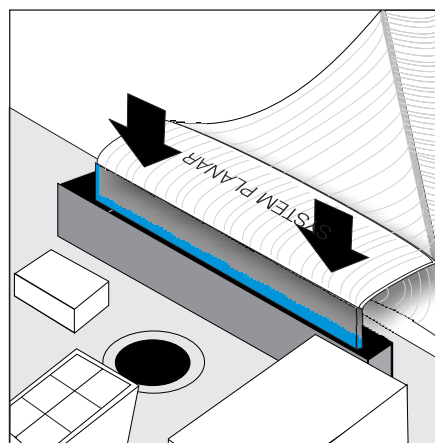


Figure 104. Install the service controller card cable into the system board of the SAN Volume Controller 2145-4F2

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Removing the service controller” on page 370

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

Related reference

Appendix C, “Fitting the service controller ATA cable,” on page 549

You must position the ATA (Advanced Technology Attachment) cable correctly when you fit it in the SAN Volume Controller 2145-4F2 to avoid damaging the cable.

Replacing the service controller

You can replace the SAN Volume Controller service controller.

Related concepts

“SAN Volume Controller menu options” on page 104

Menu options are available on the front panel display on the SAN Volume Controller.

Related tasks

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Viewing the node status” on page 7

You can view the properties for a node from the Viewing General Details panel.

“Viewing the vital product data” on page 13

You can view the vital product data for a node from the Viewing Vital Product Data panel.

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Replacing the front panel on the SAN Volume Controller 2145-4F2” on page 467

You can remove the front panel of the SAN Volume Controller 2145-4F2 in order to replace it.

“Replacing the top cover” on page 368

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

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

Related reference

“Handling static-sensitive devices” on page xliii

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

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

“Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385

When you replace a service controller at the same time that you replace the disk drive, you cannot perform a node rescue because the nonvolatile memory in the “new” service controller does not contain the operating system software required to do so.

“Displaying the vital product data” on page 95

You can use the command-line interface (CLI) to display the SAN Volume Controller cluster or node vital product data (VPD).

Replacing the SAN Volume Controller 2145-8G4 service controller

Perform the following steps to replace the SAN Volume Controller 2145-8G4 service controller:

1. Gently push the service controller (shown in Figure 105) into the frame until the rear connectors are fully seated and the service controller front metal work is up to the frame.



Figure 105. SAN Volume Controller 2145-8G4 service controller

2. Slide the SAN Volume Controller 2145-8G4 back into the rack and check that all cables are still firmly in place.
3. Connect the power cable to the SAN Volume Controller 2145-8G4 and replace the cable retention bracket.

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 4 on page 380, you might have to re-zone 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.

4. 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 WWPNNs, you cannot add the node back into the cluster until the fibre-channel switches in the SAN are re-zoned. Also, the host systems cannot access the fibre-channel ports on that node until the host systems are rebooted. To restore the WWNN, perform the following steps:
 - a. Display the node properties to view the WWNN. See “Viewing the node status” on page 7. Record the last five characters of the WWNN for the node that you are working on.
 - b. Start the node by performing a node rescue.
 - c. Display the node status on the service panel. See the procedure on how to check the status of the node ports at “SAN Volume Controller menu options” on page 104.
 - d. Press and hold the down button.
 - e. Press and release the select button.
 - f. Release the down button. The text “WWNN” is displayed on the first line of the display, with the second line containing the last five characters of the WWNN that is set on the service controller. If this value matches the WWNN from the VPD, press the select button to accept the number. This completes this procedure. Otherwise, continue with the next step.
 - g. With the WWNN displayed on the service panel, press and hold the down button.
 - h. Press and release the select button.
 - i. Release the down button.
 - j. Edit the displayed number to match the number from the VPD. Use the up and down buttons to increase or decrease the number displayed. Use the left and right buttons to move between the fields.
 - k. Press the select button twice to accept the number. The WWNN is restored.

Replacing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 service controller

Perform the following steps to replace the SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 service controller:

1. Place the retention clip (**2** in Figure 106 on page 381) over the locating holes on the left side of the service controller.

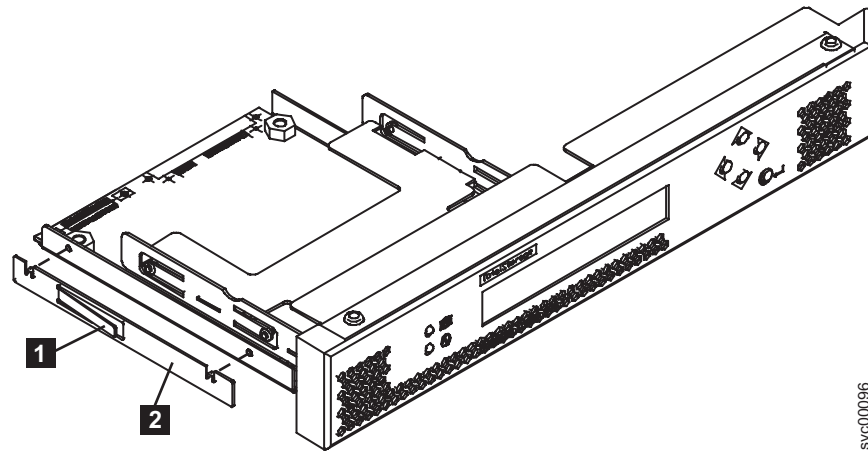


Figure 106. The SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 service controller

2. Push the service controller into the cage until the retention clip engages.
3. Relocate the cage assembly and close the blue levers to secure the cage assembly to the frame.
4. Close the fan door (1 in Figure 107) and replace the node in the rack.

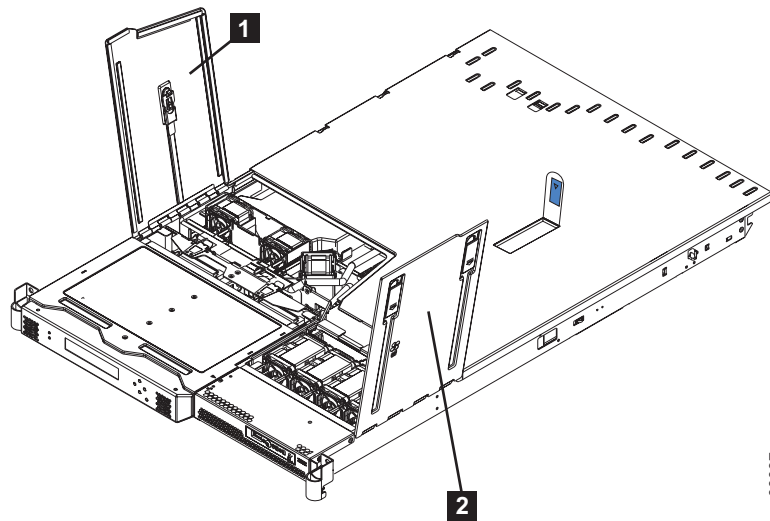


Figure 107. The SAN Volume Controller 2145-8F4 or the SAN Volume Controller 2145-8F2 with fan doors open

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 5 on page 382, you might have to re-zone 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.

5. 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 re-zoned. Also, the host systems cannot access the fibre-channel ports on that node until the host systems are rebooted. To restore the WWNN, perform the following steps:
 - a. Display the node properties to view the WWNN. See “Viewing the node status” on page 7. Record the last five characters of the WWNN for the node that you are working on.
 - b. Start the node by performing a node rescue.
 - c. Display the node status on the service panel. See the procedure on how to check the status of the node ports at “SAN Volume Controller menu options” on page 104.
 - d. Press and hold the down button.
 - e. Press and release the select button.
 - f. Release the down button. The text “WWNN” is displayed on the first line of the display, with the second line containing the last five characters of the WWNN that is set on the service controller. If this value matches the WWNN from the VPD, press the select button to accept the number. This completes this procedure. Otherwise, continue with the next step.
 - g. With the WWNN displayed on the service panel, press and hold the down button.
 - h. Press and release the select button.
 - i. Release the down button.
 - j. Edit the displayed number to match the number from the VPD. Use the up and down buttons to increase or decrease the number displayed. Use the left and right buttons to move between the fields.
 - k. Press the select button twice to accept the number. The WWNN is restored.

Replacing the SAN Volume Controller 2145-4F2 service controller

Attention: If you are replacing the service controller as part of a problem determination procedure, you must also replace the cables that are supplied as part of the service controller field replaceable unit (FRU). If you are replacing the service controller *and* the disk drive as part of the same repair operation, see the related documentation.

Perform the following steps to replace the service controller:

1. Carefully push the service controller (1 in Figure 108 on page 383) into the SAN Volume Controller 2145-4F2.

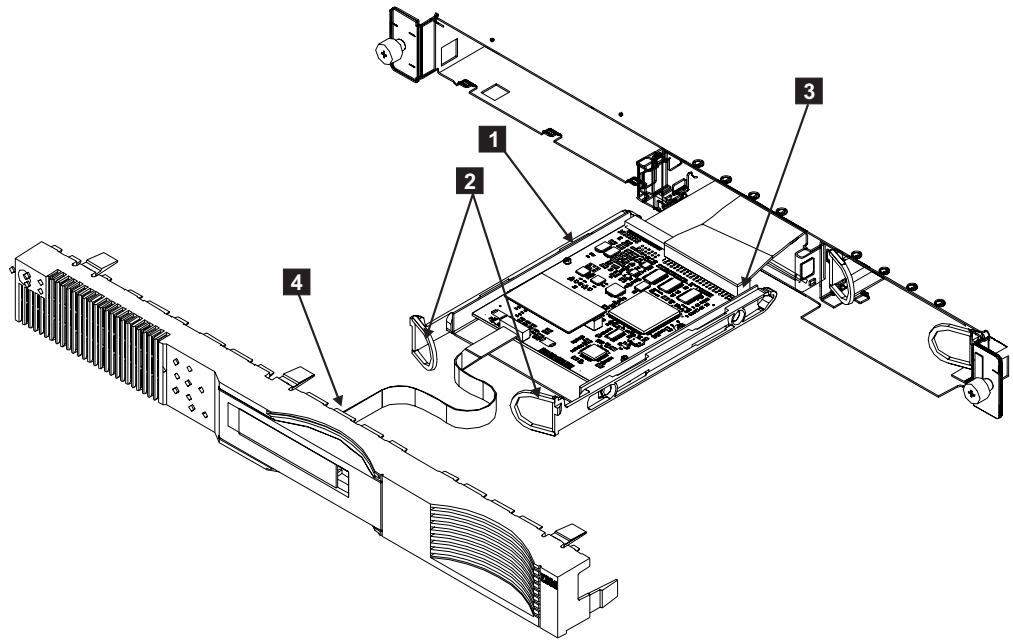


Figure 108. The SAN Volume Controller 2145-4F2 service controller

Notes:

- a. The 40-way cable connector is keyed.
- b. Before you reconnect the ribbon cable, ensure that its contacts are downward. *Carefully* install the cable to the rear of the service controller, being sure to install the cable straight in with no rocking or twisting during installation. Be sure to verify that the dark blue line on each cable connector end is not visible. This ensures that the cable is fully seated. See Figure 109 for an example of the cable when it is installed properly and Figure 110 on page 384 for an example of the cable when it is not installed properly.

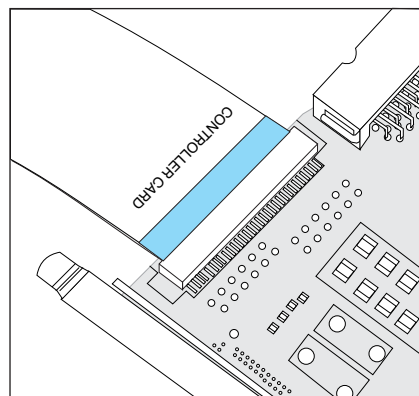


Figure 109. Service Controller card cable installed properly

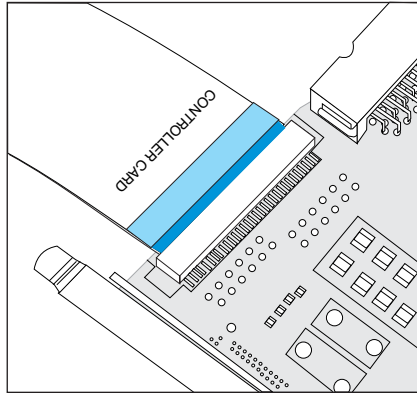


Figure 110. Service Controller card cable not properly seated

- c. When you install the service controller, ensure that the cables do not come in contact with the fan assembly that is mounted behind the service controller bay. Fold the cables under the service controller as you push the service controller into the SAN Volume Controller 2145-4F2. Keep pushing the service controller until the latches click into place.
 - d. From the inside of the SAN Volume Controller 2145-4F2, ensure that the cables are correctly attached to the service controller.
2. Place the front panel on the SAN Volume Controller 2145-4F2.
 3. Place the top cover back on the SAN Volume Controller 2145-4F2.
 4. Place the SAN Volume Controller 2145-4F2 in the rack.
 5. Restore all power to the SAN Volume Controller 2145-4F2.

Note: The worldwide port names of the fibre-channel ports are derived from the worldwide node name (WWNN) of the service controller. If you do not rewrite the WWNN on the new service controller, you must restart the host systems before they are able to access disks through this SAN Volume Controller 2145-4F2.

If you are replacing the service controller as part of concurrent maintenance, you must rewrite the WWNN on the new service controller. Failure to do so means the host systems cannot access the fibre-channel ports on that node until the host systems are rebooted. Perform the following steps to restore the WWNN:

1. Display the node properties to view the WWNN. See “Viewing the node status” on page 7. Record the last five characters of the WWNN for the node that you are working on.
2. Start the node by performing a node rescue.
3. Display the node status on the service panel. See the procedure on how to check the status of the node ports at “SAN Volume Controller menu options” on page 104.
4. Press and hold the down button.
5. Press and release the select button.
6. Release the down button. The text “WWNN” is displayed on the first line of the display, with the second line containing the last five characters of the WWNN that is set on the service controller. If this value matches the WWNN from the VPD, press the select button to accept the number. This completes this procedure. Otherwise, continue with the next step.

7. With the WWNN displayed on the service panel, press and hold the down button.
8. Press and release the select button.
9. Release the down button.
10. Edit the displayed number to match the number from the VPD. Use the up and down buttons to increase or decrease the number displayed. Use the left and right buttons to move between fields.
11. Press the select button twice to accept the number. The WWNN is restored.

Replacing a disk drive and a service controller on the SAN Volume Controller

When you replace a service controller at the same time that you replace the disk drive, you cannot perform 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 perform node rescue. Perform the following step to be able to perform node rescue after replacing the disk drive *and* the service controller:

- 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 perform node rescue on that failed node.
- When all updates are complete, swap the service controllers again, returning them to their original nodes.

Related tasks

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

“Removing the service controller” on page 370

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

“Removing the disk drive” on page 391

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

Removing and replacing the SAN Volume Controller power cable assembly

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

The power cable assembly comprises a power cable 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 the power or signal cable are defective. When removing the power cable assembly, ensure that you also remove it from the uninterruptible power supply (UPS). Perform the following steps to remove the power cable assembly:

1. Check the SAN Volume Controller 2145-8G4 (1 in Figure 111), SAN Volume Controller 2145-8F4 (1 in Figure 112), SAN Volume Controller 2145-8F2 power LED (1 in Figure 112), or the SAN Volume Controller 2145-4F2 power light (1 in Figure 113).
 - If the light is on, go to step 2 on page 387.
 - If the light is either off or flashing, power has already been removed from the SAN Volume Controller. Go to step 4 on page 387.

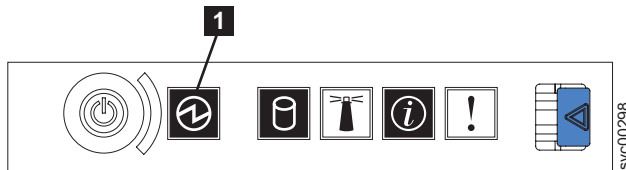


Figure 111. SAN Volume Controller 2145-8G4 operator information panel

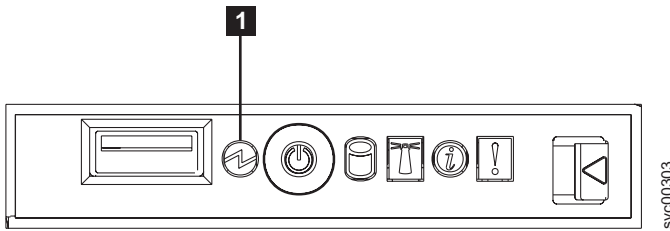


Figure 112. SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 operator information panel

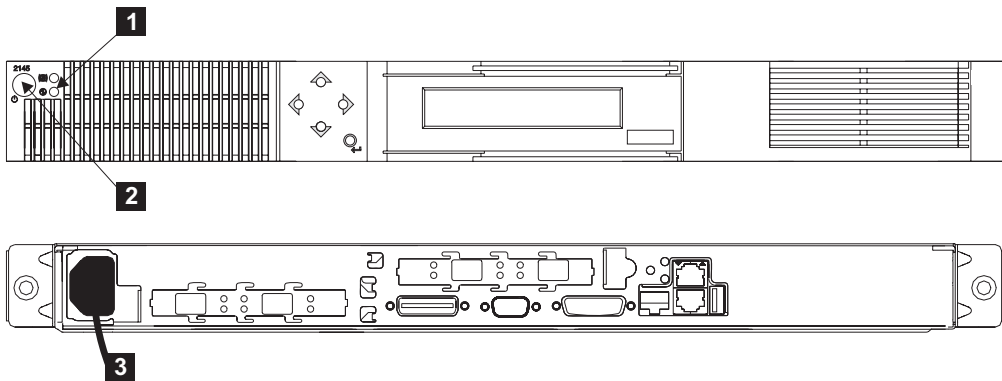


Figure 113. Front and back panel views of the SAN Volume Controller 2145-4F2

- 1 Power light
- 2 Power button
- 3 Power cable

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

2. Power off the SAN Volume Controller. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
Attention: If both SAN Volume Controllers are online, removing the power from one SAN Volume Controller causes some performance degradation because I/O operations are automatically rerouted through the other SAN Volume Controller. You must obtain the customer’s agreement before you continue with this procedure.
3. Press and release the power control button (SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and SAN Volume Controller 2145-8F2) or the power switch (SAN Volume Controller 2145-4F2,) **2**. Wait one minute for the SAN Volume Controller to power off. The other SAN Volume Controllers in the cluster might display an error code indicating that a node is missing from the cluster. Ignore this error code; it is automatically resolved when the repair is complete.
4. Remove the power cable from the back of the SAN Volume Controller.
5. Replace the power cable and make sure it is seated.
6. Replace the SAN Volume Controller cable retention bracket and the 2145 UPS-1U cable retention bracket.
7. If the SAN Volume Controller does not turn on automatically, press and release the power switch.

Note: If the SAN Volume Controller is powered off and it is the only SAN Volume Controller that is connected to the 2145 uninterruptible power supply (2145 UPS), the 2145 UPS also powers off within five minutes. You must press the power-on button on the 2145 UPS before the SAN Volume Controller can be powered on. The 2145 uninterruptible power supply-1U (2145 UPS-1U); however, does not power off when the SAN Volume Controller is shut down from the power button.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
 MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Deleting a node from the cluster” on page 9

If it is required, you can delete a node from a cluster.

“Adding a node to a cluster” on page 10

You might have to add a node into the cluster if it has been removed or rejected by a cluster.

“Removing the fibre-channel adapter assembly” on page 427

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

Related reference

“Checking the status of the node using the CLI” on page 21

You can use the command-line interface (CLI) to check the status of the node.

Removing the memory modules (DIMM)

You might need to remove one or more faulty memory modules.

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

Related tasks

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

Related reference

“Handling static-sensitive devices” on page xliii

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

Locating the memory modules

If you do not need to remove all of the memory modules, use this information to locate a specific memory module for the SAN Volume Controller model.

After you locate the location of the faulty memory module, go to “Removing memory modules” on page 390.

SAN Volume Controller 2145-8G4: These modules are numbered **5** through **8** and **1** through **4**, as shown in Figure 114.

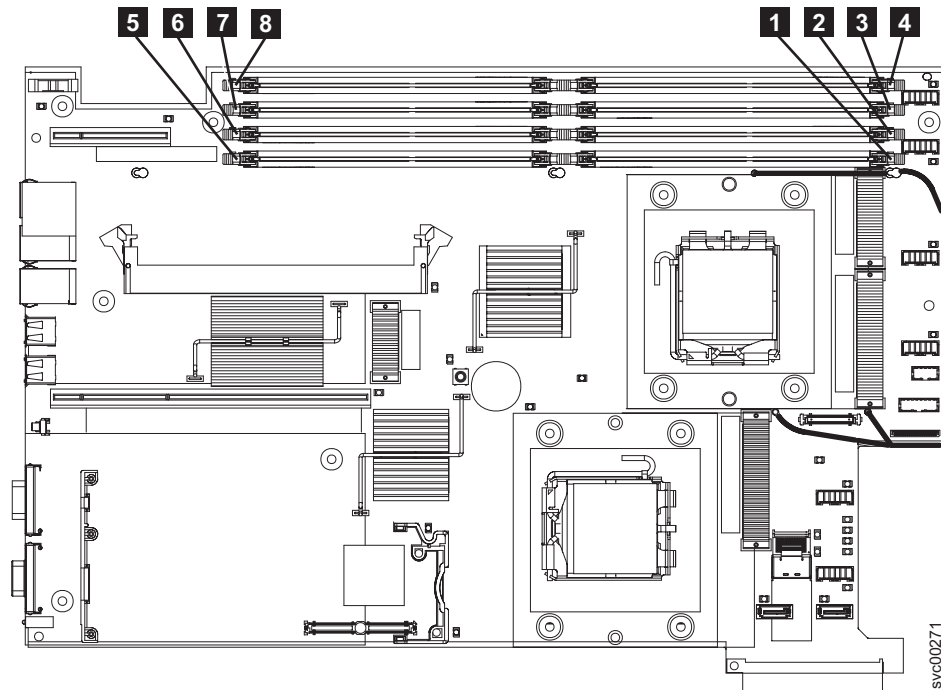


Figure 114. SAN Volume Controller 2145-8G4 system board

SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2: These modules are numbered **1** through **8**, as shown in Figure 115 on page 389.

Note: If more than one SAN Volume Controller 2145-8F2, SAN Volume Controller 2145-8F4, or SAN Volume Controller 2145-8G4 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.

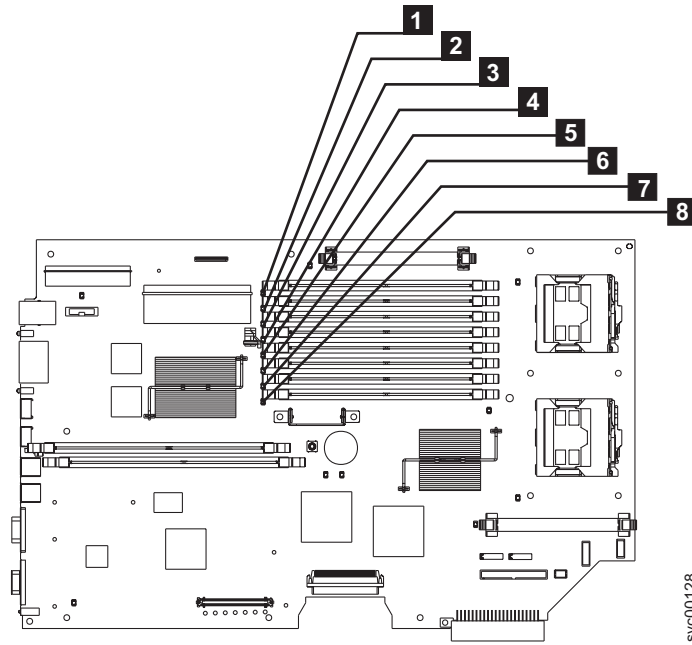


Figure 115. SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 system board

SAN Volume Controller 2145-4F2: When these memory modules are viewed from the front of the node, as shown in Figure 116, the modules are numbered **4** through **1**, from left to right. Modules **4** and **3** are in bank 2; modules **2** and **1** are in bank.

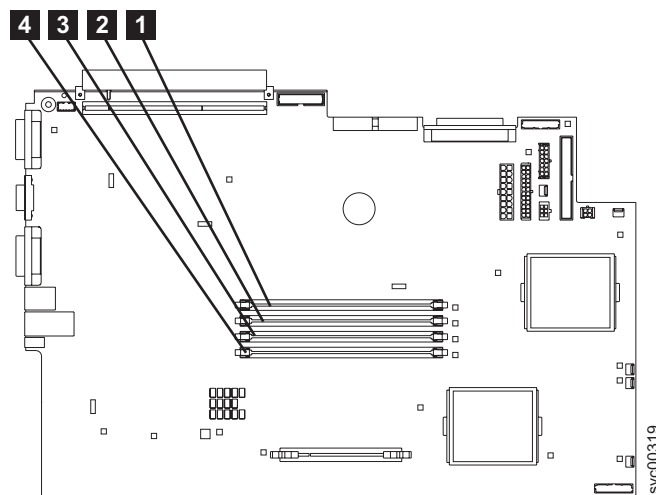


Figure 116. SAN Volume Controller 2145-4F2 system board

Removing memory modules

This topic describes how to remove the memory modules.

Perform the following steps to remove the memory modules:

1. Remove all power from the SAN Volume Controller. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the SAN Volume Controller from the rack. See “Removing the SAN Volume Controller from a rack” on page 339.
3. Remove the top cover from the SAN Volume Controller. See “Removing the top cover” on page 364.

Attention: If the fault has been isolated only to the bank of modules instead of to a particular module, exchange both modules of the bank. Otherwise, if you need to remove fewer memory modules, see “Locating the memory modules” on page 388. If more than one SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, or SAN Volume Controller 2145-8F2 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.

4. Open the clips **2** by pressing them outward, as shown in Figure 117. This action pulls the memory module **3** out of the connector.

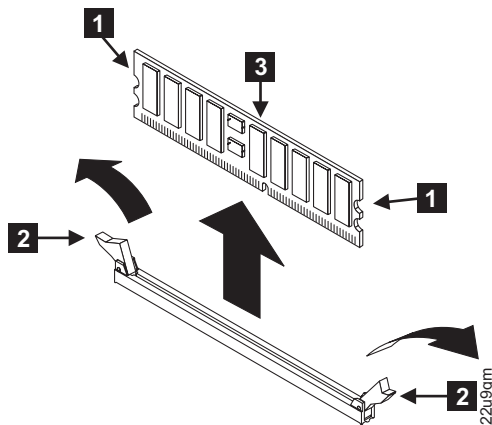


Figure 117. Removing the memory modules

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

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

Replacing the memory modules (DIMM)

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

These instructions assume the following:

- You have turned off all power to the SAN Volume Controller
- You have removed the SAN Volume Controller from the rack
- You have removed the SAN Volume Controller top cover
- You have removed the memory module to be replaced

Perform the following steps to replace the memory modules:

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

1. With the clips **2** open, lower the memory module **3** into the connector, as shown in Figure 118. Close the clips by pressing them inward.

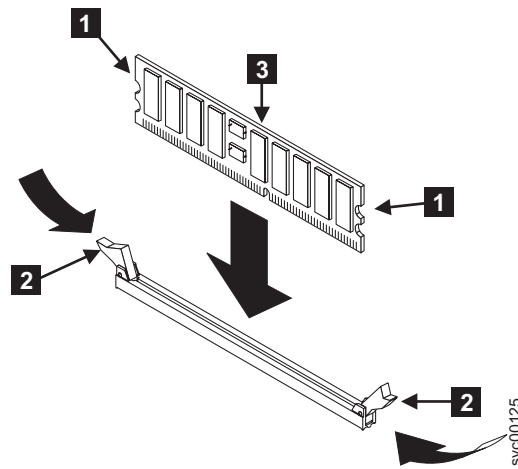


Figure 118. Replacing a memory module

2. Replace the SAN Volume Controller top cover.
3. Replace the SAN Volume Controller in the rack.
4. Restore all power to the SAN Volume Controller.

Related reference

“Handling static-sensitive devices” on page xliii

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

Removing the disk drive

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

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Replacing the disk drive” on page 398

You might have to replace the disk drive for a service action.

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Removing the service controller” on page 370

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

“Removing the SAN Volume Controller from a rack” on page 339

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

“Performing the node rescue” on page 155

If it is necessary to replace the hard disk drive or if the software on the hard disk drive is corrupted, you can use the node rescue procedure to reinstall the SAN Volume Controller software.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

Related reference

“Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385

When you replace a service controller at the same time that you replace the disk drive, you cannot perform a node rescue because the nonvolatile memory in the “new” service controller does not contain the operating system software required to do so.

“Handling static-sensitive devices” on page xliii

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

Removing the SAN Volume Controller 2145-8G4 SATA disk drive

This topic describes how to remove the SAN Volume Controller 2145-8G4 SATA disk drive.

You can remove the SAN Volume Controller 2145-8G4 disk drive after you shut down the node.

Perform the following steps to remove the SAN Volume Controller 2145-8G4 disk drive:

1. Make sure that the SAN Volume Controller 2145-8G4 cover is in place and fully closed.

Attention: To avoid damage to the hard disk drive connectors, make sure that the SAN Volume Controller 2145-8G4 cover is in place and fully closed whenever you install or remove a hard disk drive.

2. Power off the SAN Volume Controller 2145-8G4 and disconnect all power cords. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300 for more information.
3. Remove the service controller. See “Removing the service controller” on page 370.
4. Pull the loops of the drive tray (shown in Figure 119 on page 393) toward each other and pull the tray out of the bay.

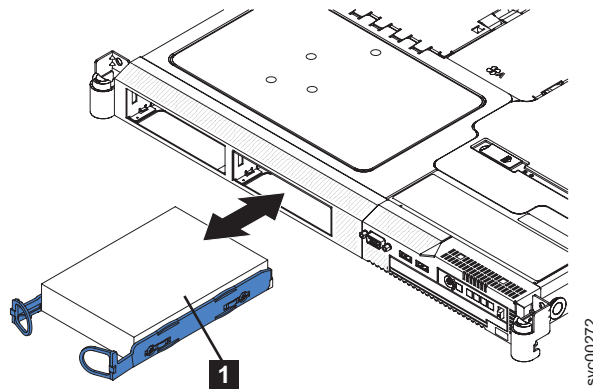


Figure 119. Removing the SATA disk drive from the SAN Volume Controller 2145-8G4

Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 SATA disk drive

You can remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 disk drive after you shut down the node.

Perform the following steps to remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 disk drive:

1. Turn off the power to the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300 for more information.
2. Remove and disconnect all power cords and external signal cables.
3. Remove the node from the rack.
4. Open fan door A (**1** in Figure 120).
5. Remove the service controller. See “Removing the service controller” on page 370.
6. Pull the disk drive out of the bay.

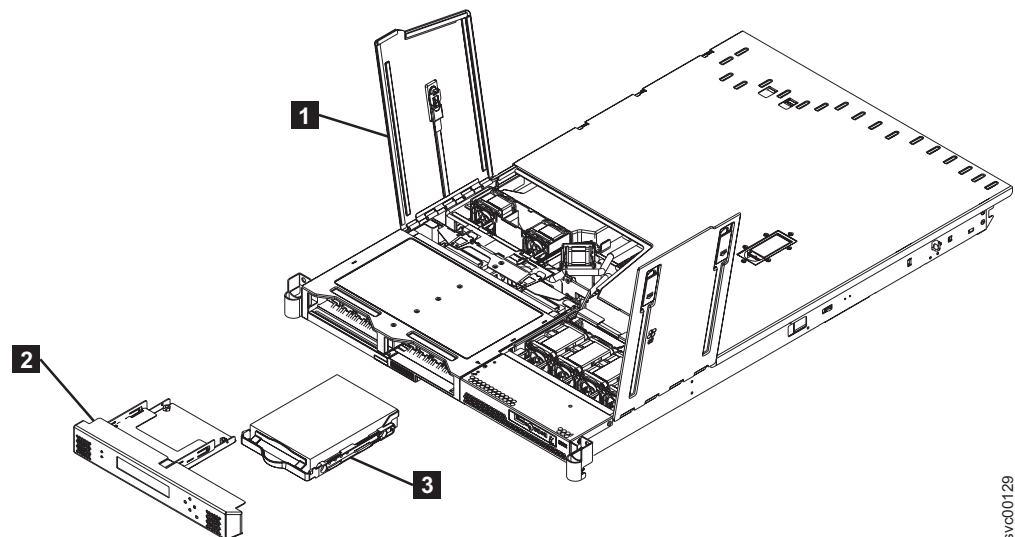


Figure 120. Removing the SATA disk drive

1 Fan door A

2 Service controller

3 SATA disk drive

You may now replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 disk drive.

Removing the SAN Volume Controller 2145-4F2 disk drive

Attention:

- Handle the disk drive with care and keep it away from strong magnetic fields.
- The disk drive is electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity. See the documentation on handling static-sensitive devices.

Perform the following steps to remove the disk drive and cables:

1. Verify that all operations between the SAN Volume Controller 2145-4F2 and the host system have been stopped.
2. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300 for more information.
3. Remove the SAN Volume Controller 2145-4F2 from the rack.
4. Remove the top cover of the SAN Volume Controller 2145-4F2.
5. Disconnect the SCSI signal connector **1** and the power connector **2** from the back of the disk drive.

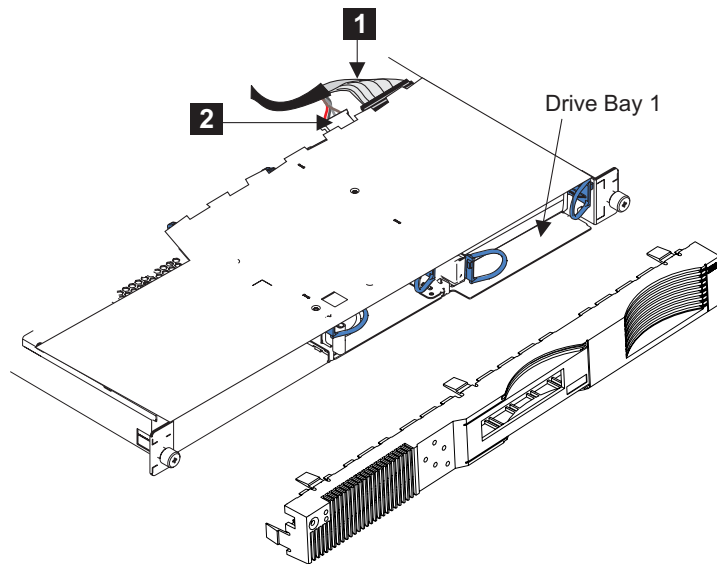


Figure 121. Removing the SAN Volume Controller 2145-4F2 disk drive

6. Remove the front panel.
7. Pull the two handles to release the latches, and pull the disk drive forward and out of the SAN Volume Controller 2145-4F2.
8. If you are exchanging the disk drive for another, locate the rails and screws that are shipped with the new disk drive. Attach the rails to the disk drive, as shown in Figure 122 on page 395.

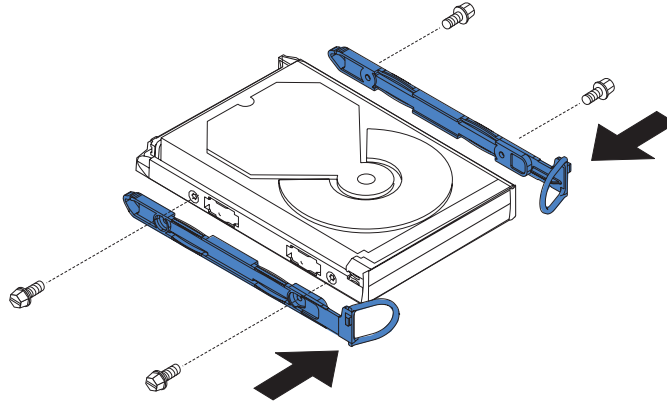


Figure 122. Attaching the rails to the SAN Volume Controller 2145-4F2 disk drive

9. Check whether the old disk drive has any jumpers installed. If it does, install matching jumpers onto the new disk drive. Figure 123 shows the location of the jumpers.

Drive HDA (rear view, PCB facing downward)

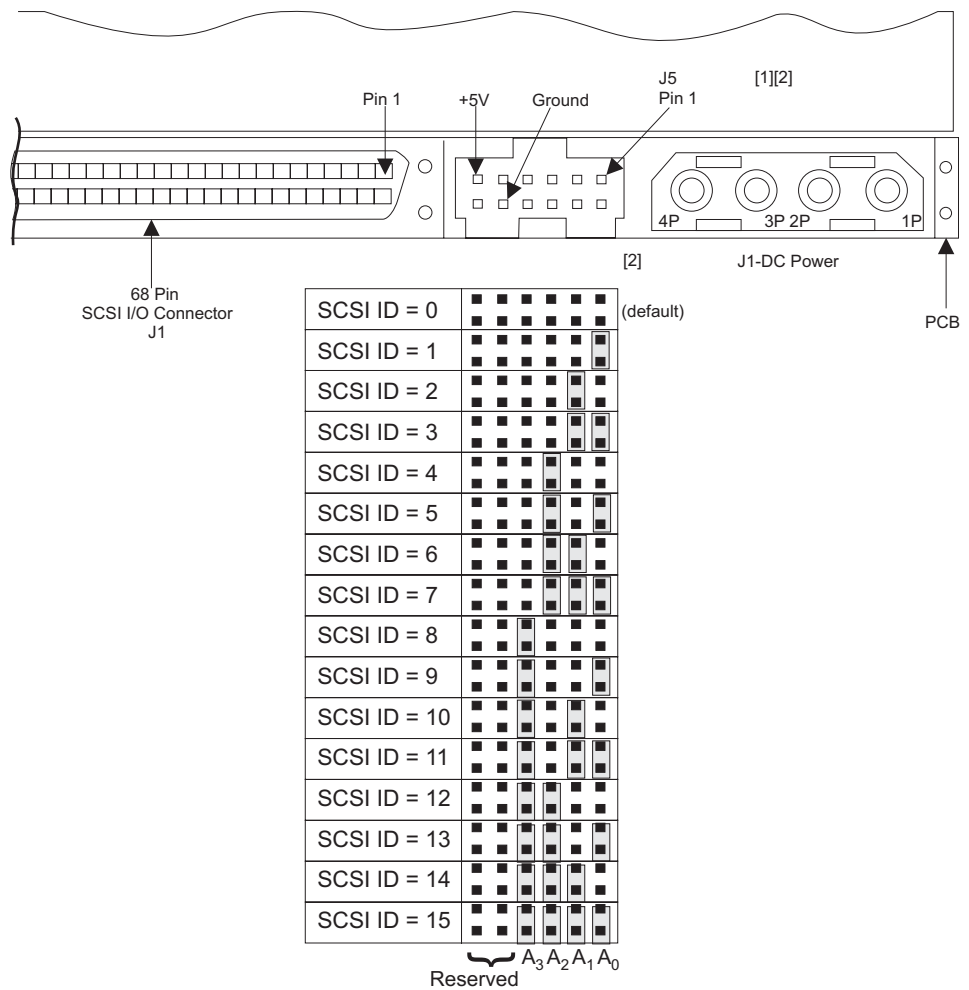


Figure 123. SAN Volume Controller 2145-4F2 disk drive jumpers

If you have any tasks that you need to perform while the service controller is removed, do them now.

Note: When you install the disk drive, push it into the SAN Volume Controller 2145-4F2 until the latches click into place.

10. After you replace a disk drive, you must reinstall the software on the SAN Volume Controller 2145-4F2 by using the node rescue procedure.

Note: If you must replace the hard disk and the service controller at the same time, you cannot start the node to perform node rescue. See “Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385.

Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate

You might have to remove the SATA backplate for a service action.

To remove the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate, complete the following steps.

1. Power off the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Disconnect and remove all power cords.
3. Remove the node from the rack. See “Removing the SAN Volume Controller from a rack” on page 339.
4. Remove the service controller. See “Removing the service controller” on page 370.
5. Pull the hard disk drive out of the node slightly to disengage it from the backplate.
6. Remove the top cover from the SAN Volume Controller 2145-8G4. See “Removing the top cover” on page 364.
7. Disconnect the two blue signal cables from the system board and disconnect the power cable from the power supply backplane card.
8. Press the locking tab **1**, which is shown in Figure 124 on page 397, and lift the backplate out of the node slightly. Disconnect the power cable and remove the backplate.

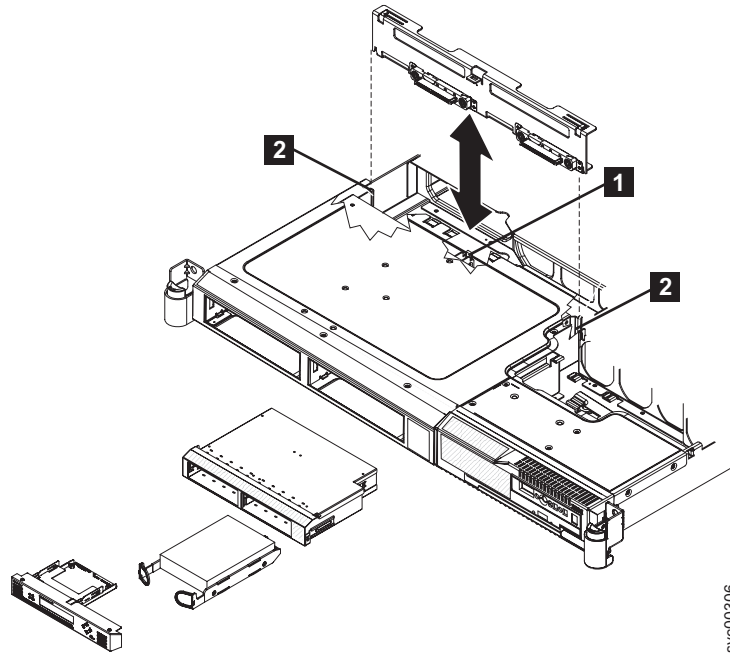


Figure 124. Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate

1 Locking tab

2 Mounting channel

Related tasks

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing the service controller” on page 370

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

Removing the SAN Volume Controller 2145-4F2 disk drive cables

The disk drive cables must be removed if they become defective or if you want to replace them.

Perform the following steps to remove the disk drive cables:

1. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the node from the rack. See “Removing the SAN Volume Controller from a rack” on page 339.
3. Remove the top cover from the SAN Volume Controller 2145-4F2. See “Removing the top cover” on page 364.
4. Disconnect the SCSI signal connector **1** and the power connector **2** from the back of the disk drive, as shown in Figure 125 on page 398, and then remove the cable.

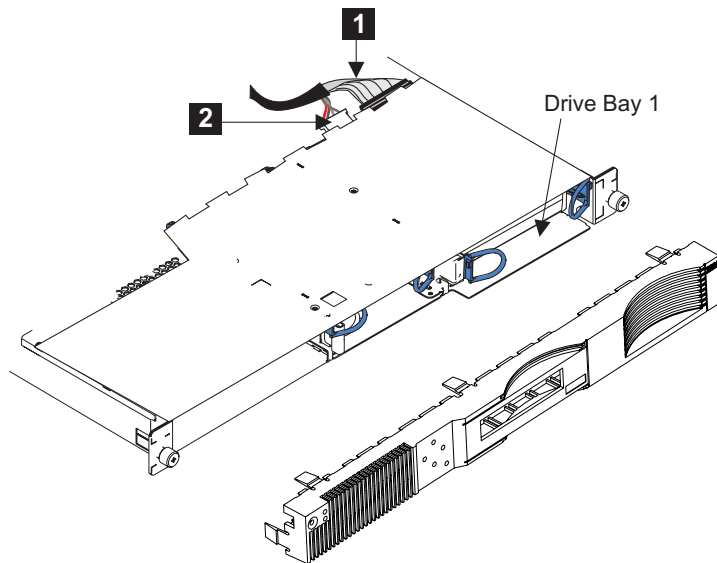


Figure 125. Removing the SAN Volume Controller 2145-4F2 disk drive cables

If you have any other tasks to do inside the SAN Volume Controller 2145-4F2, do those tasks now.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

Replacing the disk drive

You might have to replace the disk drive for a service action.

The following topics describe how to remove the SATA disk drive.

Related tasks

“Removing the disk drive” on page 391

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

“Replacing the top cover” on page 368

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

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 402

You might have to replace the SATA backplate for a service action.

Replacing the SAN Volume Controller 2145-8G4 SATA disk drive

This topic describes how to replace the SAN Volume Controller 2145-8G4 SATA disk drive.

You can replace the SAN Volume Controller 2145-8G4 SATA (serial advanced technology attachment) disk drive after you remove the existing disk drive.

Perform the following steps to replace the SAN Volume Controller 2145-8G4 disk drive:

1. Make sure that the node cover is in place and fully closed.

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

2. Find the rails assembly and screws that are shipped with the new disk drive. Attach the rails assembly to the disk drive with four screws, as shown in Figure 126, using two on each side of the disk.



Figure 126. Attaching the rails assembly to the SAN Volume Controller 2145-8G4 SATA disk drive

3. Pull the loops of the rails toward each other and slide the drive into the node until the drive connects to the backplate.
4. Release the loops of the drive tray.
5. Replace the service controller. See “Replacing the service controller” on page 378.
6. Reconnect the power cords and all external signal cables. When powering 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. .

Note: If you must replace the hard disk and the service controller at the same time, you cannot start the node to perform node rescue. See “Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385.

7. Power-on the node.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 SATA disk drive

The SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 SATA (serial advanced technology attachment) disk drive can be replaced after you remove the existing disk drive.

Perform the following steps to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 disk drive:

1. Slide the disk drive into the bay until the rear of the drive snaps into place with the rear panel-mount connector.
2. Place the service controller in the node. See “Replacing the service controller” on page 378.
3. Replace the node in the rack.
4. Reconnect the power cords and all external signal cables. When powering 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. .

Note: If you must replace the hard disk and the service controller at the same time, you cannot start the node to perform node rescue. See “Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385.

5. Power-on the node.

Replacing the SAN Volume Controller 2145-4F2 disk drive

Attention:

- Handle the disk drive with care and keep it away from strong magnetic fields.
- The disk drive is electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity. See the documentation on handling static-sensitive devices.

Perform the following steps to replace the disk drive and cables:

1. Find the rails and screws that are shipped with the new disk drive and attach the rails to the disk drive, as shown in Figure 127 on page 401.

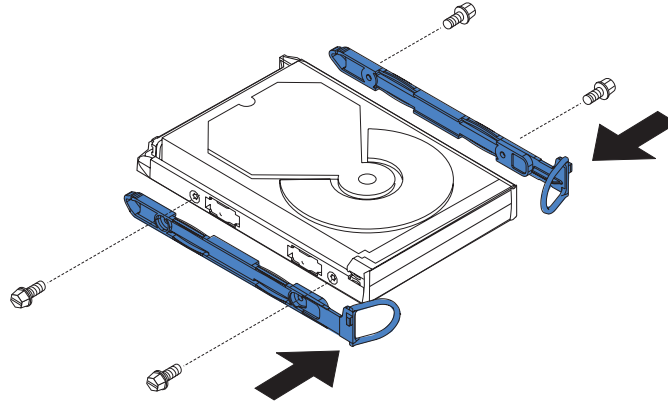


Figure 127. Attaching the rails to the SAN Volume Controller 2145-4F2 disk drive

2. Push the disk drive forward and into the SAN Volume Controller 2145-4F2.

Note: When you install the disk drive, push it into the SAN Volume Controller 2145-4F2 until the latches click into place.

3. Restore the front panel.
4. Connect the SCSI signal connector **1** and the power connector **2**, which are shown in Figure 128, to the back of the disk drive.

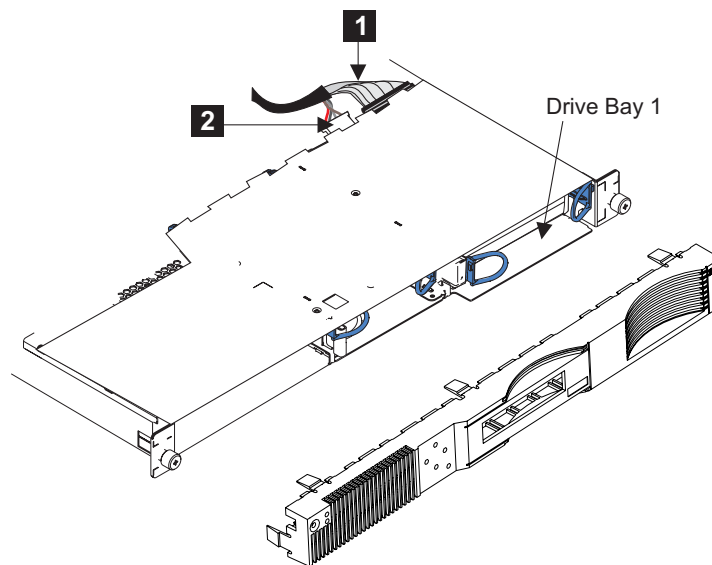


Figure 128. Replacing the SAN Volume Controller 2145-4F2 disk drive

5. Replace the top cover of the SAN Volume Controller 2145-4F2.
6. Place the SAN Volume Controller 2145-4F2 in the rack.
7. Reconnect the power cords and all external signal cables. When powering 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. .

Note: If you must replace the hard disk and the service controller at the same time, you cannot start the node to perform node rescue. See “Replacing a disk drive and a service controller on the SAN Volume Controller” on page 385.

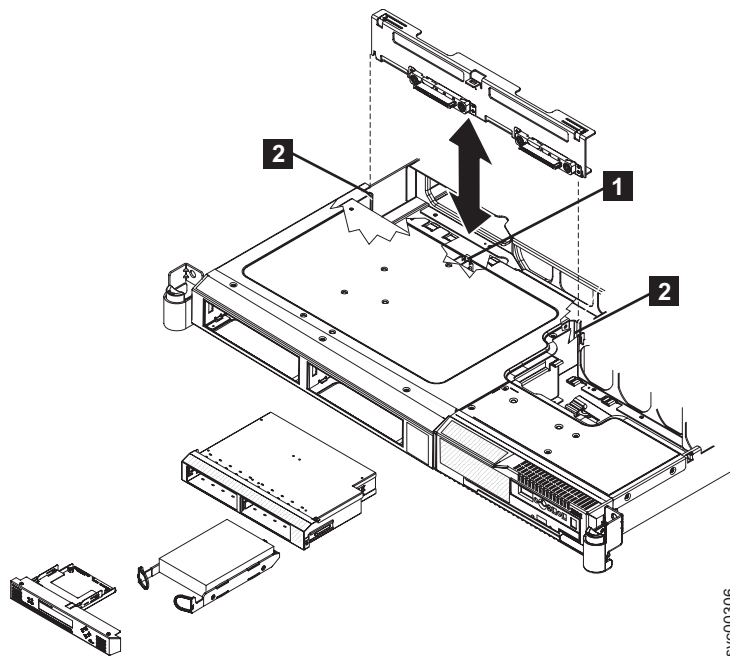
8. Power-on the node.

Replacing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate

You might have to replace the SATA backplate for a service action.

To replace the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate, complete the following steps.

1. Connect the power cable to the replacement backplate.
2. Slide the backplate into the mounting channels, **2** making sure not to trap or pinch any nearby wires or cables.



1 Locking tab

2 Mounting channel

3. Press firmly until the backplate is fully seated and the locking tab **1** snaps into place.
4. Reconnect the power cable to the power supply backplane card. Then reconnect the two blue signal cables to the system board. The left cable goes to the front system board connector and the right cable goes to the rear system board connector, as shown in Figure 129 on page 403.



Figure 129. Reconnecting the SATA cable assembly

5. Install the hard disk drive. See “Replacing the disk drive” on page 398.
6. Install the service controller. See “Replacing the service controller” on page 378.
7. Slide the node into the rack.
8. Reconnect the power cords that were removed.
9. Power on the node.

Related tasks

“Removing the SAN Volume Controller 2145-8G4 SATA cable assembly with backplate” on page 396

You might have to remove the SATA backplate for a service action.

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

Replacing the SAN Volume Controller 2145-4F2 disk drive cables

The disk drive cables must be replaced if they are removed.

Perform the following steps to replace the SAN Volume Controller 2145-4F2 disk drive cables:

1. Connect the SCSI signal connector **1** and the power connector **2** to the back of the disk drive, as shown in Figure 130 on page 404, and then replace the cable.

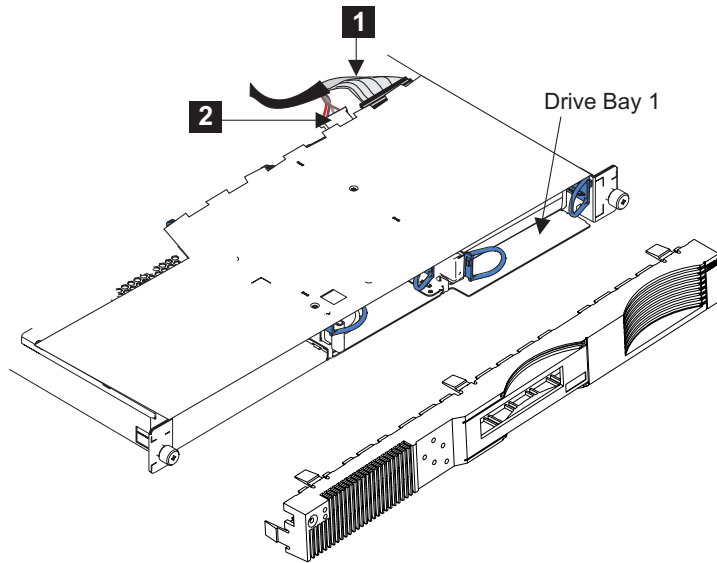


Figure 130. Replacing the SAN Volume Controller 2145-4F2 disk drive cables

2. Replace the top cover to the SAN Volume Controller 2145-4F2.
3. Place the SAN Volume Controller 2145-4F2 in the rack.
4. Replace all power to the SAN Volume Controller 2145-4F2.

Replacing the SAN Volume Controller 2145-4F2 disk drive fan

The disk drive fan must be removed if it is defective or if it needs to be replaced.

Perform the following steps to replace the disk drive fan:

1. Remove all power from the SAN Volume Controller 2145-4F2.
2. Remove the SAN Volume Controller 2145-4F2 from the rack.
3. Remove the top cover from the SAN Volume Controller 2145-4F2.
4. Unplug the power cables connected to the system board.
5. Remove the entire fan assembly **1**, as shown in Figure 131, by sliding the right-hand side of the disk drive fan forward. Then, pull the assembly away from the clip.

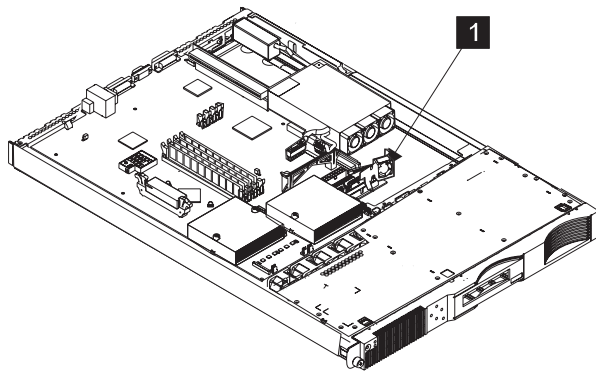


Figure 131. Removing a SAN Volume Controller 2145-4F2 disk drive fan

6. Remove the fan from the bracket by pulling the sides of the bracket apart.
7. Insert the new fan into the bracket by pulling the sides of the bracket apart.

8. If you have any other tasks that you need to perform while the fan is removed, do those tasks now. Otherwise, reinstall the parts in the reverse sequence.

Note:

- The airflow is from the front to the back of the SAN Volume Controller 2145-4F2.
- The fan cable comes out of the back of the fan. When you install a fan, ensure that the back of the fan is facing the back of the SAN Volume Controller 2145-4F2.

Related tasks

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

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.

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.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the SAN Volume Controller from a rack” on page 339

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

Related reference

“Handling static-sensitive devices” on page xliii

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

Removing the SAN Volume Controller 2145-8G4 CMOS battery

This topic describes how to remove the SAN Volume Controller 2145-8G4 CMOS battery.

Perform the following steps to remove the SAN Volume Controller 2145-8G4 CMOS battery:

1. Turn off the SAN Volume Controller 2145-8G4 and disconnect all power cords. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the cover. See “Removing the top cover” on page 364.
3. Locate the battery **1** on the system board. Figure 132 shows the location of the battery.

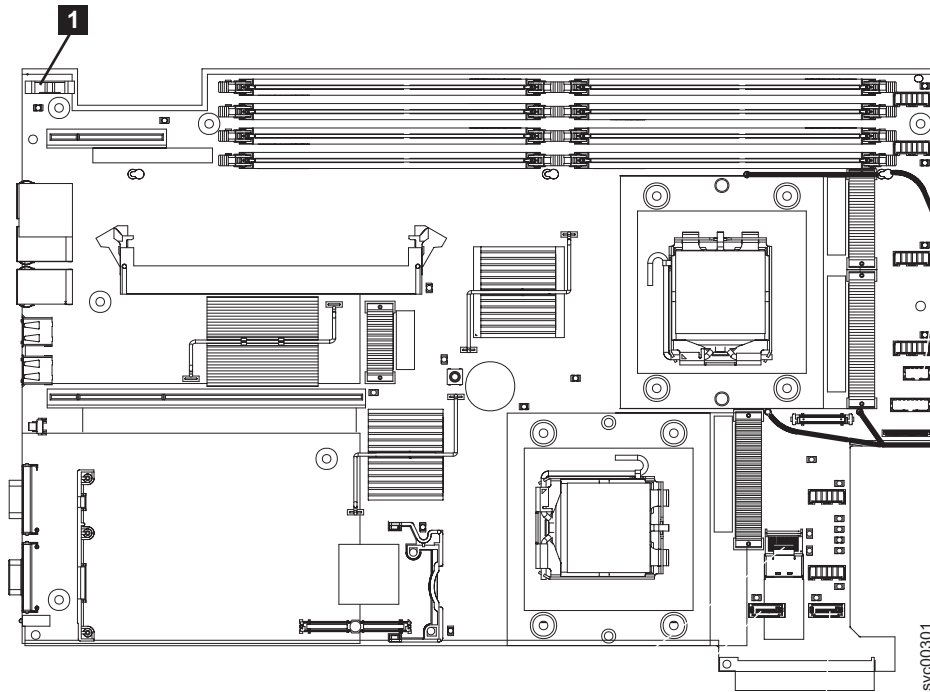


Figure 132. Location of SAN Volume Controller 2145-8G4 CMOS battery holder

4. Remove the CMOS battery, as shown in Figure 133:

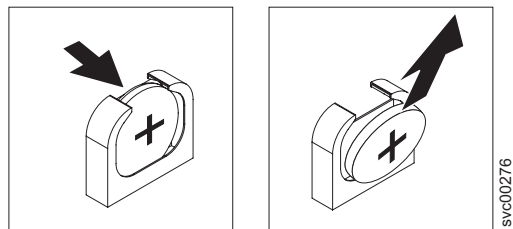


Figure 133. SAN Volume Controller 2145-8G4 CMOS battery holder

- 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.

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)

Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 CMOS battery

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

CAUTION:

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

Do not:

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

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

Perform the following steps to remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 CMOS battery:

1. Follow any special handling and installation instructions supplied with the battery.
2. Remove all power from the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
3. Remove the node from the rack.
4. Remove the top cover from the node. See “Removing the top cover” on page 364.
5. Locate the battery **1** on the system board. Figure 134 on page 408 shows the location of the battery.

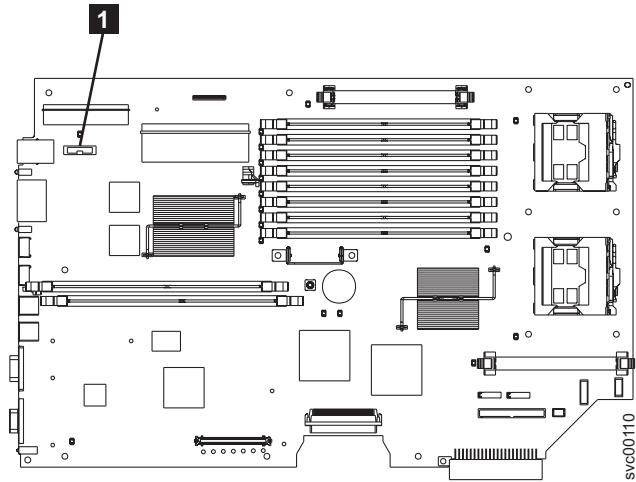


Figure 134. Battery location

6. Remove the battery:
 - a. Use one finger to pull the retainer tab, which is shown in Figure 135, that secures the battery to its housing.

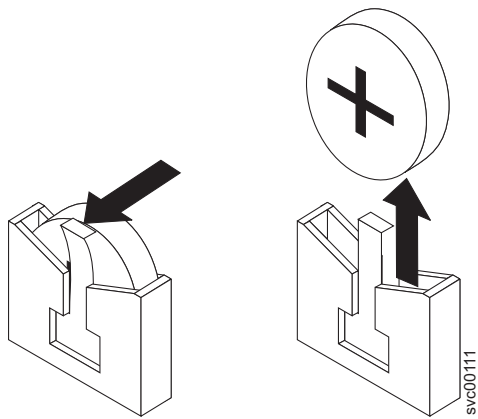


Figure 135. CMOS battery holder

- b. Use one finger to slide the battery up and out from its socket.

Removing the SAN Volume Controller 2145-4F2 system board CMOS battery

CAUTION:

Only trained service personnel may replace this battery. The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do not:

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

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C002)

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)

Perform the following steps to remove the system board CMOS battery. See Figure 136.

1. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the node from the rack.
3. Remove the top cover from the SAN Volume Controller 2145-4F2. See “Removing the top cover” on page 364.
4. Use a finger to lift the battery clip above the battery, which is shown in Figure 136.

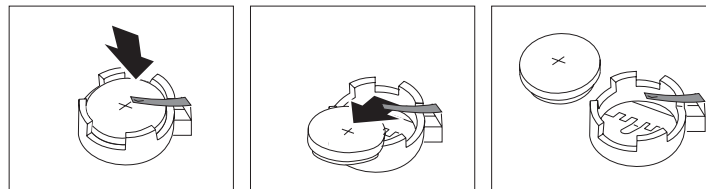


Figure 136. Removing the system board CMOS battery

5. Use one finger to slightly slide the battery out from its socket. The spring mechanism pushes the battery out toward you as you slide it from the socket.
6. Use your thumb and index finger to pull the battery out from under the battery clip.
7. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.

Replacing the CMOS battery

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

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

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

Related tasks

“Replacing the top cover” on page 368

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

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

Related reference

“Handling static-sensitive devices” on page xliii

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

Replacing the SAN Volume Controller 2145-8G4 system-board CMOS battery

This topic describes how to replace the system-board SAN Volume Controller 2145-8G4 CMOS battery.

If you are exchanging the battery for a new one, use only IBM Part Number 33F8354 or a similar type of battery that the manufacturer recommends.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

CAUTION:


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

Do not:

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

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

Perform the following steps to replace the SAN Volume Controller 2145-8G4 system-board CMOS battery:

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Locate the battery on the system board. Figure 137 on page 411 shows the location () of the battery.

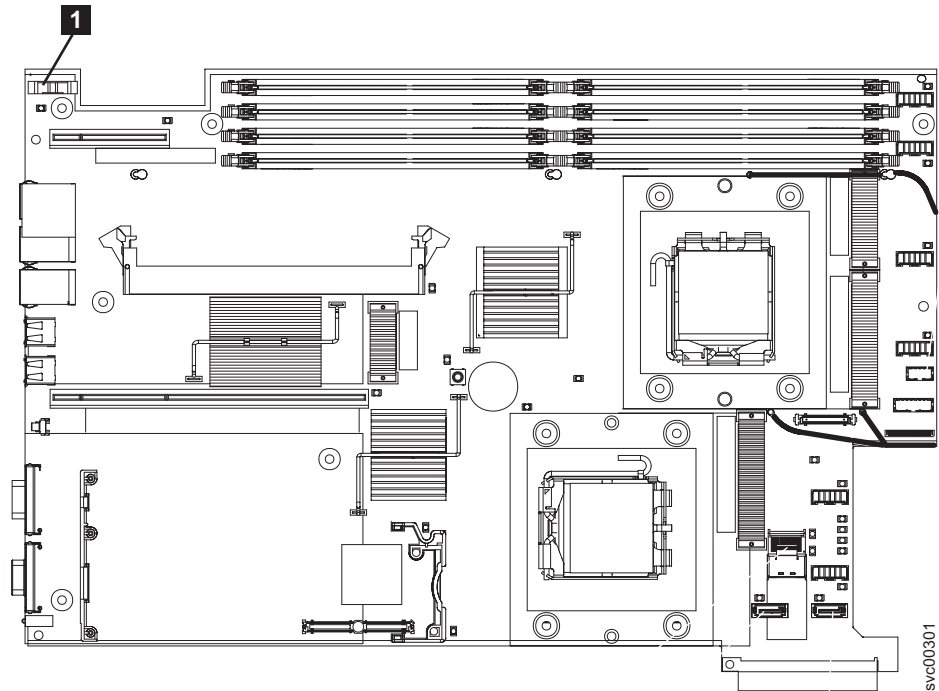


Figure 137. Location of SAN Volume Controller 2145-8G4 CMOS battery holder

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 down into the socket until it clicks into place. Make sure that the battery clip holds the battery securely, as shown in Figure 138.

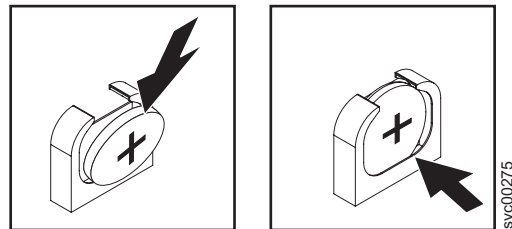


Figure 138. SAN Volume Controller 2145-8G4 CMOS battery holder

4. Replace the cover.
5. Replace the node in the rack.
6. Reconnect the external cables, and then reconnect the power cords and the node.
7. If there is a problem restarting the node, see “MAP 5900: Hardware boot”, and then connect a monitor and keyboard to the system and reset the BIOS date and time.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 CMOS battery

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.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

CAUTION:

Only trained service personnel may replace this battery. The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do not:

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

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C002)

Perform the following steps to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 CMOS battery:

1. Insert the new battery in the battery socket. Figure 139 shows the location (1) of the battery socket.

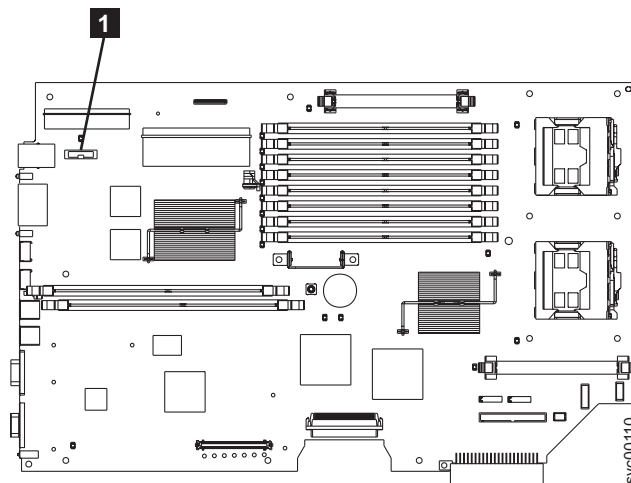


Figure 139. Location of the CMOS battery on the SAN Volume Controller 2145-8F2

- a. Hold the battery so that the positive (+) side of the battery is facing toward the center of the server.
- b. Pull the retainer tab out of the way so that you can slide the battery into its socket.

- c. Slide the battery down until it snaps into place, as shown in Figure 140.

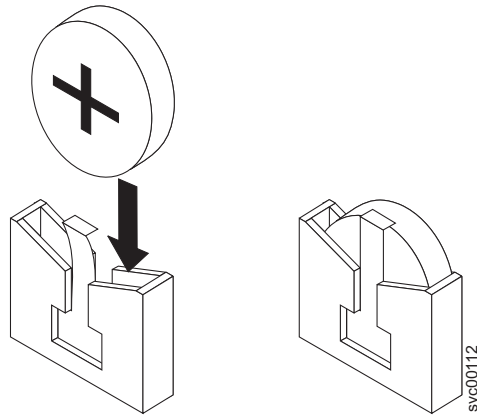


Figure 140. CMOS battery socket

2. Reinstall the node cover.
3. Replace the node in the rack.

Replacing the SAN Volume Controller 2145-4F2 system-board CMOS battery

If you are exchanging the battery for a new one, use only IBM Part Number 33F8354 or a similar type of battery that the manufacturer recommends.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

CAUTION:

Only trained service personnel may replace this battery. The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do not:

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

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C002)

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)

Perform the following steps to replace the system board CMOS battery.

1. Tilt the battery so that you can insert it into the socket under the battery clip.

- As you slide it under the battery clip, press the battery down into the socket, as shown in Figure 141.

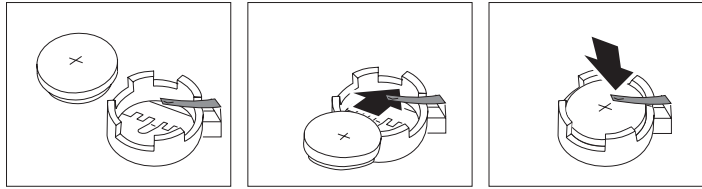


Figure 141. Replacing the SAN Volume Controller 2145-4F2 system board CMOS battery

- Place the top cover on the SAN Volume Controller 2145-4F2.
- Place the SAN Volume Controller 2145-4F2 in the rack.
- Restore all power to the SAN Volume Controller 2145-4F2.

If this SAN Volume Controller 2145-4F2 was the configuration node when the CMOS battery failed, the cluster date and time might not be correct. After replacing the CMOS battery, check the cluster time using the master console and correct it if necessary.

Removing the power supply

You must remove the SAN Volume Controller power supply if you intend to replace it.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the SAN Volume Controller from a rack” on page 339
During some service procedures, you might need to remove the SAN Volume Controller from the rack.

“Removing the top cover” on page 364
You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Replacing the SAN Volume Controller 2145-4F2 disk drive fan” on page 404
The disk drive fan must be removed if it is defective or if it needs to be replaced.

Related reference

“Handling static-sensitive devices” on page xliii
Ensure that you understand how to handle devices that are sensitive to static electricity.

Removing a SAN Volume Controller 2145-8G4 power supply

This topic describes how to remove a SAN Volume Controller 2145-8G4 power supply.

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the SAN Volume Controller 2145-8G4 power supply.

Perform the following steps to remove the power supply:

1. Power off the node and disconnect all power cords. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. At the back of the node, remove the cable restraint bracket to gain access to the rear of the node and the power supply **1**.
3. Press and hold down the orange release tab **2**, which is shown in Figure 142, and pull the power supply out of the node.

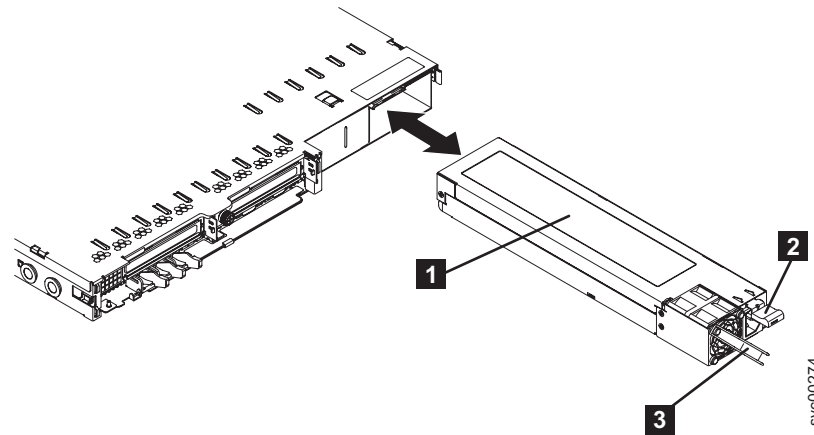


Figure 142. Removing the SAN Volume Controller 2145-8G4 power supply

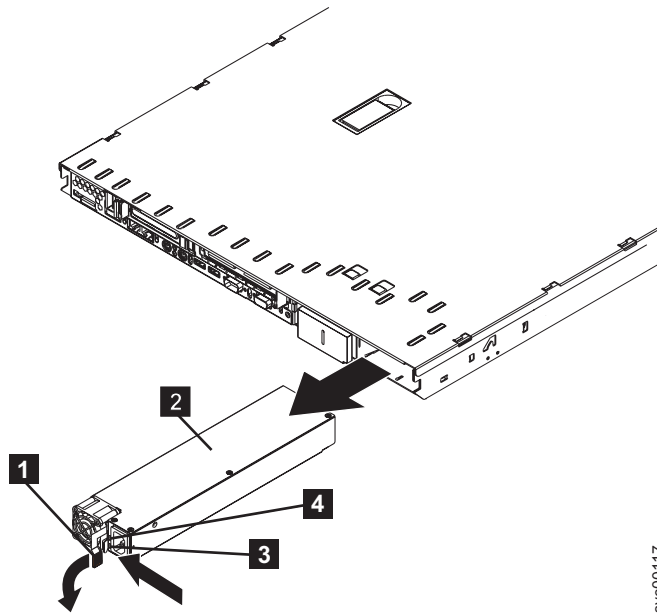
- 1** Power supply
- 2** Power supply release tab
- 3** Power supply handle

Removing a SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power supply

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power supply.

Perform the following steps to remove the power supply:

1. Power off the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Power off the 2145 uninterruptible power supply-1U (2145 UPS-1U) that is supplying this node.
3. Remove the cable retention bracket and the power cord.
4. From the rear of the node, as shown in Figure 143 on page 416, push the orange release lever to the left and then push down on it to release the power-supply assembly. This will move the power supply back, slightly, for easy removal.



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Figure 143. Removing the SAN Volume Controller 2145-8F2 power supply

- 1** Handle
- 2** Power supply
- 3** dc power LED
- 4** ac power LED

5. Pull the power supply out of the power-supply bay.

Removing the SAN Volume Controller 2145-4F2 power supply

Perform the following steps to remove the power supply:

1. Power off the node. See "MAP 5350: Powering off a SAN Volume Controller node" on page 300.
2. Remove the SAN Volume Controller 2145-4F2 from the rack.
3. Remove the top cover from the SAN Volume Controller 2145-4F2.
4. Remove the disk drive fan.
5. Press down on the clip **1** at the front of the power-cable module, as shown in Figure 144 on page 417, and slide the module toward the front of the SAN Volume Controller 2145-4F2 until the alignment tab is free of the slot that is on the side of the SAN Volume Controller 2145-4F2.

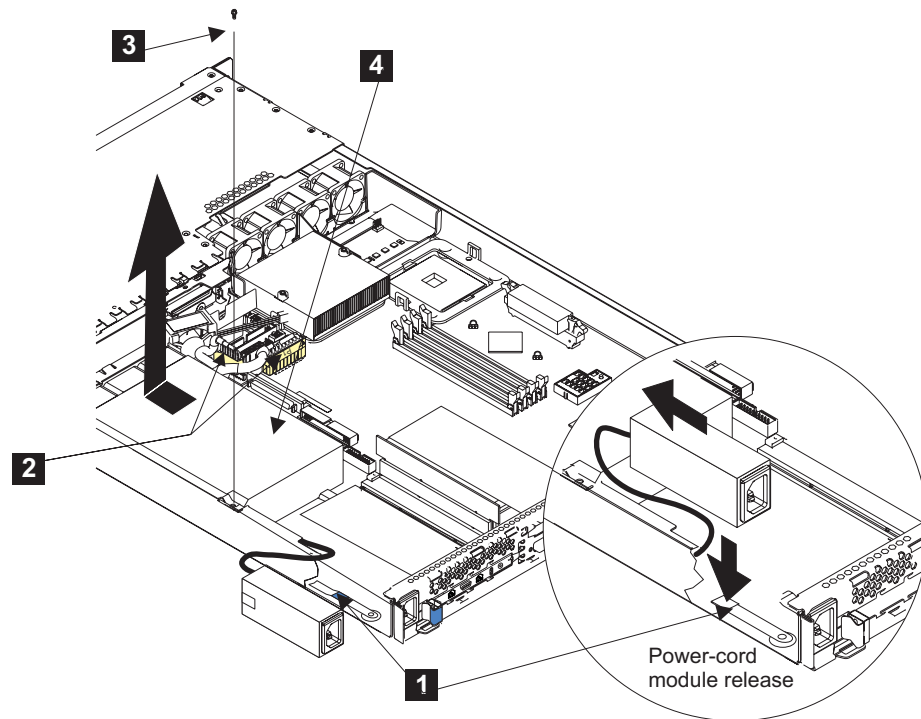


Figure 144. Removing the SAN Volume Controller 2145-4F2 power supply

6. Lift the power-cable module out from the SAN Volume Controller 2145-4F2 as far as its cable allows, and put it to one side.
7. Disconnect the power connector **2**.
8. Remove the screw **3**.
9. Slide the power supply **4** forward, and then lift it from the SAN Volume Controller 2145-4F2.

The power supply is a complete FRU. Do not try to repair or exchange any part of it.

Note: For a translation of the following notice, see *IBM Systems Safety Notices*.

DANGER

Do not open or service any power supply assembly. (D005a)

10. If you have any other tasks to perform while the power supply is removed, do those tasks now.

Replacing the power supply

You might need to replace the SAN Volume Controller power supply for a service action.

Related reference

“Handling static-sensitive devices” on page xliii

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

Replacing a SAN Volume Controller 2145-8G4 power supply

This topic describes how to replace a SAN Volume Controller 2145-8G4 power supply.

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

Perform the following steps to replace the SAN Volume Controller 2145-8G4 power supply:

1. Grasp the handle on the rear of the power supply and slide the power supply forward fully into the node until it clicks in place.

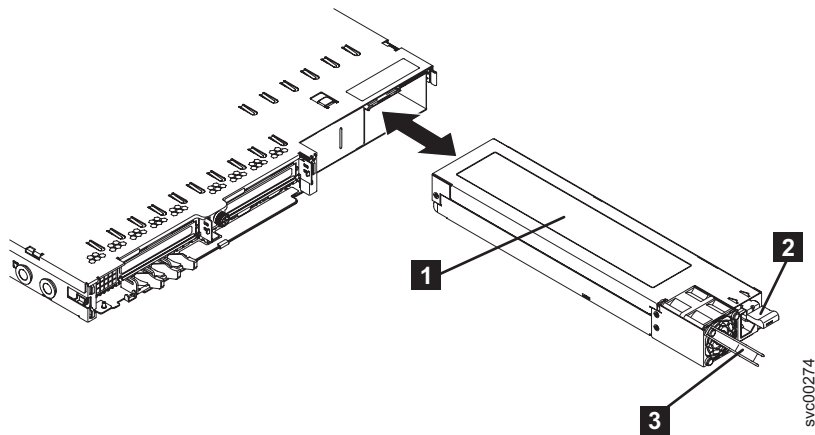


Figure 145. SAN Volume Controller 2145-8G4 power supply

- 1** Power supply
 - 2** Power supply release tab
 - 3** Power supply handle
2. Connect the power cord to the power-cord connector on the power supply, being sure to route the cord through the cable restraint bracket in order to minimize mechanical strain on the cord.
 3. Reconnect the power cord and power-on the 2145 uninterruptible power supply-1U (2145 UPS-1U).
 4. Make sure that the ac power LED **1** and the dc power LED **2** on the power supply are lit, indicating that the power supply is operating correctly. The two green LEDs are next to the power-cord connector.

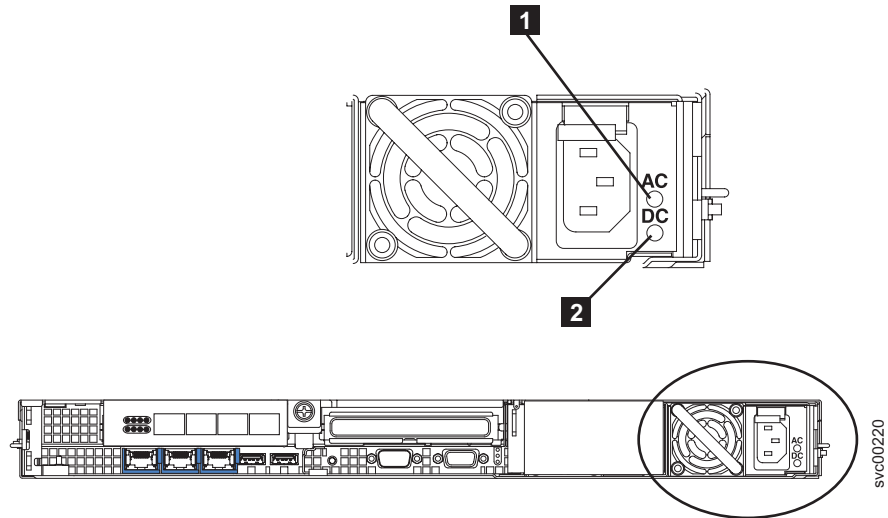


Figure 146. SAN Volume Controller 2145-8G4 AC and DC LEDs

5. Power-on the node.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power supply

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

Perform the following steps to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power supply:

1. Install the power supply in the empty power supply bay:
 - a. Rotate the handle **1** down on the rear of the power supply to the open position, and then slide the power supply forward into the power-supply bay. See Figure 147.

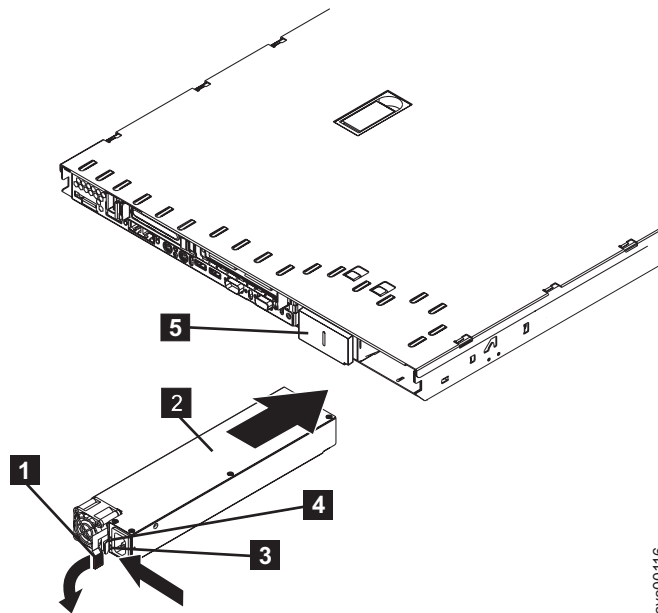


Figure 147. SAN Volume Controller 2145-8F2 power supply handle

- 1** Handle
 - 2** Power supply
 - 3** DC power LED
 - 4** AC power LED
- b. Gently lift the handle up until it clicks. This signals that the power supply is securely seated in the bay.
2. Connect the power cord for the new power supply to the power-cord connector on the power supply.
 3. Reconnect the power cord and power-on the 2145 uninterruptible power supply-1U (2145 UPS-1U).
 4. Power-on the node.
 5. Make sure that the power-supply fan starts and the AC power LED **1** and DC power LED **2** on the power supply are lit, indicating that the power supply is operating correctly. See Figure 148.

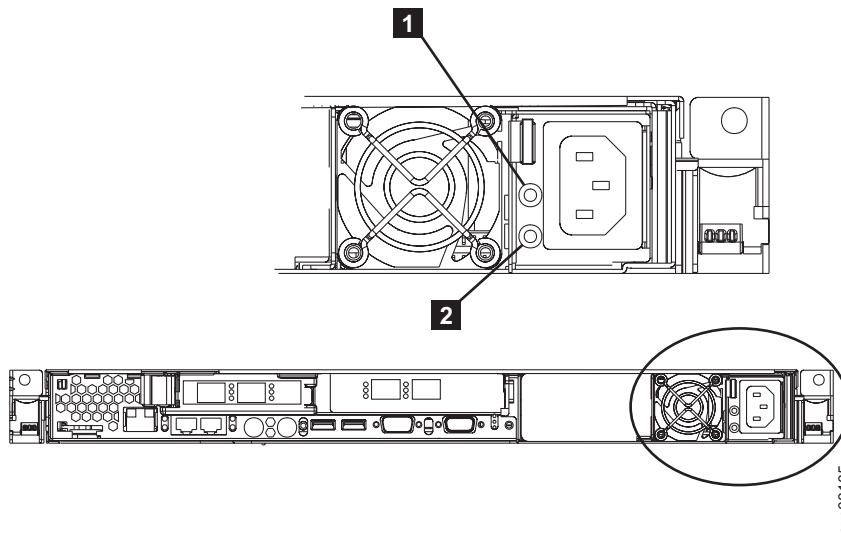


Figure 148. AC and DC power LEDs

Replacing the SAN Volume Controller 2145-4F2 power supply

Perform the following steps to replace the power supply:

1. Slide the power supply **4** into the SAN Volume Controller 2145-4F2. See Figure 149 on page 421.

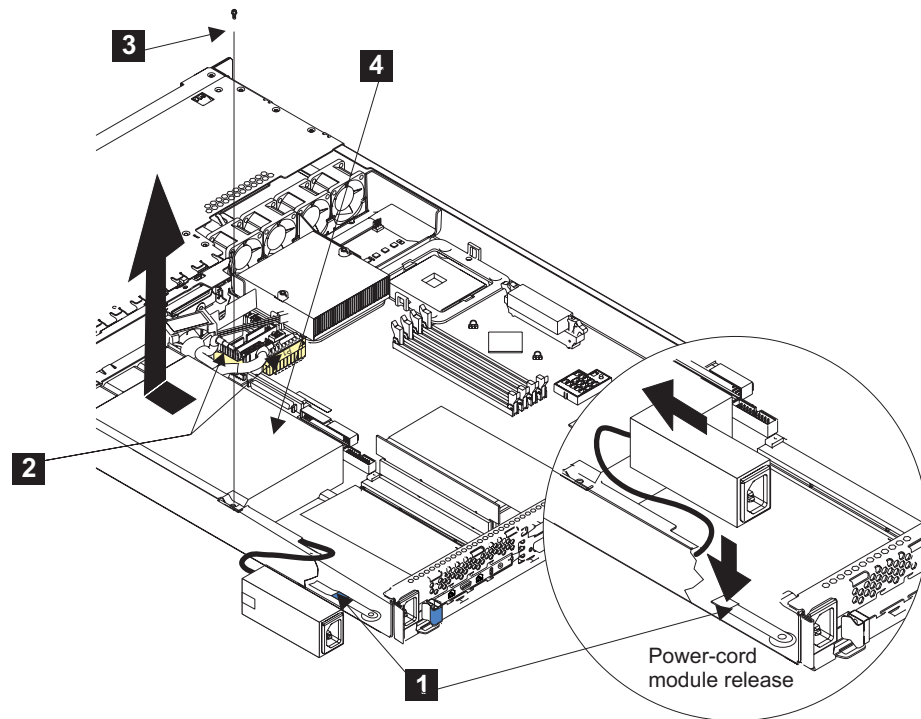


Figure 149. Replacing the SAN Volume Controller 2145-4F2 power supply

Note: For a translation of the following notice, see *IBM Systems Safety Notices*.

DANGER

Do not open or service any power supply assembly. (D005a)

2. Replace the screw **3**.
3. Connect the power connector **2**.
4. Place the power-cable module into the SAN Volume Controller 2145-4F2.
5. Slide the module toward the back of the SAN Volume Controller 2145-4F2 until the alignment tab snaps into the slot that is on the side of the SAN Volume Controller 2145-4F2.
6. Replace the disk drive fan.
7. Replace the SAN Volume Controller 2145-4F2 top cover.
8. Place the SAN Volume Controller 2145-4F2 in the rack.
9. Return all power to the SAN Volume Controller 2145-4F2.

Removing the power backplane

The SAN Volume Controller power backplane might have to be removed.

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the power backplane.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
 MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the SAN Volume Controller from a rack” on page 339
During some service procedures, you might need to remove the SAN Volume Controller from the rack.

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Removing the power supply” on page 414

You must remove the SAN Volume Controller power supply if you intend to replace it.

Related reference

“Handling static-sensitive devices” on page xliii

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

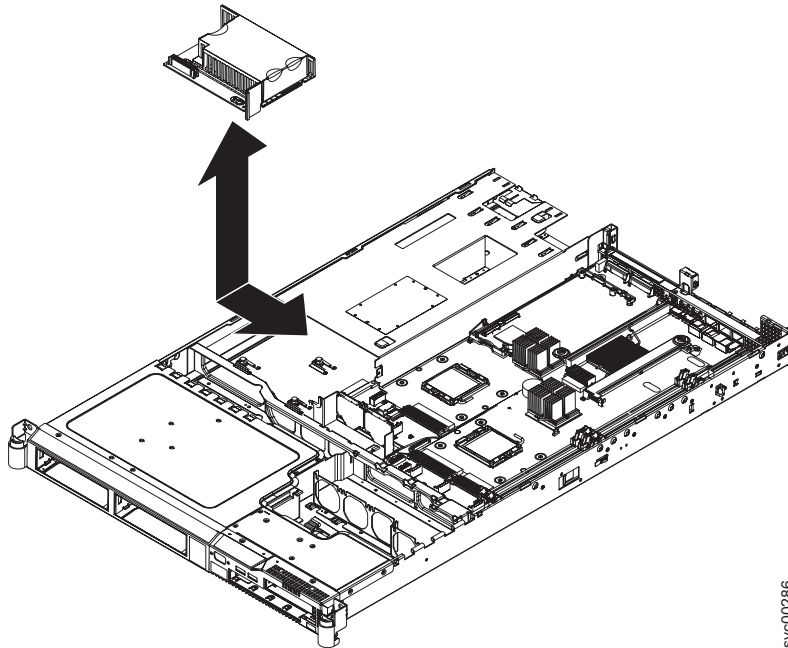
Removing the SAN Volume Controller 2145-8G4 power backplane

This topic describes how to remove the SAN Volume Controller 2145-8G4 power backplane.

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the power backplane.

Perform the following steps to remove the power backplane:

1. Power off the node and disconnect all power cords. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the node from the rack. See “Removing the SAN Volume Controller from a rack” on page 339.
3. Remove the cover. See “Removing the top cover” on page 364.
4. Disconnect the power supplies from the power-supply backplane.



svc00286

5. Disconnect the cable connected to the power-supply backplane.
6. Slide the power-supply backplane to the left, disconnecting it from the system board.

7. Lift the power-supply backplane to remove it from the node.

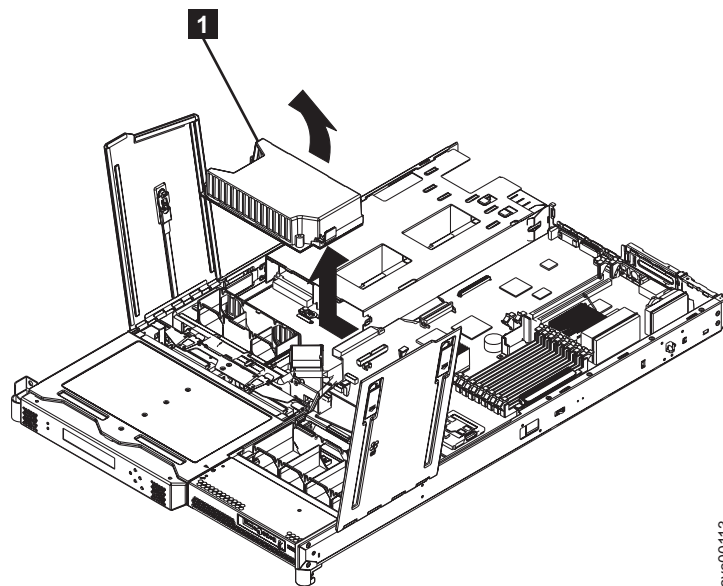
Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power backplane

The SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power backplane might have to be replaced.

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the power backplane.

Perform the following steps to remove the power backplane:

1. Turn off the node.
2. Disconnect all power cords and external cables from the back of the node.
3. Remove the node from the rack.
4. Remove the top cover.
5. Disconnect the power supply from the power backplane.
6. Slide the power backplane to the left and disconnect it from the system board.



svc00113

7. Remove the power backplane from the node.

Replacing the power backplane

The power backplane might have to be replaced for a service action.

Related tasks

“Replacing the power supply” on page 417

You might need to replace the SAN Volume Controller power supply for a service action.

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Replacing the top cover” on page 368

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

Related reference

“Handling static-sensitive devices” on page xliii

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

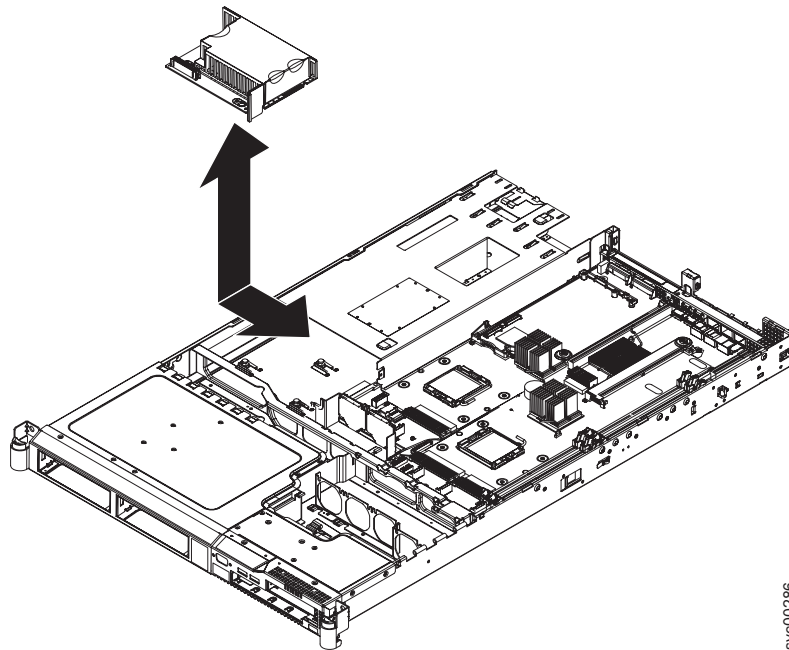
Replacing the SAN Volume Controller 2145-8G4 power backplane

This topic describes how to replace the SAN Volume Controller 2145-8G4 power backplane.

Ensure that you are aware of the procedures for handling static-sensitive devices before you replace the power backplane.

Perform the following steps to replace the power backplane:

1. Align the keyhole slots in the power-supply backplane with the mounting pins in the node.
2. Slide the power-supply backplane toward the right side of the node until the edge-connectors are fully connected.
3. Reconnect the cables to the power supply backplane.
4. Install the power supply into the power-supply bay.



svc00286

5. Replace the cover.
6. Replace the node in the rack.
7. Reconnect the power cords and any cables that were removed.
8. Power on the node.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power backplane

The SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 power backplane might have to be replaced.

Ensure that you are aware of the procedures for handling static-sensitive devices before you replace the power backplane.

Perform the following steps to replace the power backplane:

1. Lower the power backplane into position on the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 and slide it to the right to connect it to the system board. See Figure 150.

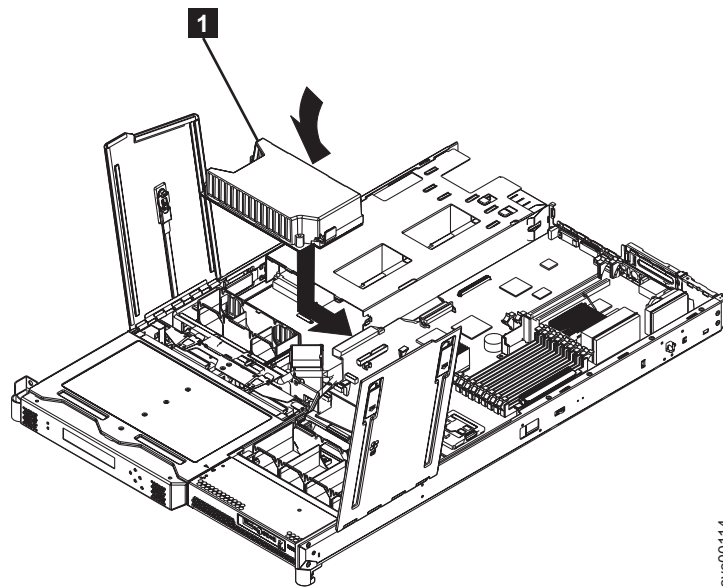


Figure 150. Replacing the power backplane

2. Connect the power supply to the power backplane.
3. Replace the top cover.
4. Place the node into the rack.
5. Connect all power cords and external cables into the back of the node.
6. Turn on the node.

Replacing the frame assembly

The SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 frame assembly must be replaced when the system board fails or when replacing other system board components fails to isolate the error.

Note: If you are replacing the frame assembly after you replaced the service controller, you must ensure that the node can be added back to the cluster. Use the following choices, which are based on the actions that you must take or have already taken, to determine how the node can be added back to the cluster:

- If you are replacing the node because the new service controller did not fix the original problem and you could not update the WWNN of the service controller, use the original service controller when you perform the frame replacement. This ensures that the WWNN is correct.
- If you have already made any required updates to the worldwide node name (WWNN) and the updates are stored in the service controller, continue with the following instructions to replace the frame assembly.
- If you must use a new service controller when you replace the frame assembly, use the following instructions to replace the frame assembly and make sure that you follow the special instructions in step 10 on page 426.

Perform the following steps to replace the frame assembly:

1. Make a note of the seven-character system serial number that is on the serial number label on the front of the node.
For the SAN Volume Controller 2145-8G4, SAN Volume Controller 2145-8F4, and the SAN Volume Controller 2145-8F2 models only: If you cannot read the serial number or if you want to verify that it is correct, you can also find it on the node vital product data (VPD).
Perform the following steps to find the serial number in the VPD:
 - a. Start the SAN Volume Controller application.
 - b. Display the VPD for the failed node.
 - c. Note the system serial number.
2. Remove the SAN Volume Controller from the rack.
3. Remove the top cover.
4. Remove the fibre-channel adapter cards from the frame assembly that you are replacing.
5. Remove the service controller from the frame assembly you are replacing.
6. Install the fibre-channel adapter cards into the new frame assembly.
7. Install the service controller into the new frame assembly.
8. Replace the top cover.
9. Install the SAN Volume Controller in the rack.
10. Start the node using the node rescue procedure.

Note: If you have to install a new service controller in the frame assembly, you must perform the next steps to allow the node rescue to find a suitable donor node.

- a. Start the node. Use your SAN monitoring tools to determine the WWNN of the node.
- b. Rezone the switch to allow at least one port of the replaced node to connect to at least one port of an existing node.
- c. Perform a node rescue.
- d. Set the WWNN of the replacement node to match the node that it replaced.
- e. Rezone the switch to its original settings.
- f. Add the node back into the cluster.
- g. Clearly label the original service controller to indicate that its WWNN has been re-used, and that the part cannot be used without first changing the WWNN.

Note: It is essential that you perform the next steps to restore the original machine serial number. Failure to do this might invalidate the customer's warranty or service agreement.

11. If you are performing this repair as part of a directed maintenance procedure, you will be prompted to type the machine serial number that you noted above. Otherwise, perform the following steps:
 - a. Delete the failed node from the cluster.
 - b. Add the repaired node to the cluster.
 - c. Start the command-line interface.
 - d. Issue the following command:

```
svcservicetask writesernum -sernum nodeserialnumber nodename
```


where *nodeserialnumber* is the number that you noted previously and *nodename* is the name of the repaired node that you added in this step. The `svcservicetask writesernum -sernum nodeserialnumber nodename` command writes the machine serial number to the SAN Volume Controller system board.

Note: The node will restart as soon as the serial number has been written to it.

- e. Write the serial number, noted previously, on the blank serial number label on the front of the node.

Related tasks

“Removing the SAN Volume Controller from a rack” on page 339

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

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Replacing the top cover” on page 368

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

“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.

“Replacing the fibre-channel adapter assembly” on page 433

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

“Removing the service controller” on page 370

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

“Replacing the service controller” on page 378

You can replace the SAN Volume Controller service controller.

“Adding a node to a cluster” on page 10

You might have to add a node into the cluster if it has been removed or rejected by a cluster.

“Using the SAN Volume Controller Console application” on page 4

The SAN Volume Controller Console is a component of the master console software. It can also be installed on any other server that meets the requirements.

“Viewing the vital product data” on page 13

You can view the vital product data for a node from the Viewing Vital Product Data panel.

“Deleting a node from the cluster” on page 9

If it is required, you can delete a node from a cluster.

“Accessing the CLI from the master console” on page 18

If you must enter and run command-line instructions, you can access the SAN Volume Controller command-line interface (CLI) from the master console.

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.

Note: The adapter assemblies are electrostatic-discharge sensitive. Take precautions when removing or replacing them to avoid damage from static electricity.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

Related reference

“Handling static-sensitive devices” on page xliii

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

Removing the SAN Volume Controller 2145-8G4 fibre channel adapter assembly

Perform the following steps to remove the SAN Volume Controller 2145-8G4 fibre channel adapter assembly:

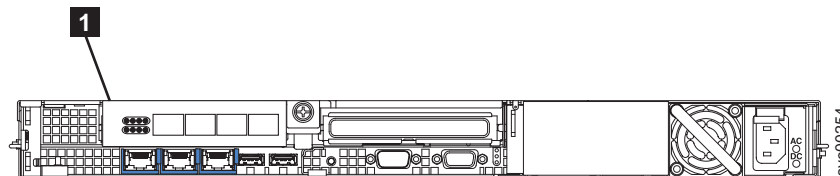


Figure 151. Rear view of the SAN Volume Controller 2145-8G4 with fibre-channel ports indicated

1. Power off the SAN Volume Controller 2145-8G4. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

Attention: When you install an adapter, make sure that the adapter is correctly seated in the connector before you turn on the server. An incorrectly seated adapter might cause damage to the system board, the riser-card assembly, or the adapter.

2. When the power off has fully completed, remove the mains power cable retention bracket and remove the power cable from the rear of the SAN Volume Controller 2145-8G4.
3. After writing down their locations, remove all other cables from the SAN Volume Controller 2145-8G4.
4. Remove the node from the rack.
5. Remove the top cover of the node.

- Grasp the riser-card assembly (**2** in Figure 152) at the rear edge and lift to remove the riser-card assembly.

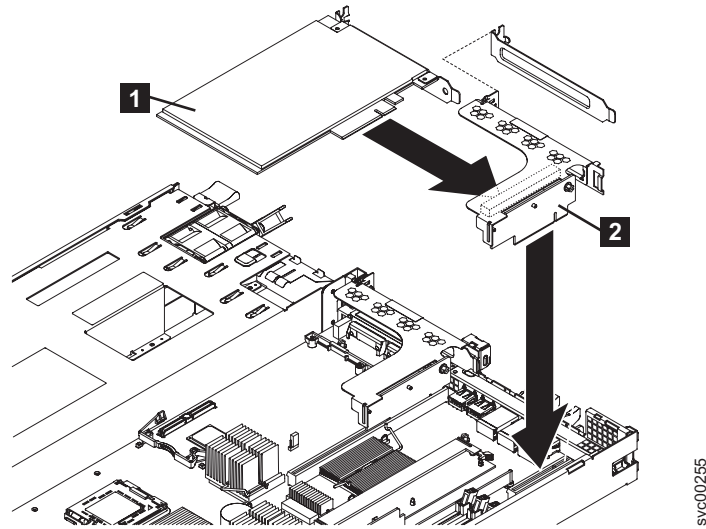


Figure 152. Removing the riser-card assembly from the SAN Volume Controller 2145-8G4

- Place the riser-card assembly on a flat, static-protective surface.
- Carefully grasp the adapter **1** by its top edge or upper corners, and pull the adapter from the riser-card assembly **2**.

Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 adapter assemblies

The SAN Volume Controller 2145-8F2 contains two types of fibre-channel adapters that are functionally identical but not interchangeable. The SAN Volume Controller 2145-8F4 contains a single 4-Port adapter in PCI slot 2.

Figure 153 shows the rear view of the SAN Volume Controller 2145-8F2 with the two fibre-channel ports identified:

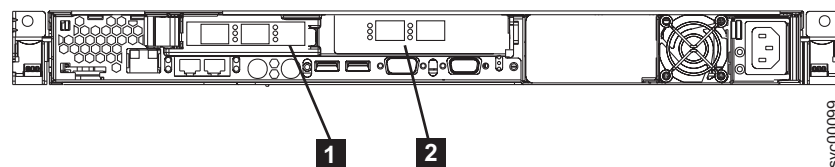


Figure 153. Rear view of the SAN Volume Controller 2145-8F2 with fibre-channel ports indicated

- PCI slot 1 - contains a dual port fibre-channel host bus adapter (HBA) in a low profile
- PCI slot 2 - contains a dual port fibre-channel HBA at full height

Figure 154 on page 430 shows the rear view of the SAN Volume Controller 2145-8F4 with the 4-port fibre-channel HBA identified:

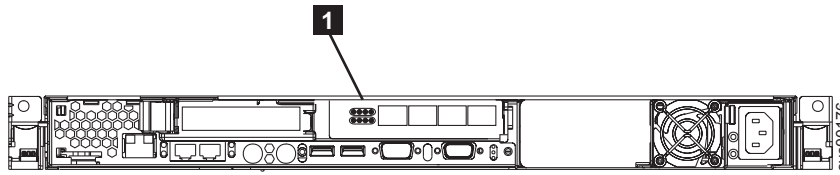


Figure 154. Rear view of the SAN Volume Controller 2145-8F4

- 1** PCI slot 2 - contains a 4-port fibre-channel HBA

Perform the following steps to remove a fibre-channel adapter assembly:

1. Remove all power from the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the node from the rack.
3. Remove the top cover of the node.
4. Perform the following steps to remove the PCI card from PCI slot 1 (low profile):
 - a. Pull the blue PCI card retainer **1** from the rear of the node, shown in Figure 155.

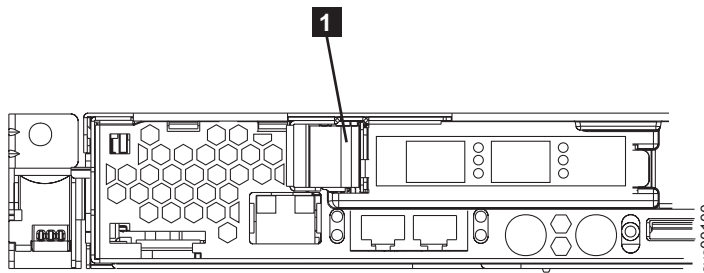


Figure 155. PCI slot 1 card retainer

- 1** Slot 1 card retainer

- b. Hold the blue adapter support away from the card and pull it away from the edge connector on the riser card assembly, as shown in Figure 156 on page 431.

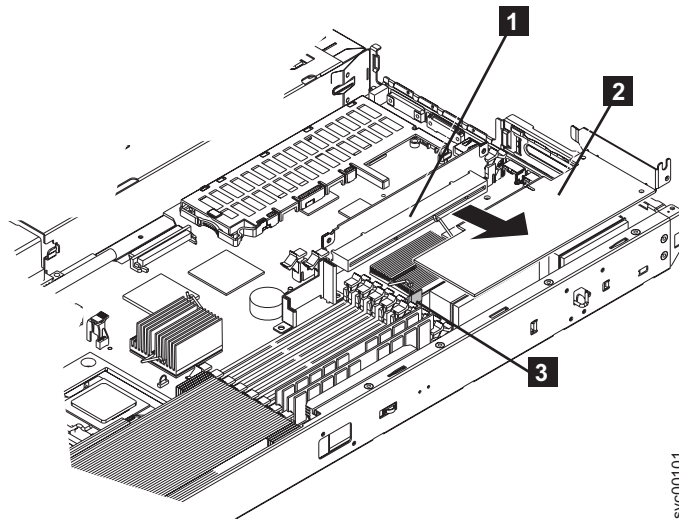


Figure 156. SAN Volume Controller 2145-8F2 riser card and low profile adapter

- 1** Riser card
- 2** Low-profile adapter
- 3** Low-profile adapter support

5. Perform the following steps to remove the PCI card from PCI slot 2:
 - a. Open the retaining clips on both sides of the slot 2 riser card (**2** in Figure 157) by pushing the clips down and away from the riser card until the clips are no longer attached to the riser card.

Note: Insert your finger into the access hole on the slot 2 adapter cover to open the retention latch at the rear of the node.

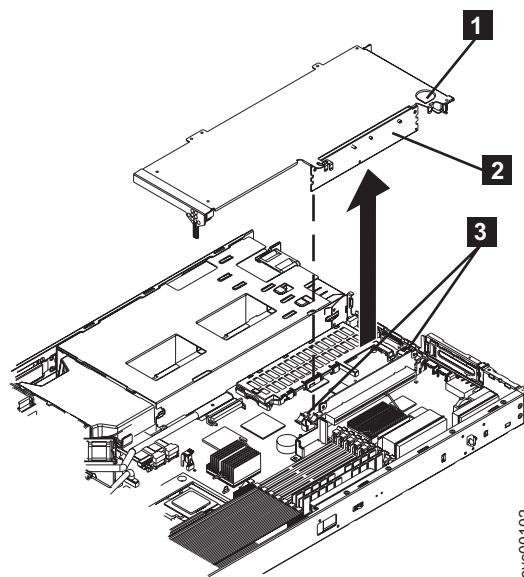


Figure 157. SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 slot 2 adapter

- 1** Access hole to retention latch
 - 2** Riser card
 - 3** Riser card retention latches
- b. Unlatch the PCI slot 2 riser card **2** and pull it clear of the system board edge connector.
 - c. Lift the riser card clear of the frame and pull the fibre-channel card from the riser card edge connector.

Removing a SAN Volume Controller 2145-4F2 adapter

Perform the following steps to remove an adapter:

1. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the SAN Volume Controller 2145-4F2 from the rack.
3. Remove the top cover from the SAN Volume Controller 2145-4F2.
4. For the adapter that you are going to remove, press the sides of the expansion-slot clip (**3** or **4** in Figure 158) together to unlock the clip, and then pivot the expansion-slot clip away from the adapter. The expansion-slot clip remains loosely attached to the SAN Volume Controller 2145-4F2.

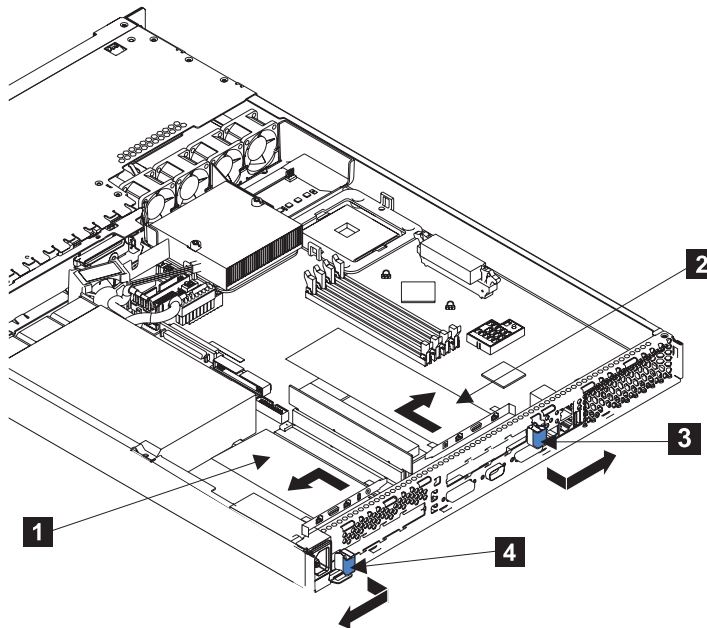


Figure 158. SAN Volume Controller 2145-4F2 before removing an adapter

- 1** Adapter 1
- 2** Adapter 2
- 3** Adapter 2 expansion-slot clip
- 4** Adapter 1 expansion-slot clip

Attention: Do not touch the components and gold-edge connectors of the adapter.

5. Unplug the adapter (**1** or **2**) from the connector.

6. Remove the adapter from the SAN Volume Controller 2145-4F2.

Replacing the fibre-channel adapter assembly

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

Related tasks

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Removing the fibre-channel adapter assembly” on page 427

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

Related reference

“Handling static-sensitive devices” on page xliii

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

Replacing the SAN Volume Controller 2145-8G4 fibre channel adapter assembly

Perform the following steps to replace the SAN Volume Controller 2145-8G4 fibre channel adapter assembly:

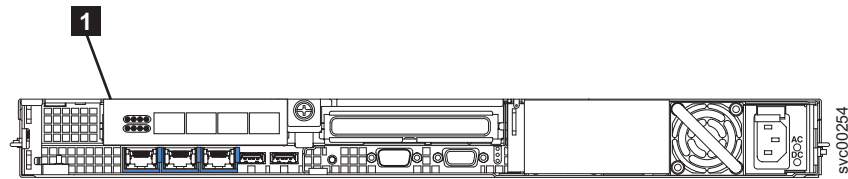


Figure 159. Rear view of the SAN Volume Controller 2145-8G4 with fibre-channel ports indicated

1. As you start inserting the adapter, align the edge connector on the low-profile adapter **1** with the connector **3** on the riser-card assembly. **4** Make sure that the adapter snaps into the riser-card securely. Press the riser-card edge connector firmly into the system-board connector. **5**

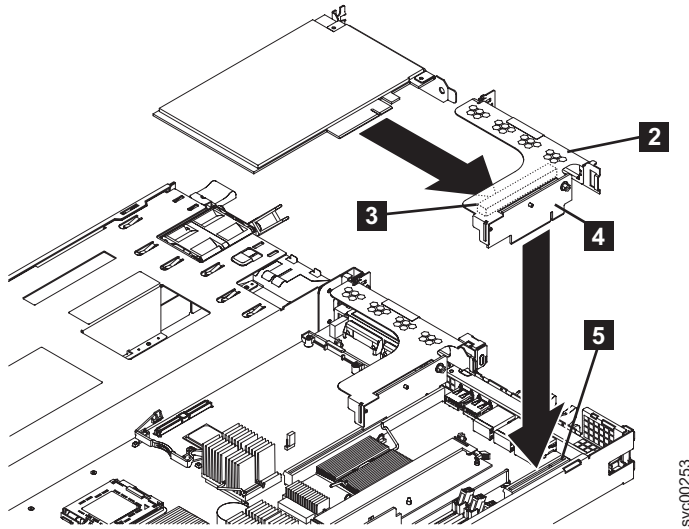


Figure 160. Replacing the riser-card assembly for the SAN Volume Controller 2145-8G4

- 1** Fibre-channel adapter
- 2** Adapter support bracket
- 3** Riser-card-adaptor connector
- 4** Riser-card assembly
- 5** System-board-riser-card connector

2. Replace the top cover of the node.
3. Replace the node in the rack.
4. Replace the cables that were removed from the node, and make sure that you replace the fibre-channel cables in the same ports from which they were removed.
5. Replace the power cable in the node and replace the power cable retention bracket.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 adapter assemblies

Note: The adapter assemblies are electrostatic-discharge sensitive. Take precautions when removing or replacing them to avoid damage from static electricity.

Perform the following steps to install the fibre-channel card into the riser-card assembly:

1. Install the fibre-channel card in slot 1. See Figure 161 on page 435.

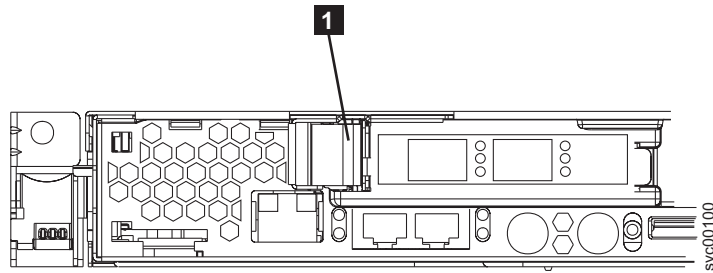


Figure 161. PCI slot 1 card retainer

- a. Slide the I/O connector portion of the adapter through the slot 1 opening and align the edge connector on the low-profile adapter with the connector on the riser card. Press the edge connector firmly into the riser-card connector. Make sure that the adapter snaps into the riser card securely and the adapter is lying on top of the low-profile adapter support.
 - b. Push the adapter down past the tab so that the adapter snaps into place on the support.
 - c. Check the retention latches on the riser card and make sure that they are still securely in place.
 - d. Close the fibre-channel card retainer to secure the card.
2. Install the fibre-channel card in slot 2.
 - a. Align the edge connector on the fibre-channel adapter with the connector on the riser card. Press the edge connector firmly into the riser-card connector. The card is fully installed when the gold connectors on the edge of the fibre-channel cards are no longer visible.
 - b. Grasp the riser card assembly by its top edge or upper corners and align the riser card with the guides for the riser-card connector.
 - c. Press the riser card edge connector firmly into the slot 2 riser-card edge connector on the system board. Make sure that the retention latches snap into place to secure the riser card into the slot 2 riser-card connector.
 3. Replace the top cover of the node.
 4. Replace the node in the rack.

Replacing a SAN Volume Controller 2145-4F2 adapter

Attention: Do not touch the components and gold-edge connectors of the adapter. When you install the adapter, ensure that it is correctly seated in the connector before you turn on the SAN Volume Controller 2145-4F2. Incorrectly-seated adapters might cause damage to the system board, the riser card for slot 1, or the adapter.

Perform the following steps to replace an adapter assembly:

1. If you are installing a new adapter, remove it from its static-protective package.
2. Hold the adapter by its top edge or upper corners and align it with the connector. Support the riser card and press the adapter fully into the connector.
3. Pivot the expansion-slot clip (**3** or **4** in Figure 162 on page 436) toward the adapter and press it into place.

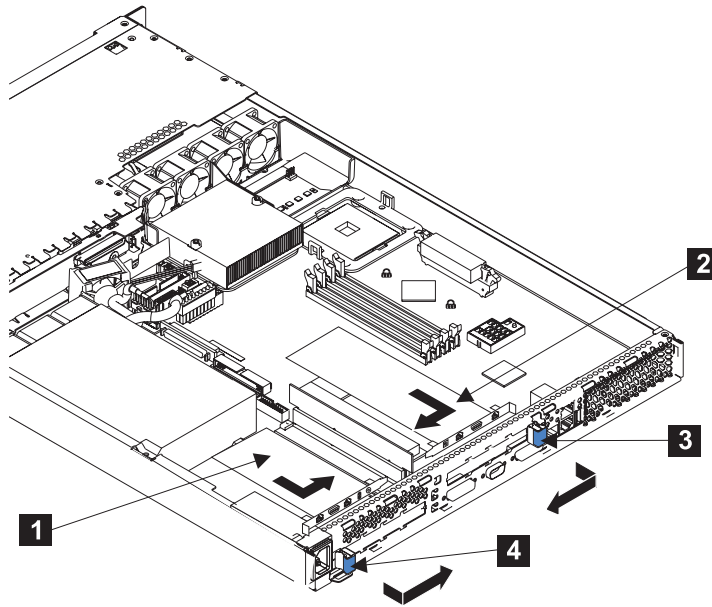


Figure 162. The SAN Volume Controller 2145-4F2 with its adapters installed

- 1 Adapter 1
- 2 Adapter 2
- 3 Adapter 2 expansion-slot clip
- 4 Adapter 1 expansion-slot clip

Removing the SAN Volume Controller 2145-8G4 PCI express riser card assembly

Use these instructions when you are prompted to remove the SAN Volume Controller 2145-8G4 PCI express riser card assembly.

Note: The adapter assemblies are electrostatic-discharge sensitive. Take precautions when removing or replacing them to avoid damage from static electricity.

To remove the SAN Volume Controller 2145-8G4 PCI express riser card assembly, follow the instructions in “Removing the SAN Volume Controller 2145-8G4 fibre channel adapter assembly” on page 428.

Replacing the SAN Volume Controller 2145-8G4 PCI express riser card assembly

Use these instructions when you are prompted to replace the SAN Volume Controller 2145-8G4 PCI express riser card assembly.

Follow the instructions in “Replacing the SAN Volume Controller 2145-8G4 fibre channel adapter assembly” on page 433.

Removing the operator information panel assembly

You might be prompted to remove the SAN Volume Controller operator information panel.

Ensure that you are aware of how to handle static-sensitive devices.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Replacing the top cover” on page 368

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

Related reference

“Handling static-sensitive devices” on page xliii

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

Removing the SAN Volume Controller 2145-8G4 operator information panel assembly

You might have to replace the operator information panel assembly on a SAN Volume Controller 2145-8G4 due to required maintenance.

Make careful note of the layout of the cables as you go through this procedure as they will need replacing in the same position when you replace the operator information panel assembly.

1. Power off the node and remove it from the rack. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the cover and open the fan door. See “Removing the top cover” on page 364.
3. Release the dummy CD/DVD drive **2** by pressing the release button **1** and sliding the drive out approximately 2 cm (1 in), as shown in Figure 163. It is possible to push the drive from the back to start it moving. Do not remove the drive from the casing.

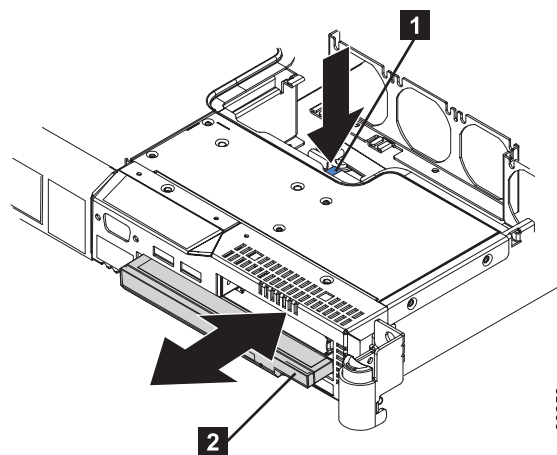


Figure 163. Releasing and sliding out the dummy CD/DVD drive

- 1** Release button
- 2** Dummy CD/DVD drive

4. Remove the CD interposer card (**2** in Figure 164) by unscrewing it, lifting it slightly and then removing the cable from it.

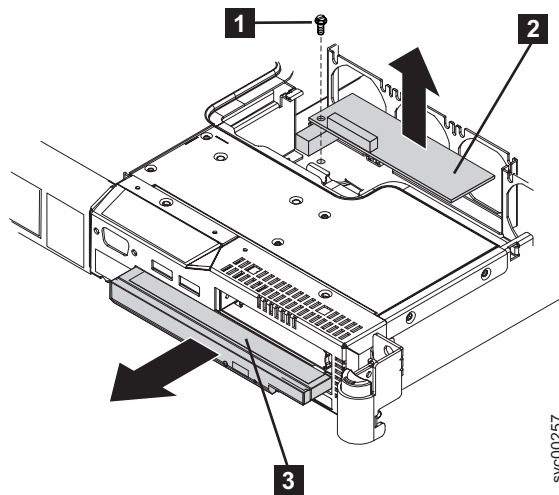
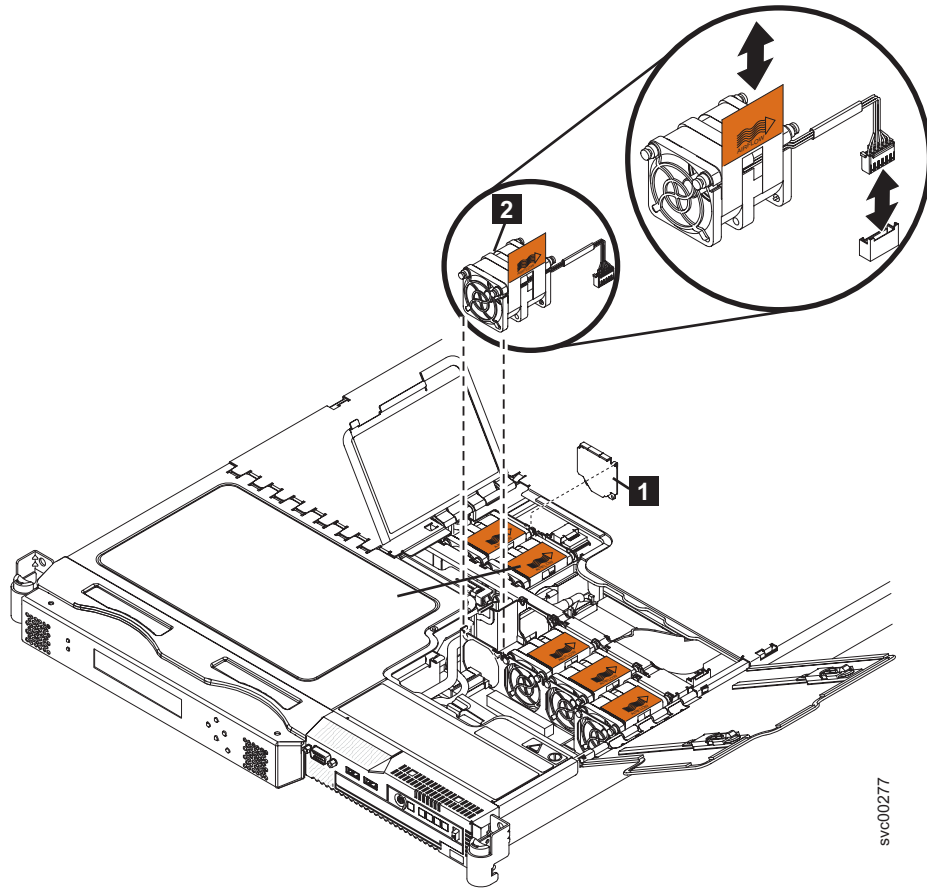


Figure 164. Removing the CD interposer card

- 1** Screw
- 2** Interposer card
- 3** Dummy CD/DVD drive

5. Remove fan 3, as shown in Figure 165 on page 439.



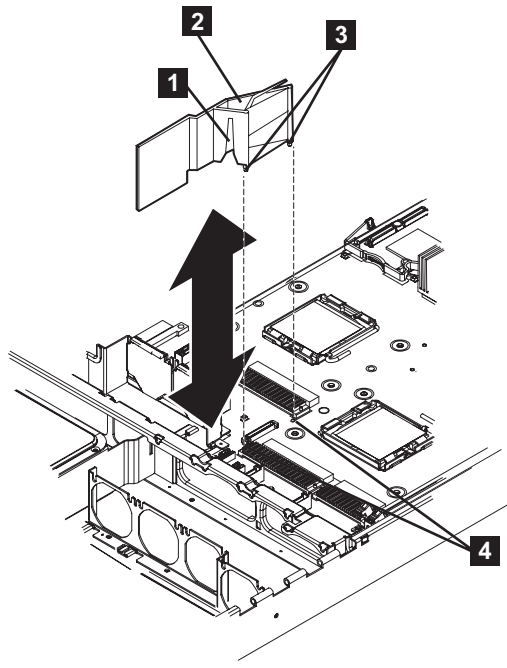
svc00277

Figure 165. Removing fan 3

1 Air baffle

2 Fan 3

6. Remove the air baffle (**2** in Figure 166 on page 440).



svc00250

Figure 166. Removing the air baffle

- 1** Cable routing slot
- 2** Air baffle
- 3** Baffle pins
- 4** Baffle mounting holes

7. Unplug the video cable **8**, the USB cable **7** and the CD/DVD cable **9** from the system board. There is no need to completely remove these cables. Unplugging them makes it easier to maneuver the light path ribbon cable **4**. In Figure 167 on page 441, the front of the node is at the bottom of the illustration.

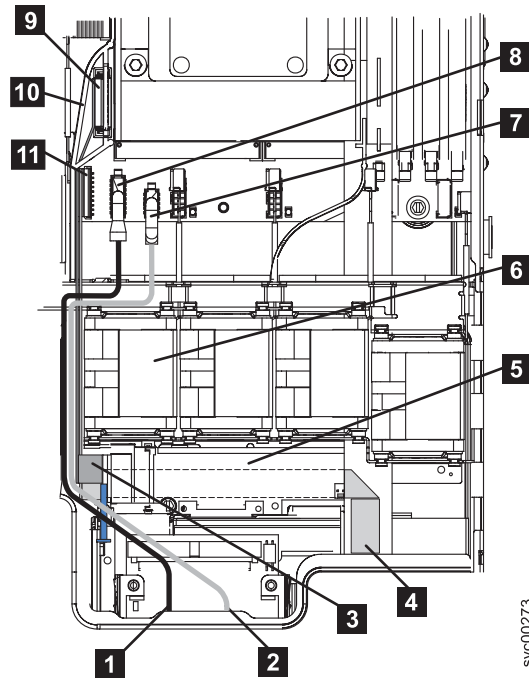


Figure 167. Unplugging the video, USB, and the CD/DVD cables

- 1** Video cable
- 2** USB cable
- 3** CD-RW cable
- 4** Lightpath cable
- 5** Interposer card
- 6** Fan 3
- 7** USB cable connector
- 8** Video cable connector
- 9** CD-RW connector
- 10** Air baffle
- 11** Lightpath cable connector

8. Unplug the light path ribbon cable **4** from the system board connector **11** and completely unthread the cable removing it from the three retaining brackets. Also release it from any tape holding it in place. The cable should be free to move forward with the light path assembly.
9. Release the light path assembly **2**, using the release button (**1** in Figure 168 on page 442) on the front, and pull forward until it locks in place.

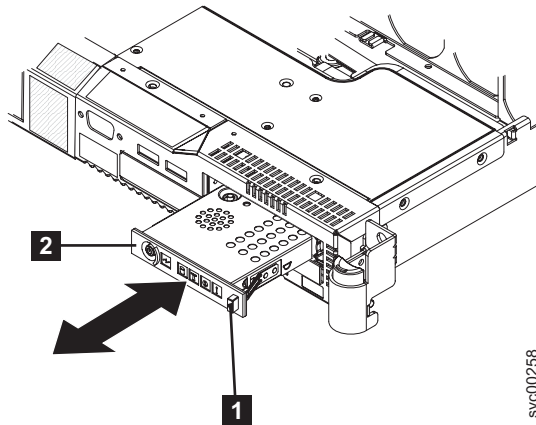


Figure 168. Releasing the light path assembly

10. Press the two release buttons (2 in Figure 169) that are visible through the top of the node and pull the light path assembly (3) completely out of the node. Carefully pull the ribbon cable (1) through after the light path assembly.

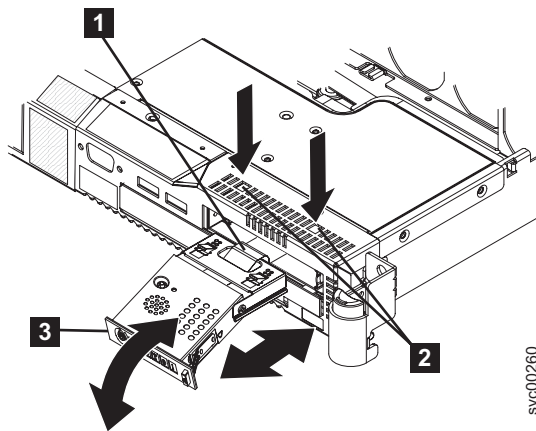


Figure 169. Removing the light path assembly

Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 operator information panel

You might have to replace the operator panel on a SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 due to required maintenance.

Perform the following steps to remove the operator information panel:

1. Turn off the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Disconnect all power cords and external cables from the back of the server.
3. Remove the top cover. If necessary, you might have to remove the node from the rack.
4. Press the operator panel release latch (2 in Figure 170 on page 443) and slide the operator information panel away from the SAN Volume Controller 2145-8F2.

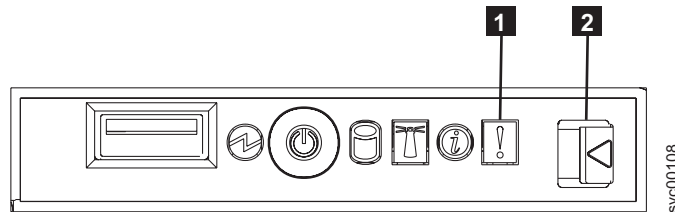


Figure 170. Operator information panel

5. Use a small screwdriver to push in the retention springs (**1** in Figure 171) on the sides of the operator information panel assembly.

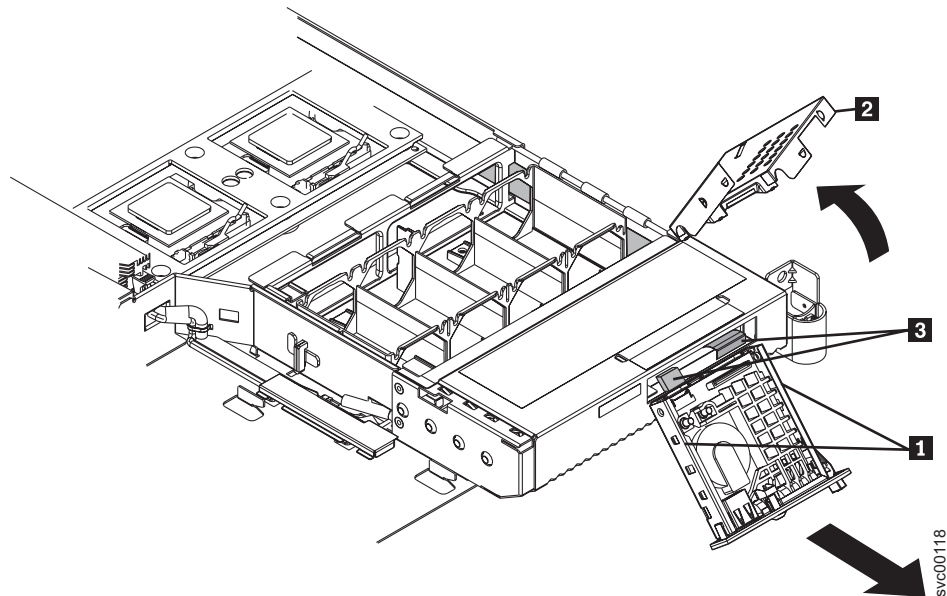


Figure 171. SAN Volume Controller 2145-8F2 with exposed operator information panel

- 1** Retention springs
- 2** Operator information panel assembly cover
- 3** Cables

6. Slide the assembly forward and out of the node.
7. Push out on the two sides of the assembly cover to flare it out.
8. Rotate the assembly cover (**2** in Figure 171) up and off of the operator information panel assembly.
9. Unplug the two cables from the rear of the assembly (**3** in Figure 171).

Replacing the operator information panel assembly

You might be prompted to replace the SAN Volume Controller operator information panel assembly.

Ensure that you are aware of how to handle static-sensitive devices.

Related tasks

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Replacing the top cover” on page 368

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

Related reference

“Handling static-sensitive devices” on page xliii

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

Replacing the SAN Volume Controller 2145-8G4 operator information panel assembly

You might have to replace the operator panel on a SAN Volume Controller 2145-8G4 due to required maintenance.

Perform the following steps to replace the operator information panel:

1. Thread the light path assembly ribbon cable into the light path assembly cage and out through the back of it.
2. Slide the light path assembly back into its cage until it locks in place (in the In position); gently pull the cable through at the back as you do this.

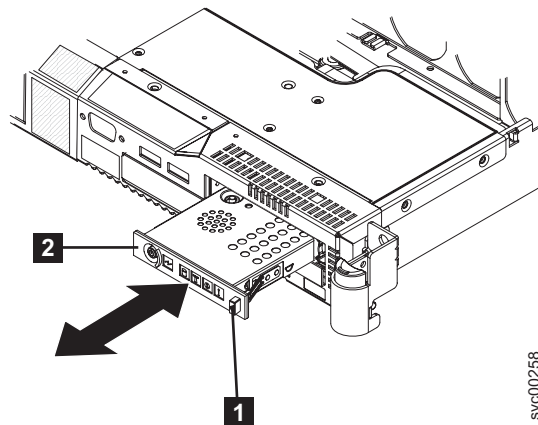


Figure 172. Installing the light path assembly

- 1 Release button
- 2 Light path assembly
3. Carefully thread the light path assembly ribbon cable **4** back under its retaining brackets and replace the tape securing it in place.
4. Thread the light path assembly ribbon cable **4** back to the system board. Reconnect the cable to the system board socket **11**. In Figure 173 on page 445, the front of the node is shown at the bottom of the illustration. The connectors on the cable plug go towards the center of the node and the blue side is towards the outside of the node.

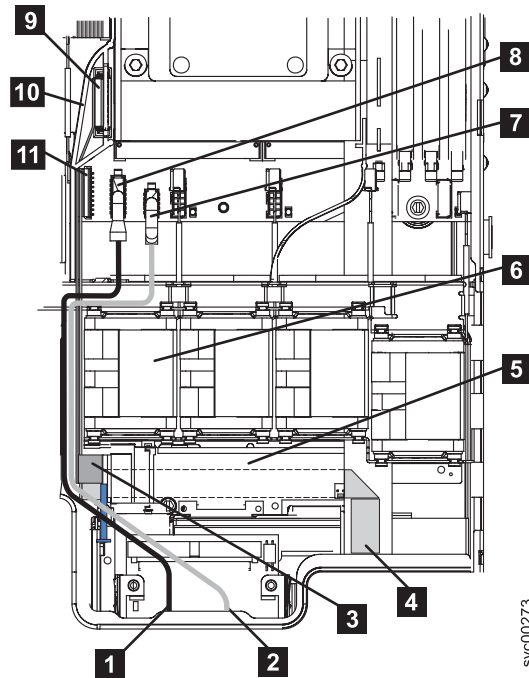
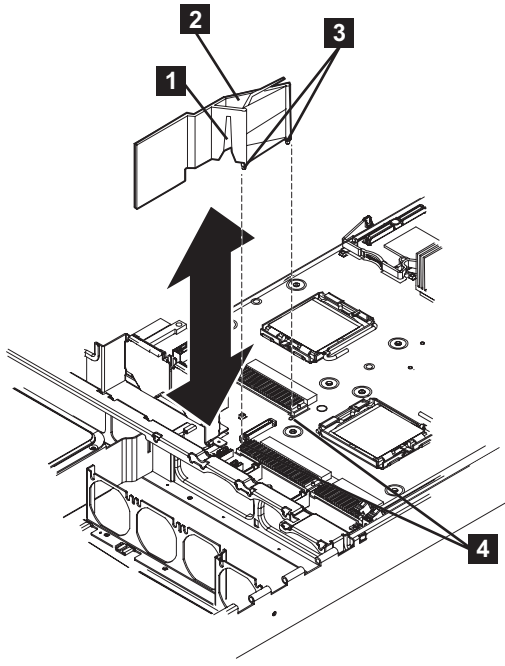


Figure 173. Threading the video, USB, and the CD/DVD cables

- 1** Video cable
- 2** USB cable
- 3** CD-RW cable
- 4** Lightpath cable
- 5** Interposer card
- 6** Fan 3
- 7** USB cable connector
- 8** Video cable connector
- 9** CD-RW connector
- 10** Air baffle
- 11** Lightpath cable connector

5. Reconnect the video cable **8**, the USB cable **7** and the CD/DVD cable **9** to the system board.
6. Replace the air baffle **2**. It is easier to do this if you remove fan 2. Ensure that all the cables are routed correctly and not obstructing the fan doors.

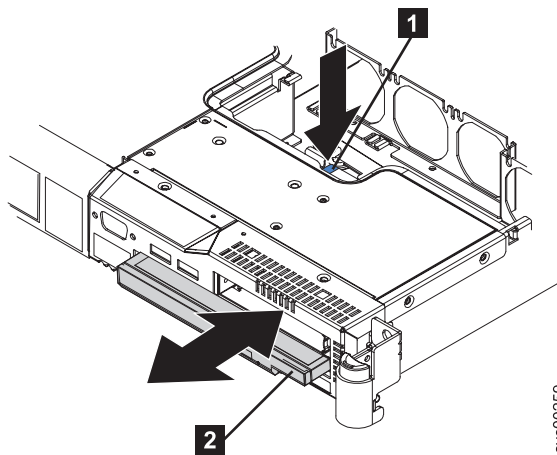


svc00250

Figure 174. Replacing the air baffle

- 1** Cable routing slot
- 2** Air baffle
- 3** Baffle pins
- 4** Baffle mounting holes

7. Reconnect the CD cable to the interposer card, locating the pins on the right hand side; then, mount the card to the server with the screw that you removed.
8. Push the dummy CD/DVD drive **2** back into its enclosure.



svc00259

Figure 175. Replacing the dummy CD/DVD drive

- 1** Release button
- 2** Dummy CD/DVD drive

9. Replace fan 3.

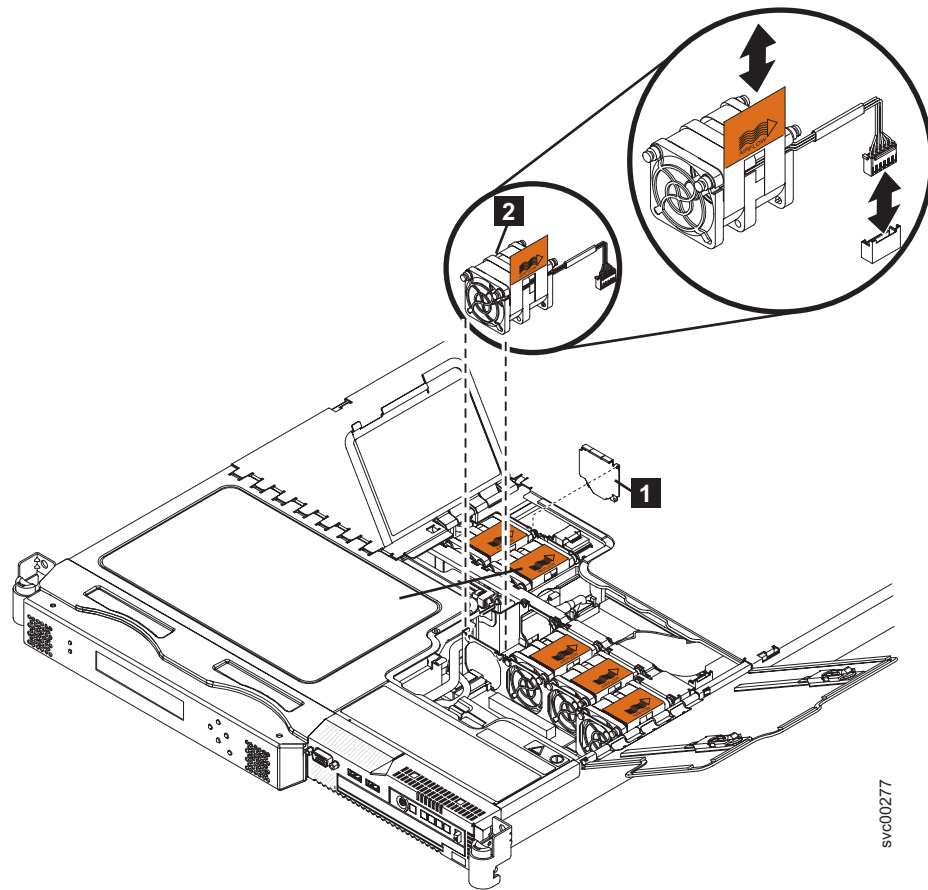


Figure 176. Replacing fan 3

1 Air baffle

2 Fan 3

10. Ensure that the fan door still closes; realign the cable if it does not.
11. Reopen the fan door and replace the cover; close all doors.
12. Replace the node in the rack, reconnect all cables, and power on the node.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 operator information panel

You might have to replace the operator panel on a SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 due to required maintenance.

Perform the following steps to replace the operator information panel:

1. Plug in the two cables on the rear of the assembly **1**. See Figure 177 on page 448.

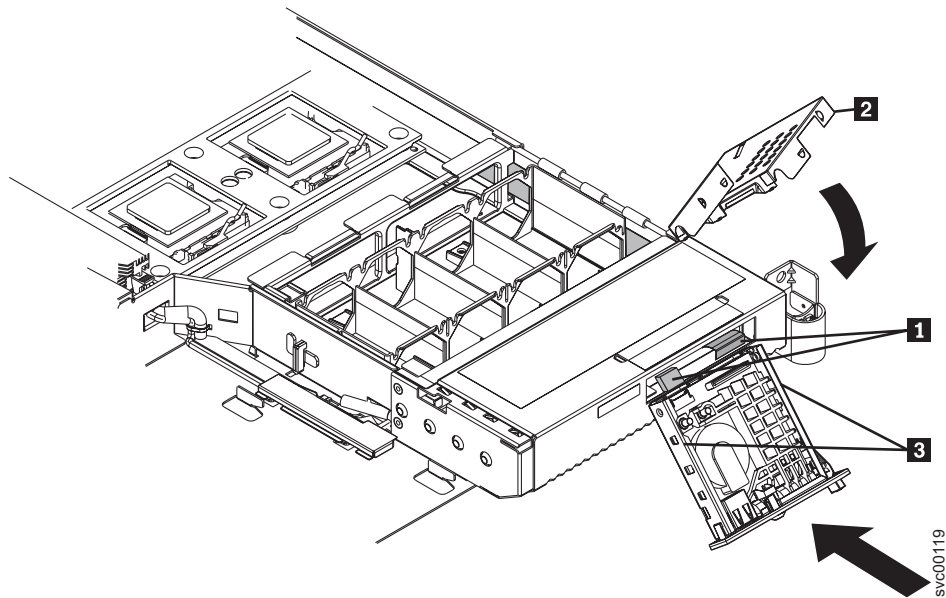


Figure 177. Replacing the operator information panel

- 1** Cables
- 2** Operator information panel assembly cover

2. Replace the assembly cover **2** onto the operator information panel assembly.
3. Slide the assembly into the node until it is firmly anchored.
4. Replace the top cover and replace the node in the rack, if necessary.
5. Connect all power cords and external cables to the back of the server.
6. Power on the node.

Removing the fans

The SAN Volume Controller fans might have to be replaced due to failure.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Replacing the fans” on page 452

The SAN Volume Controller fans might have to be replaced due to failure.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Replacing the top cover” on page 368

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

“Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 VRM” on page 464

You might remove the voltage regulator module (VRM) to perform maintenance on the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

Related reference

“Handling static-sensitive devices” on page xliii

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

Removing the SAN Volume Controller 2145-8G4 fans

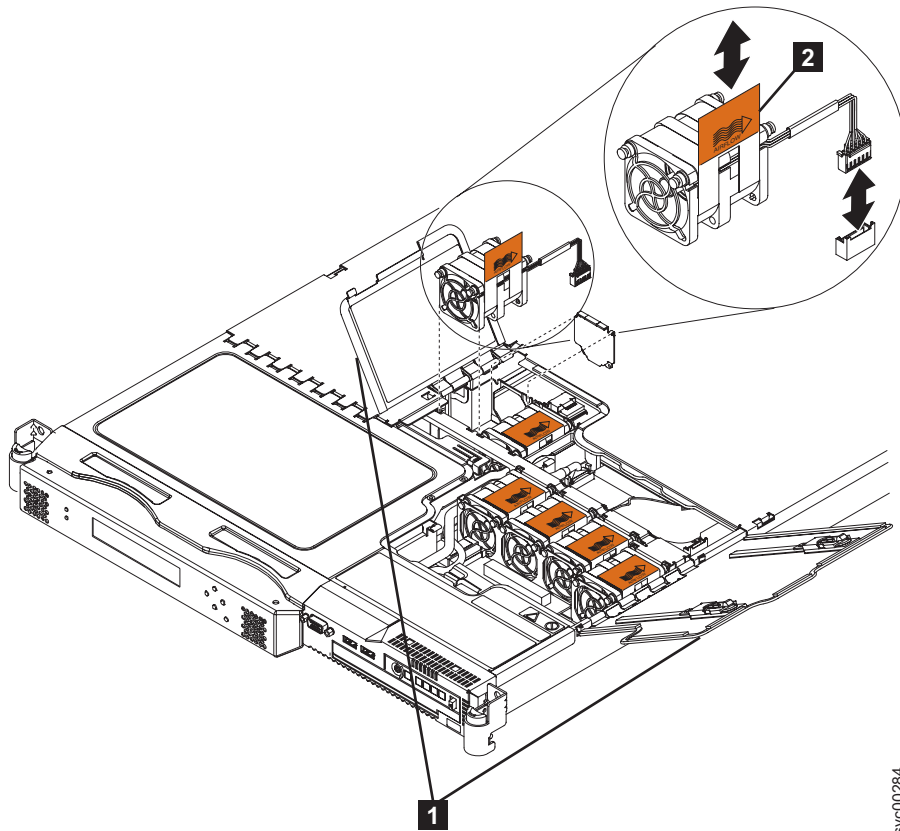
This topic describes how to remove the SAN Volume Controller 2145-8G4 fans.

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the SAN Volume Controller 2145-8G4 fans.

Perform the following steps to remove a failed fan:

1. Power off the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Slide the node forward to gain access to the fan doors (1 in Figure 178 on page 450).
3. Open the fan door for the failing fan. The LED near the connector of the failing fan assembly is lit, unless you remove the power cable.

Note: The node has six fan positions that are numbered left to right under the two fan doors.



svc00284

Figure 178. SAN Volume Controller 2145-8G4 fan doors, locations, and connectors

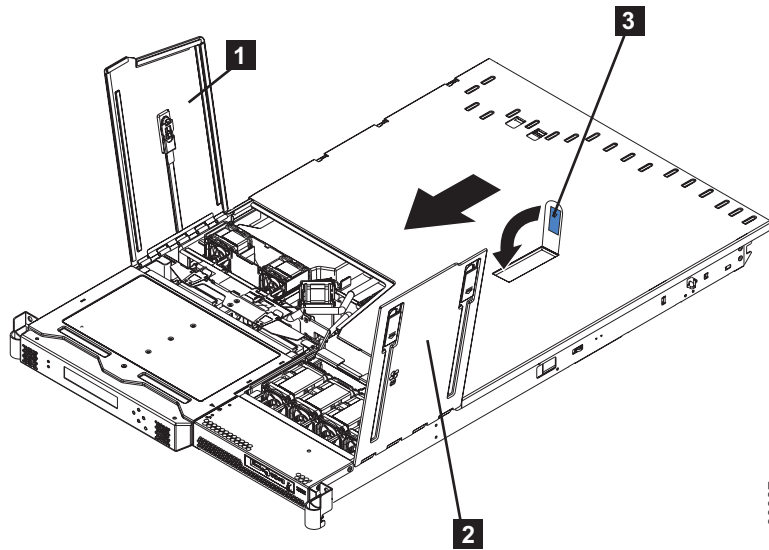
4. Disconnect the cable of the failing fan from the connector on the system board by pressing the release latch on the plug at the end of the cable.
5. Pull up on the orange tab (2 in Figure 178) of the failing fan to lift the fan out of the node.

Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 fans

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fans.

Perform the following steps to remove a failed fan:

1. Remove all power from the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the node from the rack.
3. Open the fan door where the failed fan resides. Fans 1, 2, and 3 are under fan door A 1. Fans 4 through 7 are under fan door B 2, as shown in Figure 179 on page 451.



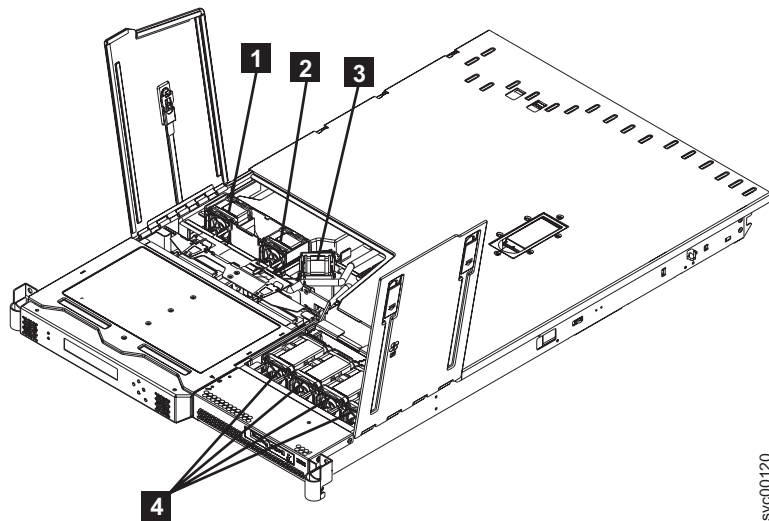
svc00087

Figure 179. SAN Volume Controller 2145-8F2 with open fan doors

1 Fan door A

2 Fan door B

4. Disconnect the cable of the failing fan from the connector.



svc00120

Figure 180. SAN Volume Controller 2145-8F2 with open fan doors

1 Fan 1

2 Fan 2

3 Fan 3

4 Fans 4, 5, 6, and 7

5. Pull up on the orange tab on the side of the failing fan.

6. Lift the fan out of the node.

You can now replace the failed fan.

Removing the SAN Volume Controller 2145-4F2 microprocessor fan

Perform the following steps to remove the microprocessor fan:

1. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the SAN Volume Controller 2145-4F2 from the rack.
3. Remove the top cover from the SAN Volume Controller 2145-4F2.
4. Disconnect the fan cable from the system board.

Note: The fans are numbered from one to four, from left to right. See Figure 181.

5. Lift the fan upward out of the retaining clip.

Note: To remove the fourth fan, first remove the third fan, then move the fourth fan to the left before lifting it.

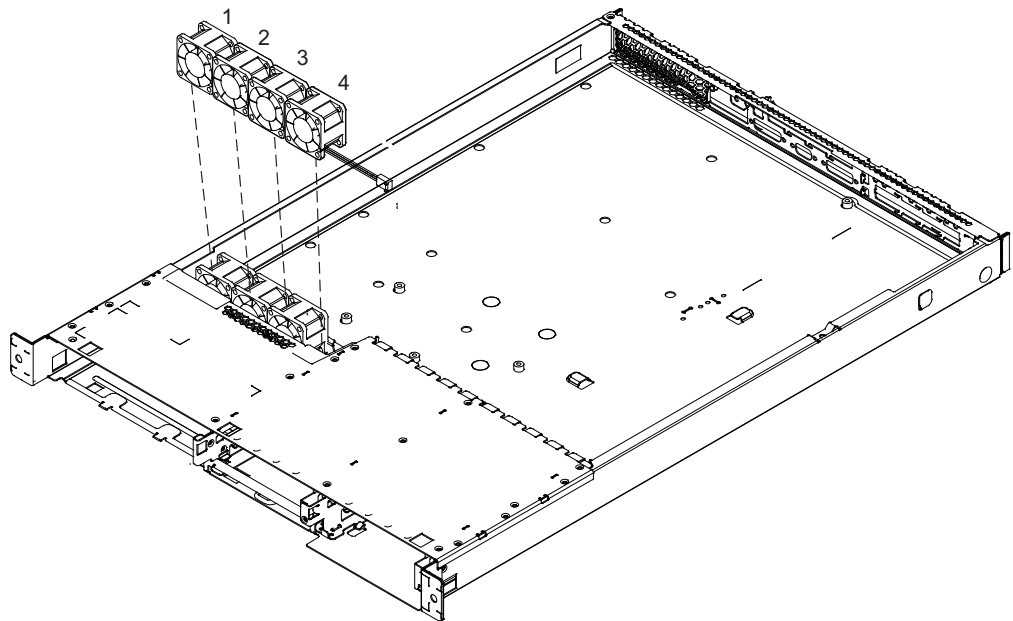


Figure 181. Removing a microprocessor fan

6. If you have any other tasks to do inside the SAN Volume Controller 2145-4F2, do those tasks now.

Replacing the fans

The SAN Volume Controller fans might have to be replaced due to failure.

Related tasks

“Removing the fans” on page 448

The SAN Volume Controller fans might have to be replaced due to failure.

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Replacing the top cover” on page 368

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

Related reference

“Handling static-sensitive devices” on page xliii

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

Replacing the SAN Volume Controller 2145-8G4 fans

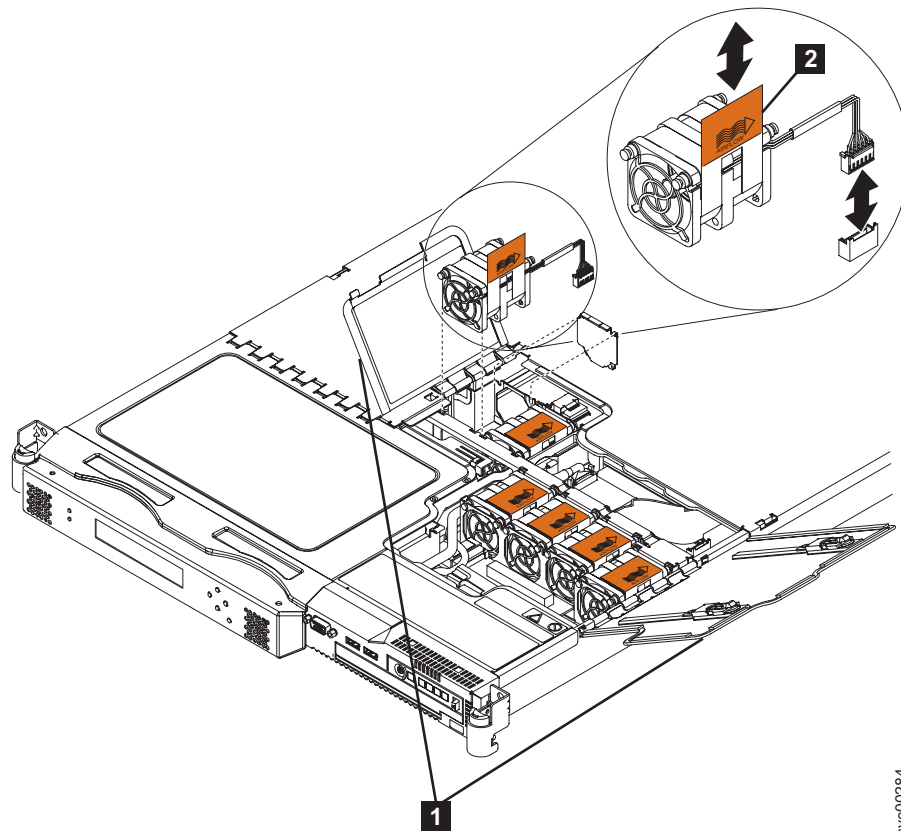
This topic describes how to replace the SAN Volume Controller 2145-8G4 fans.

Ensure that you are aware of the procedures for handling static-sensitive devices before you replace the SAN Volume Controller 2145-8G4 fans. The replacement procedures in this topic assume that the following are true:

- The failed fan is removed
- The node power is turned off
- The node is removed from the rack

Perform the following steps to replace a failed fan:

1. Orient the new fan in the same position as the fan that you removed. Make sure that the airflow indicator on the orange tab, **2** is pointing to the rear of the node.



svc00284

2. Push the fan assembly down into the server until the blue mounting grommets are correctly seated.
3. Connect the cable of the replacement fan into the system board connector.
4. Close the fan door. **1**
5. Replace the node in the rack.
6. Restore power to the node.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fans

Ensure that you are aware of the procedures for handling static-sensitive devices before you replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fans. The replacement procedures in this topic assume that the following are true:

- The failed fan is removed
- The node power is turned off
- The node is removed from the rack

Perform the following steps to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fans:

1. Orient the new fan in the same position as the fan you removed. Make sure that the airflow indicator, on top of the fan, is pointing to the rear of the server.
2. Push the fan assembly down into the server until the blue grommets are correctly seated.
3. Connect the cable of the replacement fan into the connector.
4. Close the fan door.
5. Replace the top cover.
6. Return the node to the rack.
7. Reconnect the cables and power cords.
8. Restore power to the node.

Replacing the SAN Volume Controller 2145-4F2 microprocessor fan fans

Note:

- The airflow is from the front to the back of the SAN Volume Controller 2145-4F2.
- The fan cable comes out of the back of the fan. When you install the fan, ensure that the back of the fan is facing the back of the SAN Volume Controller 2145-4F2.
- If you are installing a microprocessor fan, orient the fan in the retaining clip so that the cable can reach the connector on the system board.

Perform the following steps to remove the microprocessor fan:

1. Push the fan downward into the retaining clip. See Figure 182 on page 455.

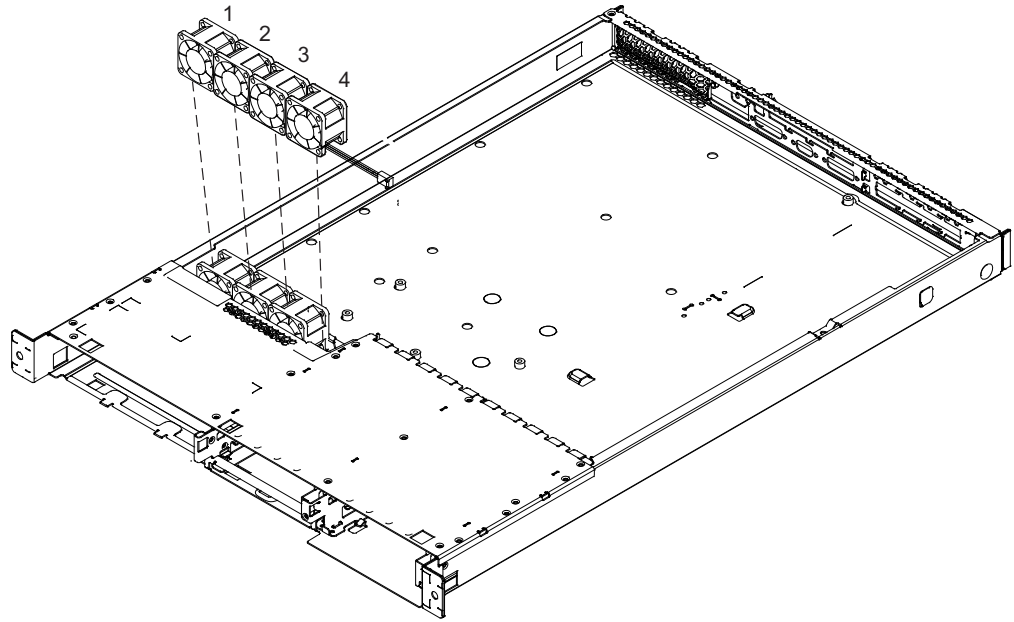


Figure 182. Replacing a microprocessor fan

2. Connect the fan cable to the system board.

Note: The fans are numbered from one to four, from left to right. See Figure 182.

3. Replace the top cover to the SAN Volume Controller 2145-4F2.
4. Place the SAN Volume Controller 2145-4F2 in the rack.
5. Power up the SAN Volume Controller 2145-4F2.

Removing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fan holder and fan backplanes

The fan holder with fan backplanes field replaceable unit (FRU) is supplied as a kit of parts. Replace only the failed assembly and discard any unused part.

Perform the following steps to remove the fan holder with fan backplane:

1. Turn off the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Disconnect all power cords and external cables from the back of the node.
3. Remove the node from the rack.
4. Remove the top cover.
5. Unplug the fans from the fan backplane.
6. Remove the screws and set them in a safe place.
7. Disconnect the fan cable.
8. Pull the fan bracket out of the node.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the SAN Volume Controller from a rack” on page 339
During some service procedures, you might need to remove the SAN Volume Controller from the rack.

“Removing the top cover” on page 364
You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

Related reference

“Handling static-sensitive devices” on page xliii
Ensure that you understand how to handle devices that are sensitive to static electricity.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 fan holder and fan backplanes

The fan holder with fan backplanes field replaceable unit (FRU) is supplied as a kit of parts. Replace only the failed assembly and discard any unused part.

Perform the following steps to replace the fan holder with fan backplane:

1. Place the fan bracket into the node.
2. Connect the fan cable.
3. Replace the screws that you had set aside.
4. Plug the fans into the fan backplane.
5. Replace the top cover.
6. Replace the node in the rack.
7. Connect all power cords and external cables into the back of the node.
8. Turn on the node.

Tip: When reinstalling the fan brackets on the front right side of the node, remove the cage assembly that holds the disk drive and service controller and remove the fan cable cover. Pull the cable loose before plugging it into the fan backplane, then install the fan holder and backplane assembly in the node.

Related tasks

“Replacing the top cover” on page 368
You must replace the top cover on the SAN Volume Controller after maintenance is completed.

“Replacing the SAN Volume Controller in a rack” on page 346
You must use caution when you replace the SAN Volume Controller in a rack.

Related reference

“Handling static-sensitive devices” on page xliii
Ensure that you understand how to handle devices that are sensitive to static electricity.

Removing the microprocessor

Before you remove the microprocessor, ensure that you are aware of handling static-sensitive devices.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the SAN Volume Controller from a rack” on page 339
During some service procedures, you might need to remove the SAN Volume Controller from the rack.

“Removing the top cover” on page 364
You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 VRM” on page 464
You might remove the voltage regulator module (VRM) to perform maintenance on the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4.

“Replacing the microprocessor” on page 460
Use this topic when you are required to replace a microprocessor.

Related reference

“Handling static-sensitive devices” on page xliii
Ensure that you understand how to handle devices that are sensitive to static electricity.

Removing the SAN Volume Controller 2145-8G4 microprocessor

Attention:

- Do not allow 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:

1. Power off the node and disconnect the power cord. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the cover. See “Removing the top cover” on page 364.
3. Remove the heat sink (**1** in Figure 183 on page 458). Loosen two captive screws on alternate sides of the heat sink fully before loosening the other two captive screws. (This helps to break the bond between the heat sink and the microprocessor.) After the captive screws are loosened, remove the heat sink.

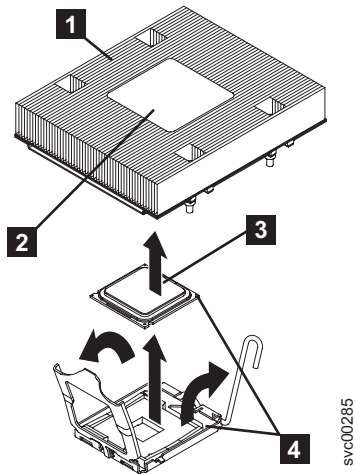


Figure 183. Removing the heat sink from the microprocessor

- 1** Heat sink
- 2** Heat sink installation label
- 3** Microprocessor
- 4** Alignment indicator

4. Open the microprocessor release lever (**1** in Figure 184) to the fully open position.

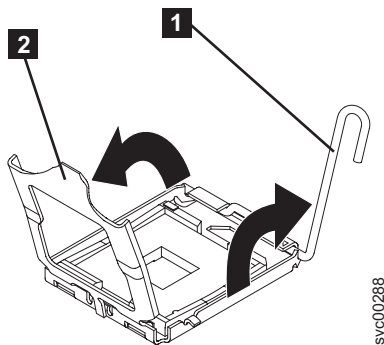


Figure 184. The microprocessor release lever and bracket frame fully opened

- 1** Microprocessor release lever
- 2** Microprocessor bracket frame

5. Open the microprocessor bracket frame (**2** in Figure 184).
6. Carefully remove the microprocessor from the socket. Be careful to only touch the edges of the microprocessor.
7. 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 SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 microprocessor

The SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 must always be fitted with both microprocessors to function correctly.

Figure 185 shows the microprocessors and voltage regulator modules (VRMs).

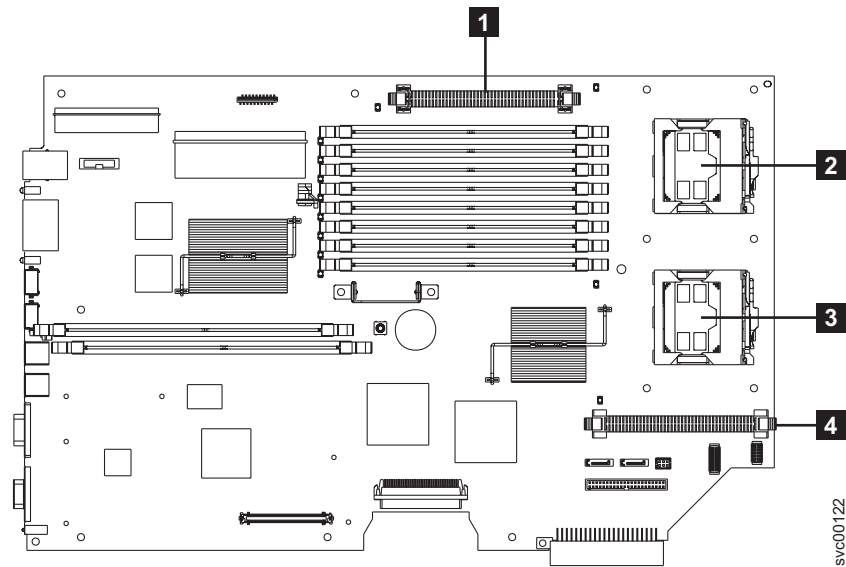


Figure 185. Location of the microprocessor and VRM sockets

- 1 VRM 1
- 2 Microprocessor 1
- 3 Microprocessor 2
- 4 VRM 2

Each microprocessor is matched with a VRM and a heat sink. When removing the microprocessor, you must first remove the heat sink.

Perform the following steps to remove a microprocessor:

1. Turn off all power to the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Disconnect all power cords and external cables.
3. Remove the node from the rack.
4. Remove the top cover.
5. Fully loosen one captive screw before loosening the other captive screw. This helps to break the bond between the heat sink and the microprocessor.
6. Remove the heat sink.

Important: Be careful when handling the microprocessor and heat sink. If you wish to reuse the thermal grease between the heat sink and the microprocessor, do not contaminate it. If thermal grease is supplied with your replacement microprocessor, remove all traces of the used thermal grease before applying the new grease.

7. Rotate the microprocessor socket lever arm upward to its maximum vertical position.
8. Remove the microprocessor from the socket.

Replacing the microprocessor

Use this topic when you are required to replace a microprocessor.

Before you replace the microprocessor, ensure that you are aware of handling static-sensitive devices.

Related tasks

“Replacing the top cover” on page 368

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

“Replacing the SAN Volume Controller in a rack” on page 346

You must use caution when you replace the SAN Volume Controller in a rack.

“Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 VRM” on page 465

Before you replace the microprocessor, you must replace the voltage regulator module (VRM).

“Removing the microprocessor” on page 456

Related reference

“Handling static-sensitive devices” on page xliii

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

Replacing the SAN Volume Controller 2145-8G4 microprocessor

This topic describes how to replace the microprocessor.

The documented steps to replace the SAN Volume Controller 2145-8G4 microprocessor assume that you:

- Removed all power from the node
- Removed the node from the rack
- Removed the top cover of the node
- Removed the microprocessor that is being replaced

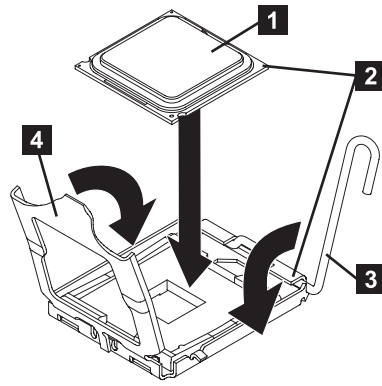
Perform the following steps to replace the SAN Volume Controller 2145-8G4 microprocessor:

1. Rotate the release lever from the closed and locked position to the open position.
2. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the node.
3. Remove the microprocessor from the package.

Attention: Be careful how you handle the microprocessor. Do not touch the microprocessor contacts; handle the microprocessor by the edges only.

Dropping the microprocessor during installation or removal can damage the contacts. Also, contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

4. Position the microprocessor **1** over the microprocessor socket. Use the triangular alignment cutout on the microprocessor socket and the triangular alignment mark **2** on the microprocessor to assist you in aligning the microprocessor to the socket. Then, carefully place the microprocessor onto the socket. Do not force the microprocessor. It only fits one way onto the socket.

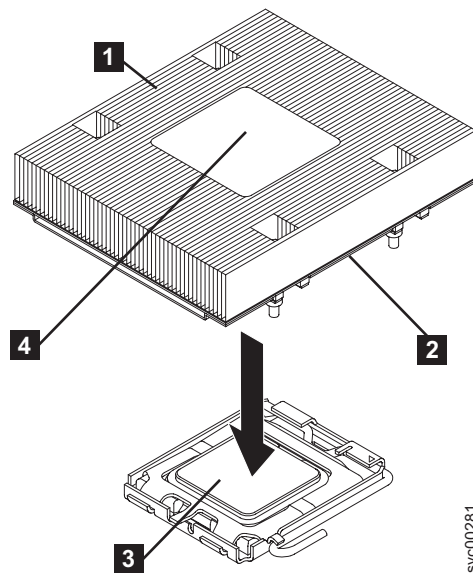


svc00283

- 1** Microprocessor
- 2** Alignment marks
- 3** Microprocessor release lever
- 4** Microprocessor bracket frame

5. Place the microprocessor bracket frame **4** down over the microprocessor and the microprocessor socket to secure the microprocessor position in the socket.
6. Rotate the microprocessor release lever **3** into a closed position.
7. Place the heat sink **1** on top of the microprocessor **3** with the thermal grease **2** side down. Tighten the captive screws to secure the heat sink to the system board. Alternate among the screws on either side of the heat sink until they are snug, and then alternate again until they are tight, making sure that you do not overtighten any of them.

Attention: Do not touch the thermal grease on the bottom of the heat sink after you remove the plastic cover. Touching the thermal grease will contaminate it.



svc00281

- 1** Heat sink
- 2** Thermal grease

- 3 Microprocessor
 - 4 Heat sink installation label
8. Replace the cover.
 9. Replace the node in the rack.
 10. Reconnect the power cords and any cables that were removed.
 11. Power on the node.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 microprocessor

The SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 must always be fitted with both microprocessors in order to function correctly.

The documented steps to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 microprocessor assume that you:

- Removed all power from the node
- Removed the node from the rack
- Removed the top cover of the node
- Removed the microprocessor that is being replaced

Perform the following steps to replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 microprocessor:

1. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the node.
2. Remove the microprocessor from the package.
3. Rotate the locking lever 3 from the closed position to the open position. See Figure 186.

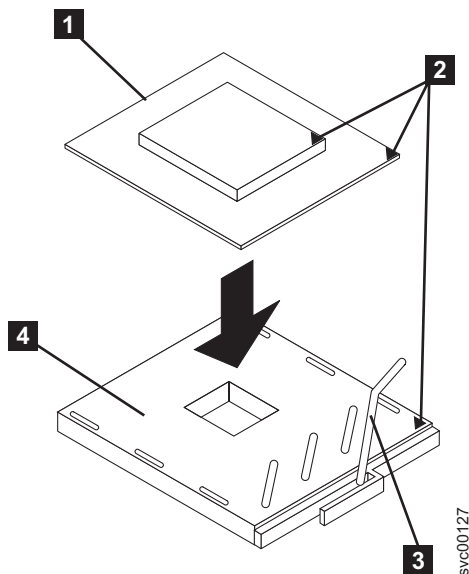


Figure 186. Microprocessor locking lever in open position

- 1 Microprocessor
- 2 Corner marks
- 3 Locking lever

4 Microprocessor socket

4. Center the microprocessor **1** over the microprocessor socket **4**.
5. Align the triangle **2** on the corner of the microprocessor with the triangle on the corner of the socket and carefully press the microprocessor into the socket.

Attention: Do not use excessive force when pressing the microprocessor into the socket.

6. Close the lever.

Note: A voltage regulator module (VRM) and a heat sink are included in the microprocessor package.

- Do not set the heat sink down after removing it from the package.
- Do not touch or contaminate the thermal grease on the bottom of the heat sink. Doing so damages its heat-conducting capability and exposes the microprocessor to overheating.
- If you must remove the heat sink after installing it, note that the thermal grease might have formed a strong bond between the heat sink and the microprocessor. Do not force the heat sink and microprocessor apart; doing so causes damage to the microprocessor pins. Loosen one captive screw fully before loosening the other captive screw to help break the bond between the components without damaging them.

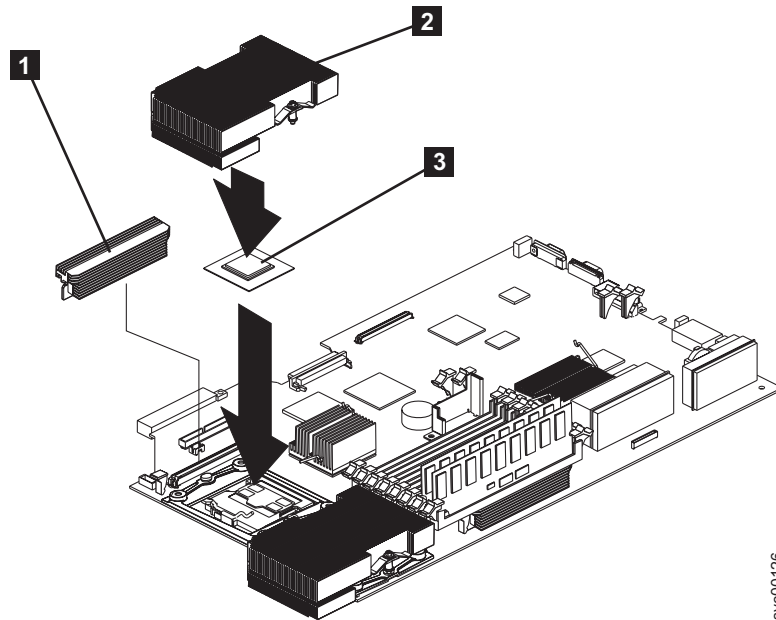


Figure 187. Microprocessor and heat sink locations

- 1** VRM
- 2** Heat sink
- 3** Microprocessor

7. Install the heat sink **2** on top of the microprocessor **3**. See Figure 187.
8. Tighten the captive screws. Alternate between the screws until they are all tightened. Do not overtighten.

9. Replace the cover.
10. Replace the node in the rack.
11. Reconnect the power cords and any cables that were removed.
12. Power on the node.

Removing the SAN Volume Controller 2145-8F4 or SAN Volume Controller 2145-8F2 VRM

You might remove the voltage regulator module (VRM) to perform maintenance on the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4.

Before you remove the VRM, ensure that you are aware of handling static-sensitive devices. Figure 188 shows the microprocessors and VRMs.

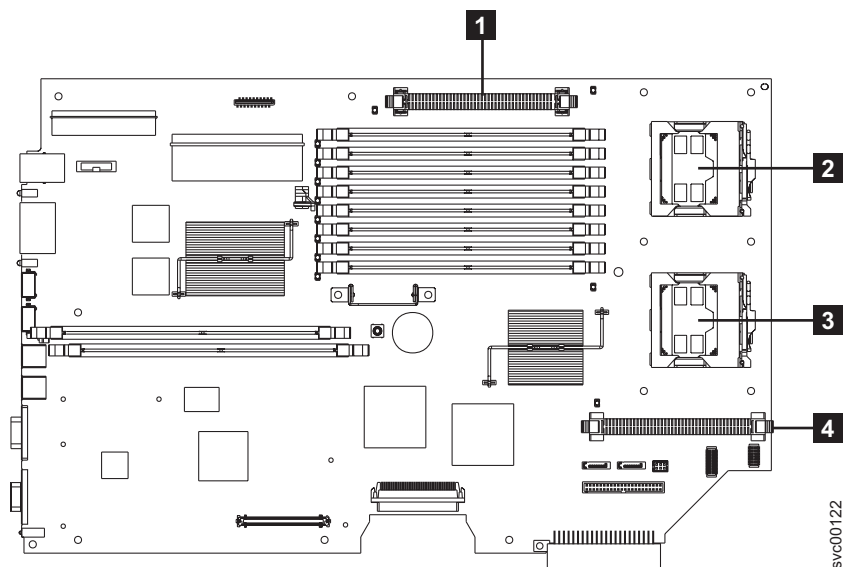


Figure 188. Location of the microprocessor and VRM sockets

- 1** VRM 1
- 2** Microprocessor 1
- 3** Microprocessor 2
- 4** VRM 2

Perform the following steps to remove the VRM:

1. Remove all power from the node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove the node from the rack.
3. Remove the node top cover.
4. Press the latches on both sides of the VRM downward and outward.

The VRM is pulled out of the node and you can now replace the VRM.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the SAN Volume Controller from a rack” on page 339
During some service procedures, you might need to remove the SAN Volume Controller from the rack.

“Removing the top cover” on page 364
You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 VRM”

Before you replace the microprocessor, you must replace the voltage regulator module (VRM).

Related reference

“Handling static-sensitive devices” on page xliii
Ensure that you understand how to handle devices that are sensitive to static electricity.

Replacing the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 VRM

Before you replace the microprocessor, you must replace the voltage regulator module (VRM).

Before you replace the VRM, ensure that you are aware of handling static-sensitive devices. These instructions assume the following:

- The power to the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 is turned off.
- The node is removed from the rack.
- The node top cover is removed.
- The old VRM is removed from the node.

Perform the following steps to replace the VRM:

1. Align the VRM in the connector.
2. Press both sides of the VRM downward until the latches click into place.
3. If you are replacing the microprocessor, perform the steps required to do so. If not, replace the SAN Volume Controller 2145-8F2 or SAN Volume Controller 2145-8F4 top cover.
4. Place the node in the rack.
5. Power up the node.

Removing the front panel from the SAN Volume Controller 2145-4F2

You can remove the front panel to perform maintenance on the SAN Volume Controller 2145-4F2.

Perform the following steps to remove the front panel from the SAN Volume Controller 2145-4F2:

1. Verify that all operations between the SAN Volume Controller 2145-4F2 and the host system have stopped.

2. Remove all power from the SAN Volume Controller 2145-4F2. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
3. Slide the SAN Volume Controller 2145-4F2 out from the rack approximately 5 cm (2 in).
4. Press the seven latches that are on the top, sides, and bottom of the front panel to release the assembly.
5. Carefully pull the assembly and its attached cable away from the SAN Volume Controller 2145-4F2. First pull one end of the assembly, and then clear the other latches one by one by slowly pulling the end of the front panel toward you.

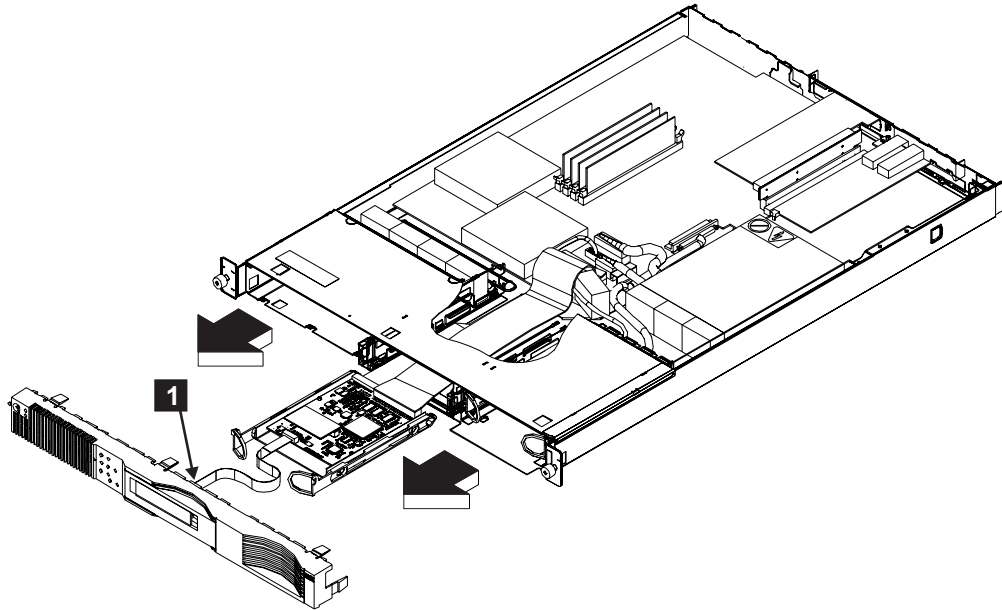


Figure 189. Removing the front panel of the SAN Volume Controller 2145-4F2

6. Disconnect the connector (1 in Figure 189).

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Replacing the front panel on the SAN Volume Controller 2145-4F2” on page 467

You can remove the front panel of the SAN Volume Controller 2145-4F2 in order to replace it.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the power cable from the 2145 UPS” on page 509

You can replace the power cable from the 2145 uninterruptible power supply (2145 UPS) if you are having problems with the power supply and suspect that the power cable is defective.

“Removing the SAN Volume Controller from a rack” on page 339

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

Replacing the front panel on the SAN Volume Controller 2145-4F2

You can remove the front panel of the SAN Volume Controller 2145-4F2 in order to replace it.

Perform the following steps to remove the SAN Volume Controller 2145-4F2 front panel:

1. Connect the cable **1** to the front panel. See Figure 190.

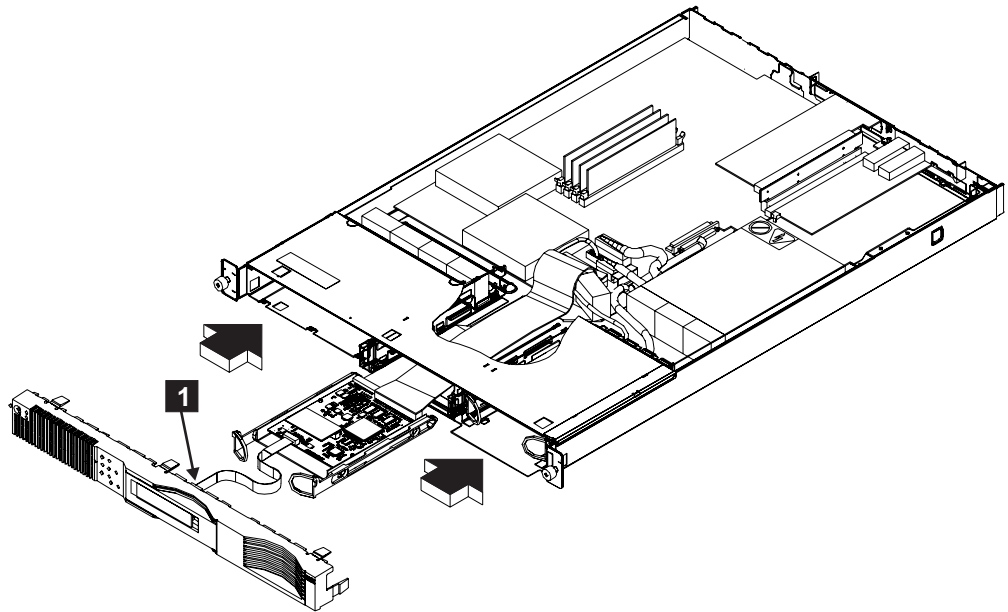


Figure 190. Replacing the front panel

2. Fold the cable into the front of the SAN Volume Controller 2145-4F2.
3. Insert the assembly and its attached cable into the front of the SAN Volume Controller 2145-4F2.
4. Align the front panel with the front of the SAN Volume Controller 2145-4F2 and ensure that the latches enter the frame of the SAN Volume Controller 2145-4F2. Push the front panel until you hear the latches click into place.

Note: If you replaced the front panel field replaceable unit (FRU) with a new FRU, go to the front panel maintenance analysis procedure (MAP) to perform the steps for the replacement of the front panel.

Related tasks

“MAP 5400: Front panel” on page 307

MAP 5400: Front panel helps you to solve problems that have occurred on the SAN Volume Controller front panel.

“Removing the front panel from the SAN Volume Controller 2145-4F2” on page 465

You can remove the front panel to perform maintenance on the SAN Volume Controller 2145-4F2.

Removing the SAN Volume Controller 2145-4F2 system board

During routine maintenance, you may be required to remove and replace the system board.

The system board field replaceable unit (FRU) is a kit that includes the following parts:

- PCI riser card
- Two microprocessors
- Microprocessor voltage regulator module (VRM)
- Planar

Use all the parts in the kit when you replace the system board FRU.

The system board is electrostatic-discharge sensitive. Take precautions to avoid damage from static electricity.

For information about working with static-sensitive devices, see the documentation about handling static-sensitive devices at the end of this topic.

Perform the following steps to remove the system board:

1. Remove all power from the SAN Volume Controller.
2. Remove the SAN Volume Controller from the rack.
3. Remove the top cover from the SAN Volume Controller (**1** in Figure 191 on page 469).

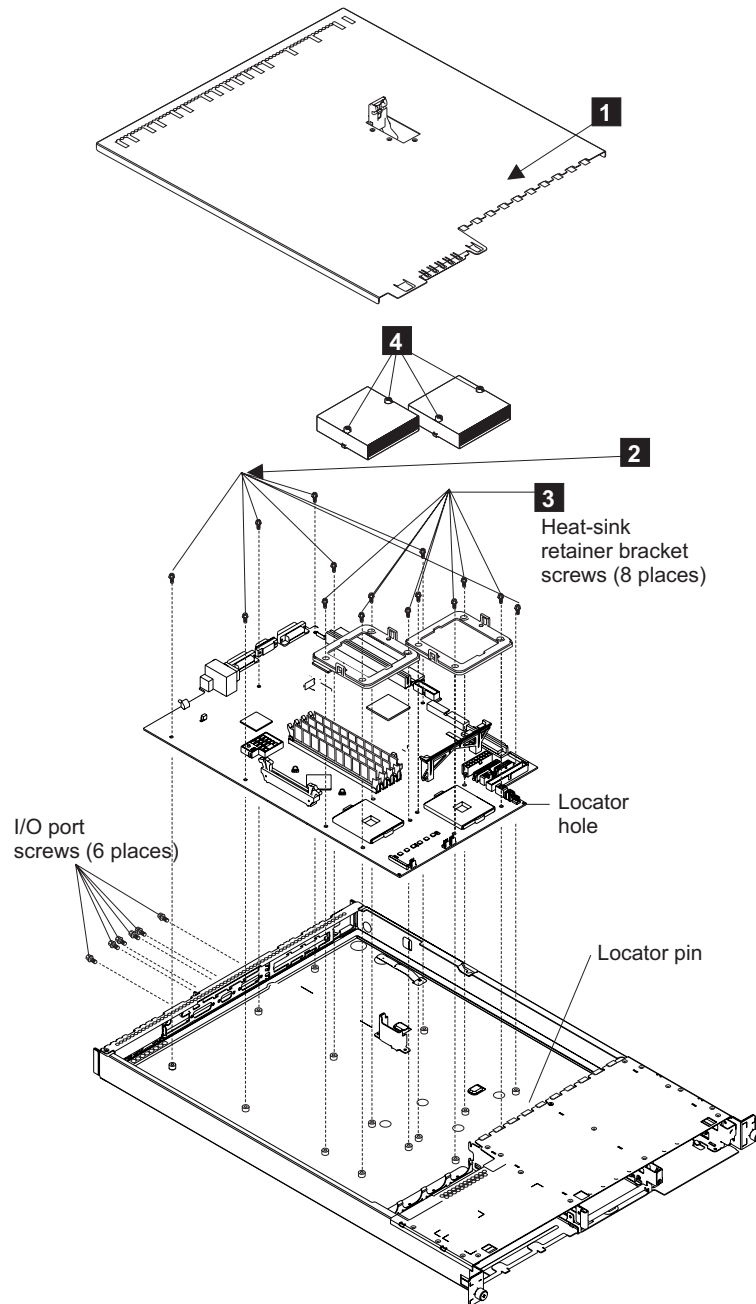


Figure 191. Removing the system board

If you are going to exchange the system board for another system board, go to step 4. Otherwise, go to step 6.

4. Remove the adapter assemblies; however, keep the adapter assemblies—they must be installed onto the replacement system board.
5. Remove the memory modules; however, keep the memory modules—they must be installed onto the replacement system board.
6. Disconnect the following:
 - All fan connectors
 - Power connectors P1 and P2
 - SCSI power connector

- ATA connector
 - Disk drive connectors
 - Service Controller connector
7. Lift out the air baffle.
 8. Unscrew the heat sink captive screws (**4** in Figure 191 on page 469).
 9. Move the heat sinks gently from side to side to break the seal formed by the thermal compound and then pull them off the processors.
 10. Remove the screws from each of the heat sink retainer brackets (**3** in Figure 191 on page 469).
 11. Remove the retainer brackets.
 12. Remove the two screws from each of the three connectors.
 13. Remove the seven screws (**2** in Figure 191 on page 469).
 14. Remove the system board.

At this time if you have any tasks to do while the system board is removed, do them.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
 MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

“Removing the SAN Volume Controller from a rack” on page 339

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

“Removing the top cover” on page 364

You can remove the SAN Volume Controller’s top cover if maintenance is necessary.

“Removing the fibre-channel adapter assembly” on page 427

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

“Removing the memory modules (DIMM)” on page 387

You might need to remove one or more faulty memory modules.

Related reference

“Handling static-sensitive devices” on page xliii

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

Replacing the SAN Volume Controller 2145-4F2 system board

During routine maintenance, you may be required to replace the system board.

The system board field replaceable unit (FRU) is a kit that includes the following parts:

- PCI riser card
- Two microprocessors
- Microprocessor voltage regulator module (VRM)
- Planar

Note:

1. Use all the parts in the system board FRU kit (system board, processors [2], VRM, riser card). If you removed the system board and are replacing it, reuse only the four memory modules and the two adapter assemblies that you removed. See the related documentation, at the end of this topic, on how to remove the system board.
2. Before you install the new system board, check whether the old system board has any jumpers installed. If it has, install matching jumpers onto the new system board.
3. Before you install the processors on the system board, remove the dust covers from the processor socket.
4. If you were not sent here from the directed maintenance procedures, rewrite the SAN Volume Controller 2145-4F2 serial number. If you were sent here from directed maintenance procedures, this step is performed from within the procedure.
5. The system board is electrostatic-discharge sensitive. Take precautions to avoid damage from static electricity. For information about working with static-sensitive devices, see the related documentation at the end of this topic.
6. To force-restore the system board flash memory, you must run the node rescue procedure after all external cables are reconnected to the node and the node is first powered on.

Perform the following steps to replace the system board:

1. Replace the seven screws **2**. See Figure 192 on page 472.
2. Replace the two screws from each of the three connectors.
3. Replace the retainer brackets.
4. Replace the screws from each of the heat sink retainer brackets **3**. See Figure 192 on page 472.
5. Screw in the heat sink captive screws **4**.
6. Return the air baffle to its place.
7. Connect the following:
 - All fan connectors
 - Power connectors P1 and P2
 - SCSI power connector
 - ATA connector
 - Disk drive connectors
 - Service Controller connector
8. Replace the memory modules onto the replacement system board.
9. Replace the adapter assemblies onto the replacement system board.
10. Replace the top cover **1** of the node.

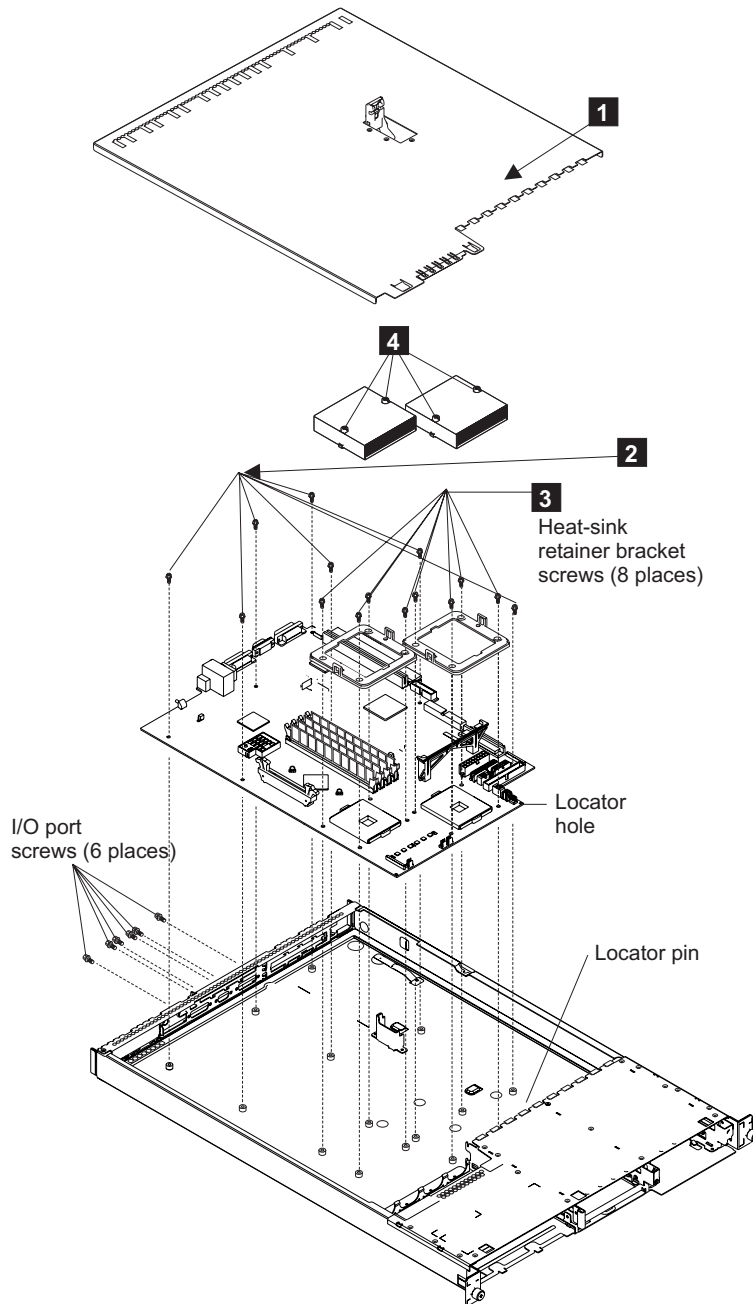


Figure 192. Replacing the system board

- 1** Top cover
- 2** Screws
- 3** Heat sink retainer brackets
- 4** Heat sink captive screws

11. Place the node in the rack.
12. *Carefully* install the end of the ribbon cable (marked System P1anar) to the system board, being sure to install the cable straight in. See Figure 193 on page 473. Be sure to verify that the blue line on the cable connector end is not visible.

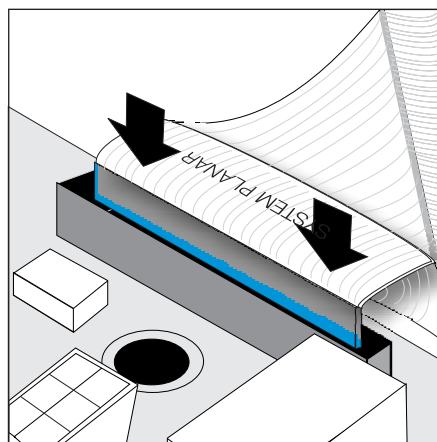


Figure 193. Install service controller cable into the system board

13. Return all power to the SAN Volume Controller.
14. If you are performing this repair as part of a directed maintenance procedure, you will be prompted to type the machine serial number. Otherwise, perform the following steps:
 - a. Delete the failed node from the cluster.
 - b. Add the repaired node to the cluster.
 - c. Start the command-line interface.
 - d. Issue the following command:

```
svcservicetask writesernum -sernum nodeserialnumber nodename
```

where *nodeserialnumber* is the serial number on the node frame and *nodename* is the name of the repaired node that you added in this step.

The `svcservicetask writesernum -sernum nodeserialnumber nodename` command writes the machine serial number to the SAN Volume Controller system board.

Note: The node will restart as soon as the serial number has been written to it.

Related tasks

“Removing the SAN Volume Controller 2145-4F2 system board” on page 467
During routine maintenance, you may be required to remove and replace the system board.

Related reference

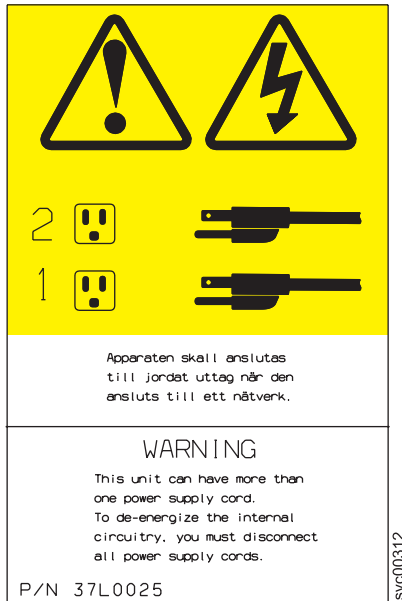
“Handling static-sensitive devices” on page xliii

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

Removing the redundant ac power switch

Use this topic when you need to remove a redundant ac power switch.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.



To remove a redundant ac power switch, complete the following steps:

1. Power off each SAN Volume Controller node connected, via a UPS, to the redundant ac power switch. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
 - a. There might be one or two nodes connected to the redundant ac power switch. If two nodes are connected to the redundant ac power switch, before powering off the nodes you must ensure that both nodes are not in the same I/O group. If they are in the same I/O group, the customer will lose access to the data managed by that I/O group if they are both powered off.
 - b. If both nodes powered by the redundant ac power switch are in the same I/O group, power off one node, disconnect it from the redundant ac power switch, and connect it to a different power source. Then power the node back on. When it has recovered and rejoined the I/O group, it will be able to maintain the I/O access when the other node is powered off and the redundant ac power switch is removed. If you have had to perform this operation, pay particular attention to checking when it is safe to power off the second node. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.
2. Remove both the redundant ac power switch input power cables from the site power distribution unit and un-thread 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. Unscrew the four screws holding the redundant ac power switch into the rack. Be careful to support the redundant ac power switch during this procedure since 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.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

Replacing the redundant ac power switch

Use this topic when you need to replace a redundant ac power switch.

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.

To replace a redundant ac power switch, complete the following steps:

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 on the side of the redundant ac power switch containing the output power sockets. See Figure 194.



Figure 194. 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 rack power distribution end “Power source <name>, outlet <id>” to redundant ac power switch <location> <MAIN | BACKUP> input. For example: “Power source D2, outlet 4 to redundant ac power switch pos 7 MAIN input”.
3. Label the redundant ac power switch end “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 using the clips of the redundant ac power switch. See Figure 195 on page 476.



Figure 195. 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: Redundant ac power verification” on page 298.
12. Connect the one or two 2145 UPS-1Us that are powered by this redundant ac power switch. The power cables should still be plugged into the 2145 UPS-1Us.
 - 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 UPSs 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 2145 UPS-1U parts

The remove and replace procedures for the 2145 UPS-1U field replaceable units are described in the topics which follow.

Removing and replacing the 2145 UPS-1U power cable retention bracket

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.

Note: The 2145 UPS-1U power cable retention bracket (shown in Figure 196) can be attached only to the most recent versions of the 2145 UPS-1U. Older versions do not have the correct mounting holes.

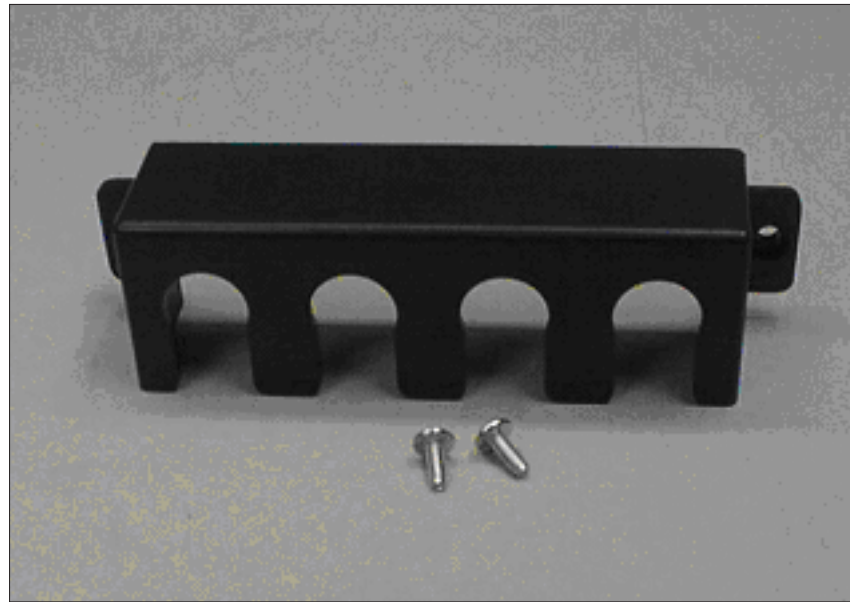
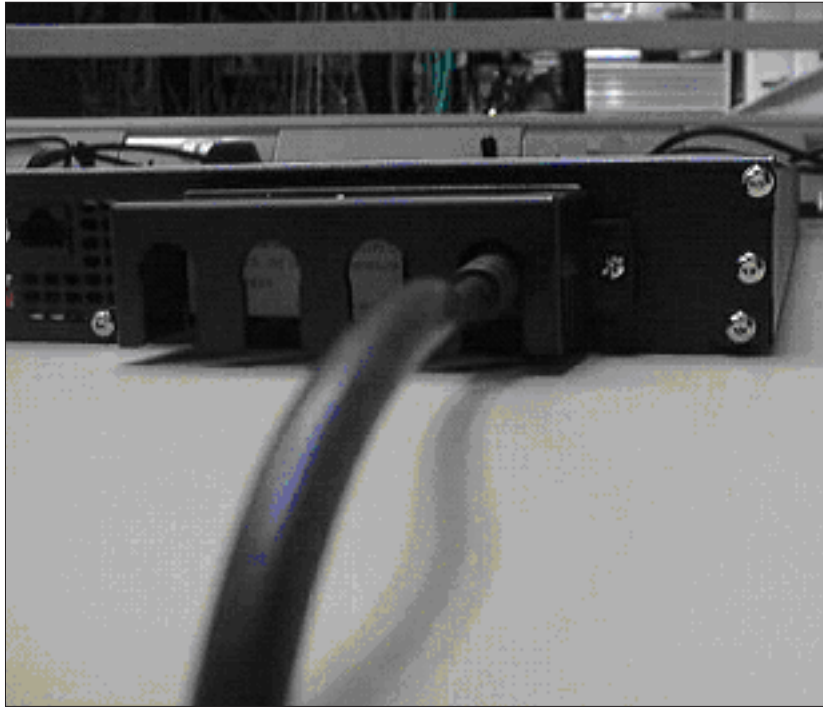


Figure 196. 2145 UPS-1U power cable retention bracket hardware

Removing the 2145 UPS-1U power cable retention bracket

Perform the following steps to remove the 2145 UPS-1U power cable retention bracket:

1. Remove the retaining screw from each side of the bracket.



svc00200

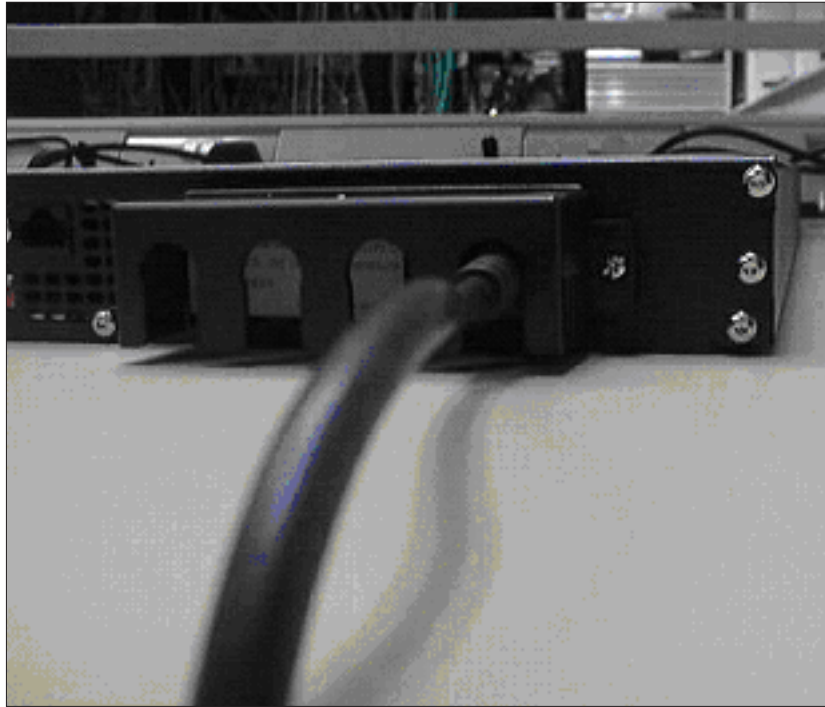
Figure 197. 2145 UPS-1U power cable retention bracket

2. Lift the bracket off the cable.

Replacing the 2145 UPS-1U power cable retention bracket:

Perform the following steps to replace the 2145 UPS-1U power cable retention bracket:

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 198 on page 479.



svc00200

Figure 198. 2145 UPS-1U power cable retention bracket

Removing the 2145 UPS-1U

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

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)

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 powered off, prior to step 1. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

1. At the front of the 2145 UPS-1U, press and hold the on/off button (**1** in Figure 199) until the power light is extinguished (approximately five seconds). The 2145 UPS-1U enters standby mode.

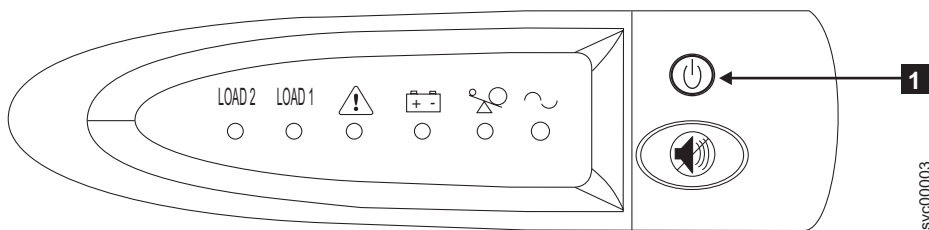


Figure 199. The 2145 UPS-1U front panel assembly

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 200 on page 481).
3. Disconnect the signal cable from the communication port (**2** in Figure 200 on page 481).

4. Disconnect the main power cable from the main power source (**1** in Figure 200).

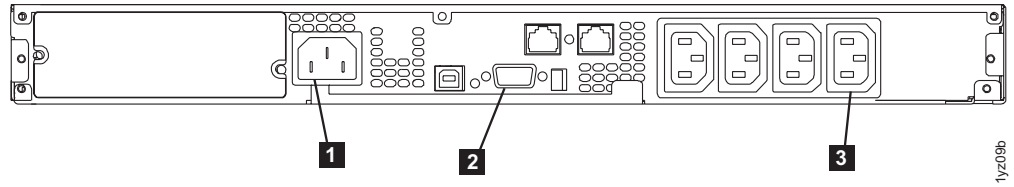


Figure 200. 2145 UPS-1U (rear view)

5. Remove the 2145 UPS-1U front panel, as shown in Figure 201.

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.

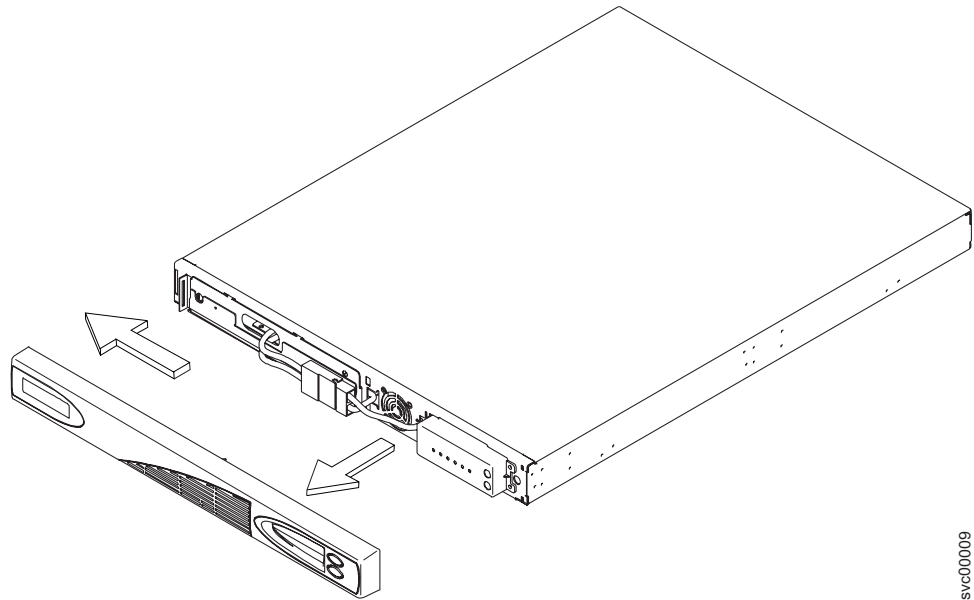


Figure 201. Removing the 2145 UPS-1U front panel

6. Disconnect the internal battery connector, which is circled in Figure 202 on page 482.

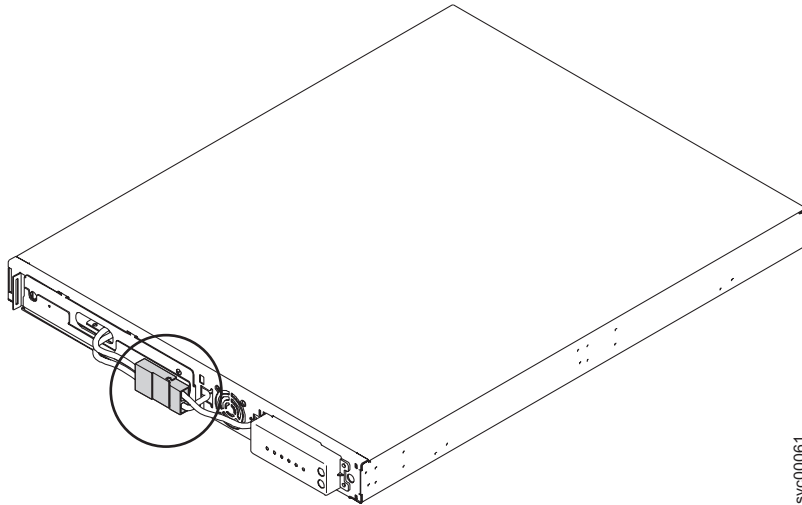


Figure 202. The 2145 UPS-1U internal battery connector

7. After pulling the two connectors apart, cover the exposed battery connector (shown in Figure 203) with adhesive tape.

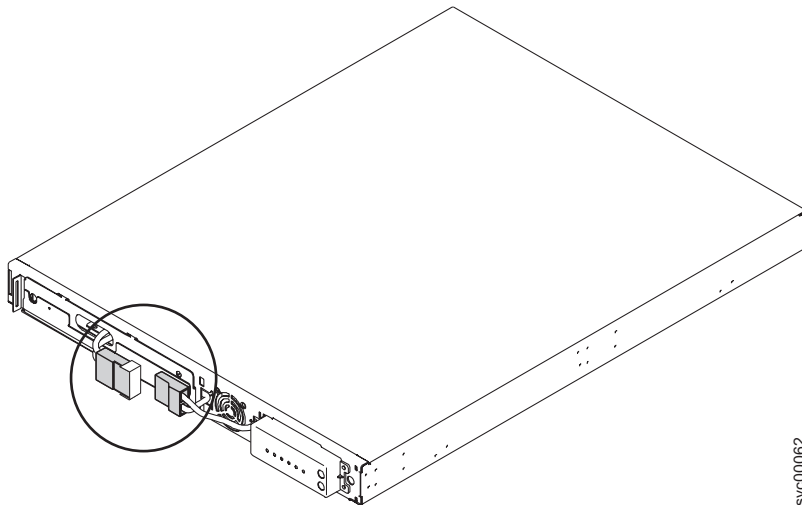


Figure 203. The 2145 UPS-1U internal battery connector with protective tape

8. Reinstall the front panel.
9. At the front of the 2145 UPS-1U, unscrew the two mounting screws **1**, as shown in Figure 204 on page 483.

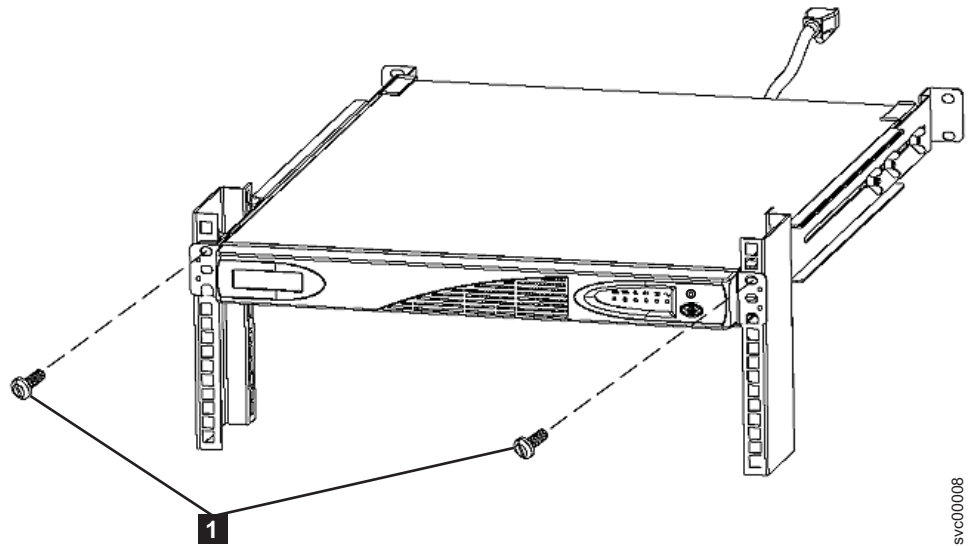


Figure 204. Mounting screws for the 2145-1U uninterruptible power supply

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.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the 2145 UPS-1U battery” on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

“Replacing the 2145 UPS-1U”

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

Replacing the 2145 UPS-1U

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

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)

Perform the following steps to replace the 2145 UPS-1U:

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 205).

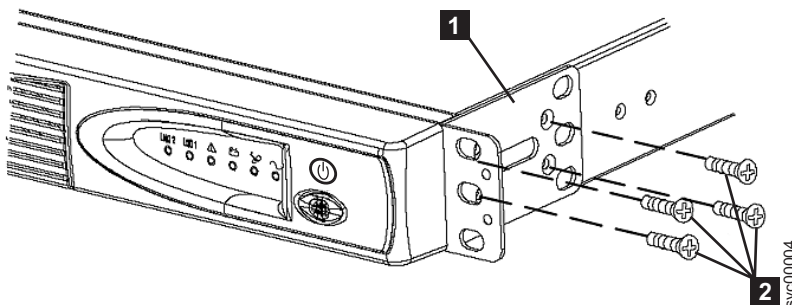


Figure 205. Installing the support rails for a 2145 UPS-1U into the rack

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 206 on page 485).

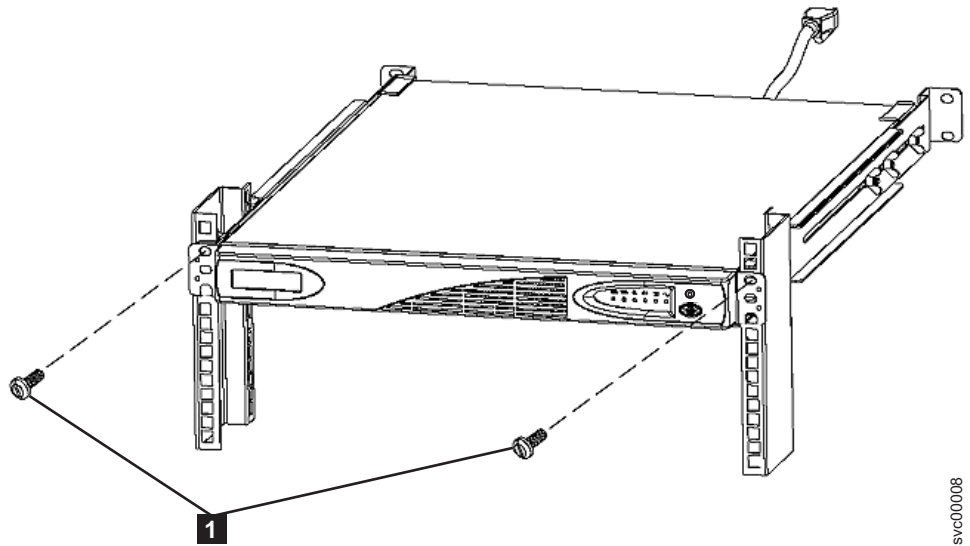


Figure 206. Mounting screws for the 2145-1U uninterruptible power supply

5. Remove the 2145 UPS-1U front panel by pulling it towards you and to the left, as shown in Figure 207.

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.

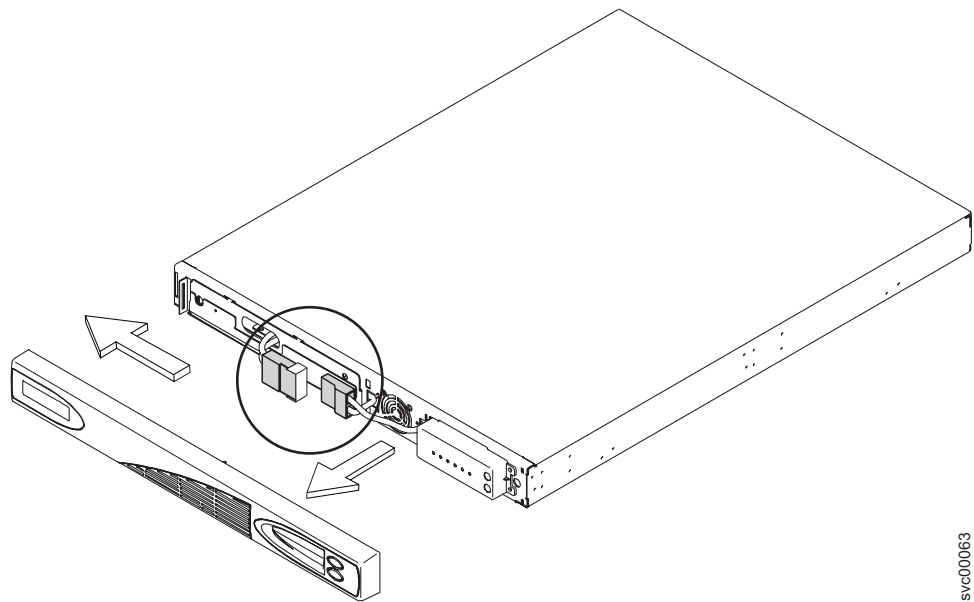


Figure 207. Removing the 2145 UPS-1U front panel

6. Remove the protective tape from the internal battery connector (circled in Figure 208 on page 486).

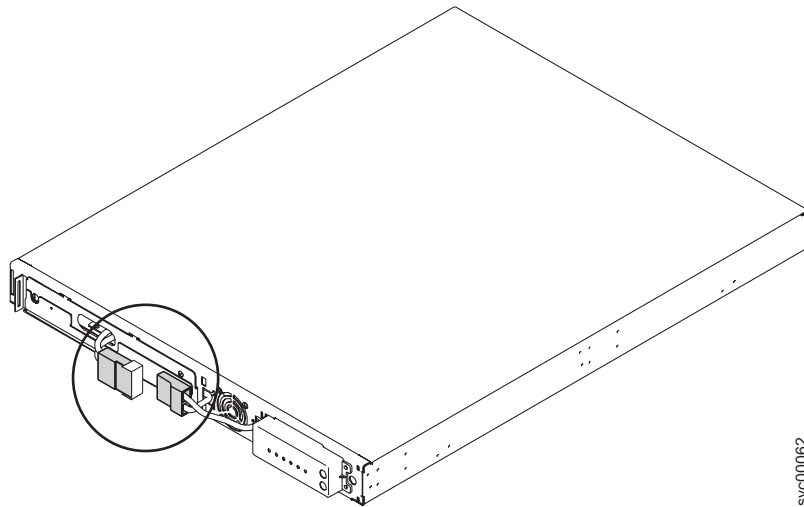


Figure 208. The 2145 UPS-1U internal battery connector with protective tape

7. Connect the internal battery connector (circled in Figure 209).

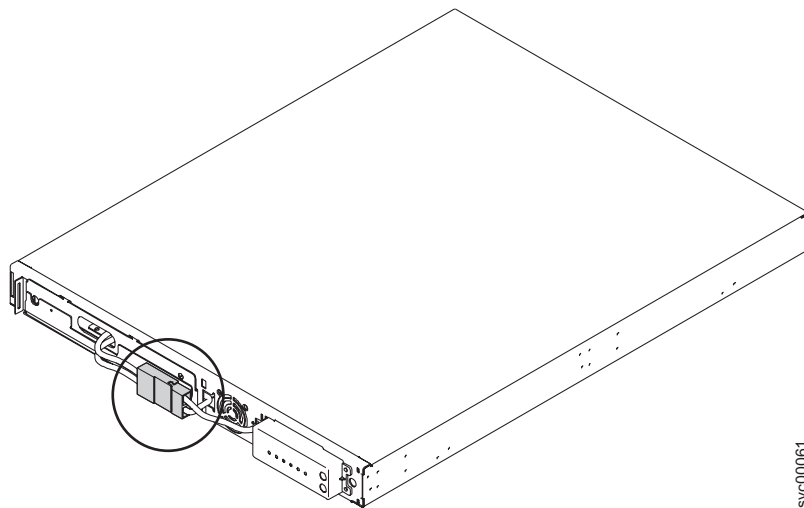


Figure 209. The 2145 UPS-1U with internal battery connectors in place

Note: A small amount of arcing may 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 211 on page 487). If applicable, install the power cable retention bracket (shown in Figure 210 on page 487).

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.

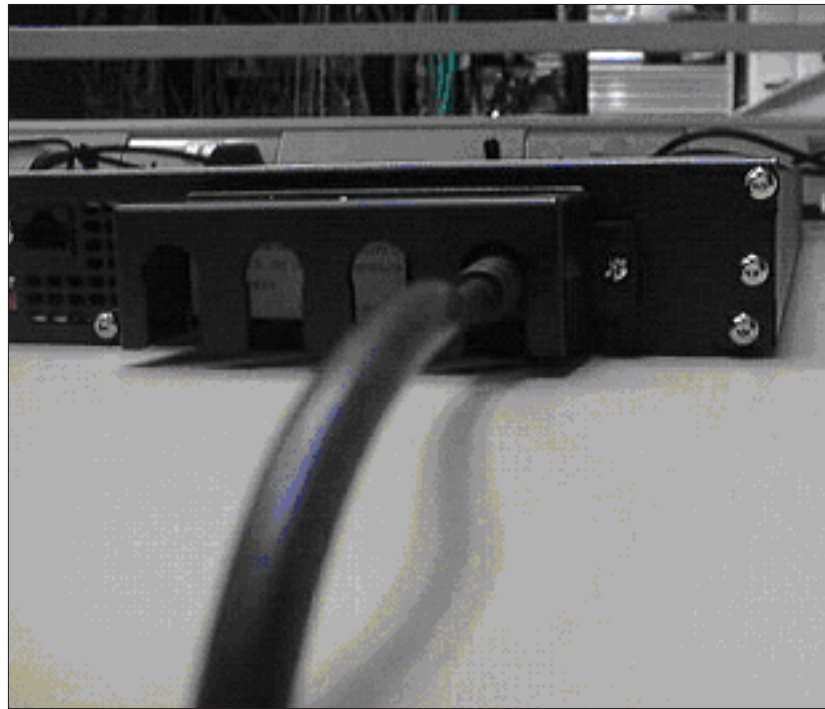


Figure 210. The 2145 UPS-1U cable retention bracket connected to the 2145 UPS-1U

10. Reconnect the SAN Volume Controller signal cable to the communication port (**2** in Figure 211).
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 211).

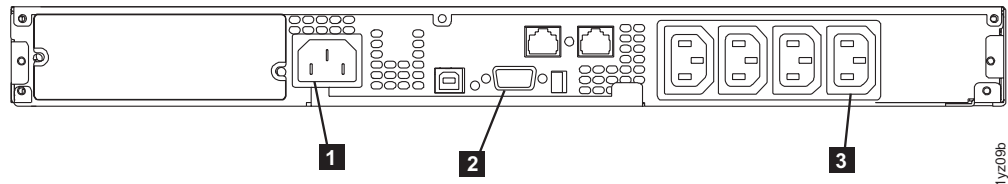


Figure 211. 2145 UPS-1U (rear view)

The 2145 UPS-1U is now in standby mode with the SAN Volume Controller offline. All indicators that are shown in Figure 211 are off.

12. To turn on the 2145 UPS-1U, press and hold the on/off button (**2** in Figure 212 on page 488). The 2145 UPS-1U undergoes a self-test, taking approximately five seconds, before the power-on indicator **1** and the load indicators (**7** and **8**) 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.

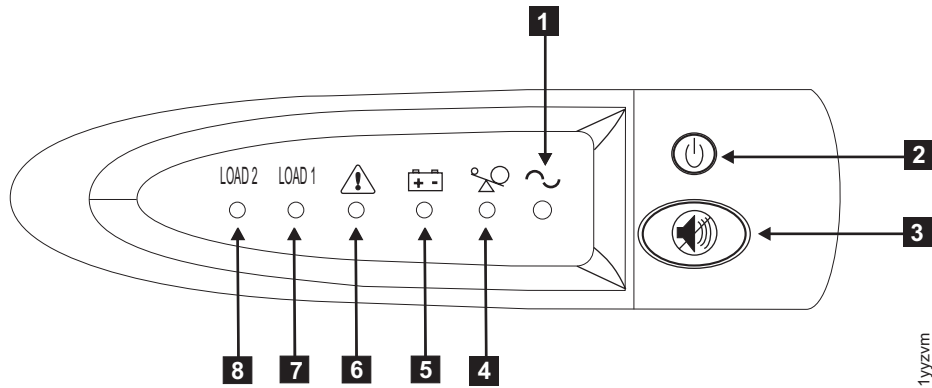


Figure 212. The 2145 UPS-1U front panel assembly

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.

Related tasks

“Removing the 2145 UPS-1U battery” on page 493

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

Removing the support rails for a 2145 UPS-1U

You can remove the support rails for the 2145 uninterruptible power supply-1U (2145 UPS-1U).

Perform the following steps to remove the support rails:

1. Loosen and remove the two M6 × 10 screws from each side of the 2145 UPS-1U. See **1** in Figure 213.

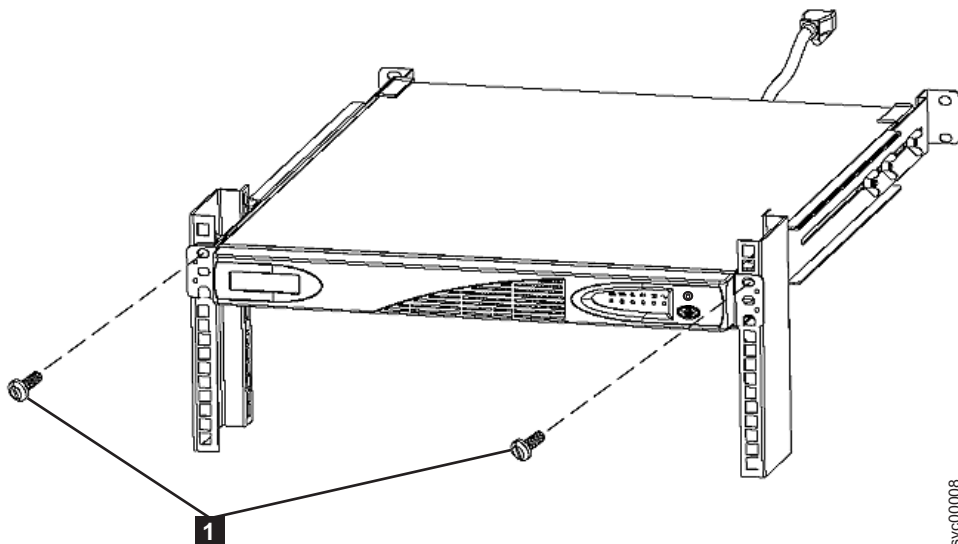


Figure 213. Removing the front screws from the 2145 UPS-1U

2. Remove the 2145 UPS-1U from the rack.
3. Remove the clip nut from the top hole of the rail (**3** in Figure 214).

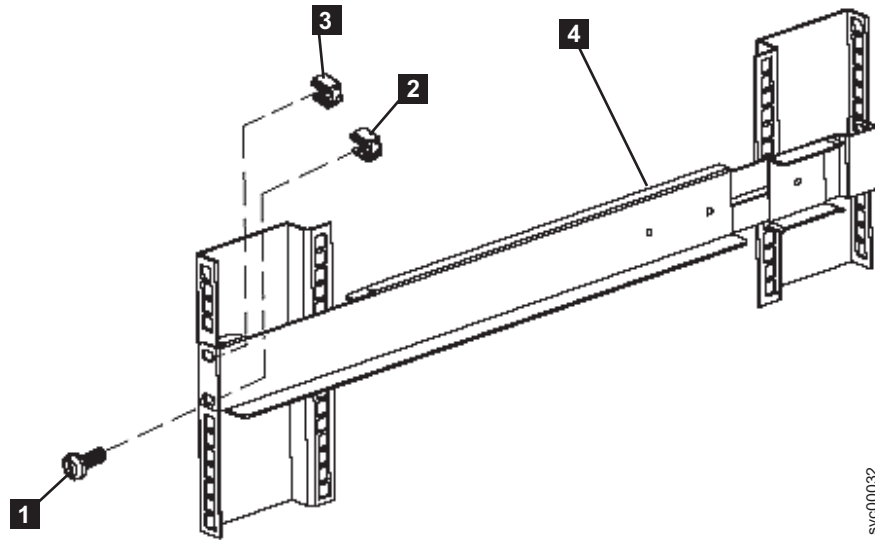


Figure 214. Removing the front rail on the 2145 UPS-1U

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 215) and the two clip nuts (**2**).

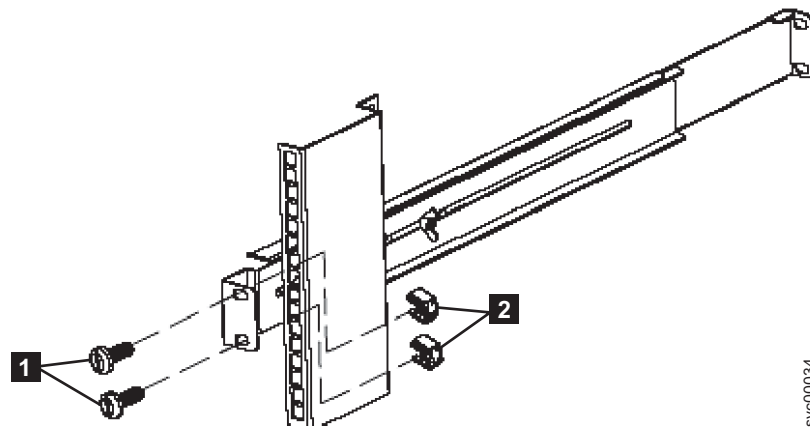


Figure 215. Removing the rear rail on the 2145 UPS-1U

6. Remove the rail from the rack.
7. Repeat step 3 through step 6 to remove the other rail from the rack.

Installing the support rails for the 2145 UPS-1U

You must install the support rails in the rack before installing the 2145 uninterruptible power supply-1U (2145 UPS-1U).

Complete the following prerequisites before installing the support rails:

1. Use the user's hardware location chart to determine where in the rack that the 2145 UPS-1U is to be installed.
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.

Perform the following steps to install the support rails for the 2145 UPS-1U:

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 216.

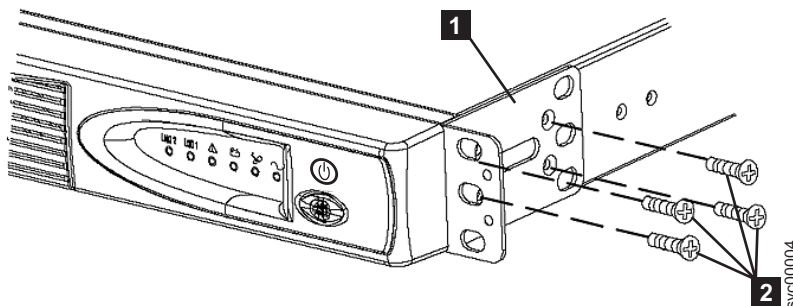


Figure 216. Installing the support rails for a 2145 UPS-1U into the rack

4. Loosen the assembly wing nuts (**1** in Figure 217) on both rail assemblies and adjust the rail size to the depth of your rack.

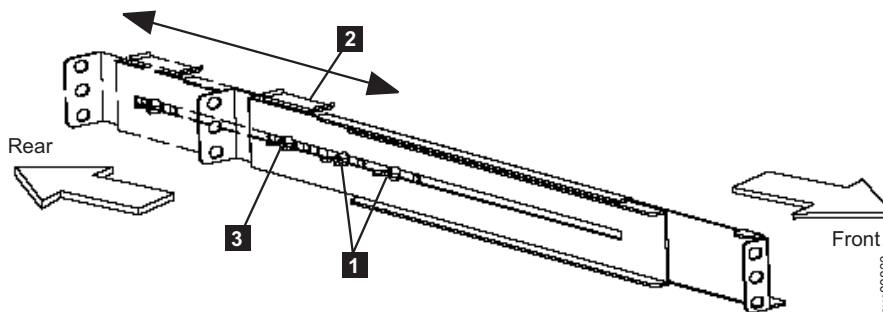


Figure 217. Adjusting the rail depth on the 2145 UPS-1U

- 1** Assembly wing nuts
- 2** Hold-down bracket
- 3** Wing nut

5. Position the rear, hold-down bracket (**2** in Figure 217 on page 490) towards the end of the rail assemblies and tighten the wing nut (**3** in Figure 217 on page 490).
6. Select the holes in the rail where you want to position the 2145 UPS-1U.

Note: The bottom flange of the support rail must align with the EIA mark on the rack.

7. Using two M6 × 10 screws (**1** in Figure 218) and two clip nuts **2**, attach the rail to the rear of the rack. The customer's rack might be different than the one shown here, and if so, might require different clip nuts or fasteners.

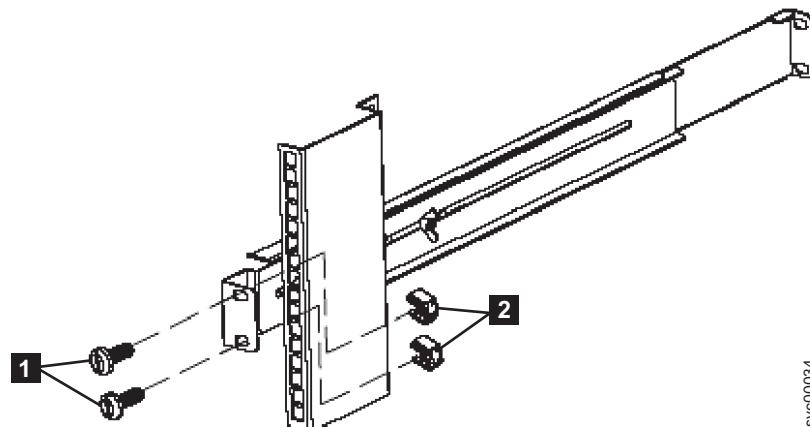


Figure 218. Securing the rear rail on the 2145 UPS-1U

8. Attach only the bottom hole of the rail to the front of the rack with one M6 × 10 screw and one clip nut (**1** in Figure 219).

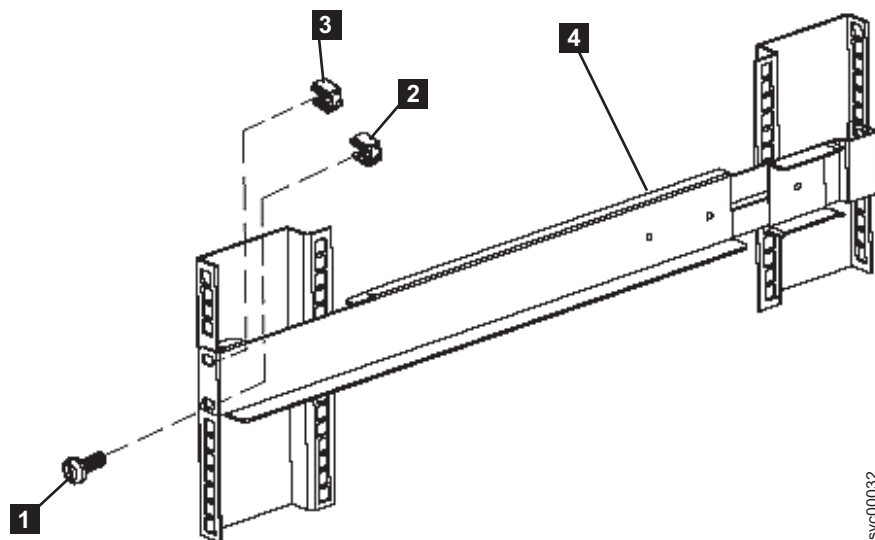


Figure 219. Securing the front rail on the 2145 UPS-1U

9. Install a clip nut in the top hole of the rail **3**.
10. Repeat step 7 through step 9 for the other rail.

11. Tighten the assembly wing nuts on both rail assemblies.

Removing the power cable from the 2145 UPS-1U

You can remove the power cable from the 2145 uninterruptible power supply-1U (2145 UPS-1U) if you are having problems with the power supply and suspect that the power cable is defective.

Perform the following steps to remove the power cable:

1. Remove the power from each SAN Volume Controller. See MAP 5350 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 five seconds). The 2145 UPS-1U enters standby mode, with all indicators off. See Figure 220 for an illustration of the front and rear view of the 2145 UPS-1U.

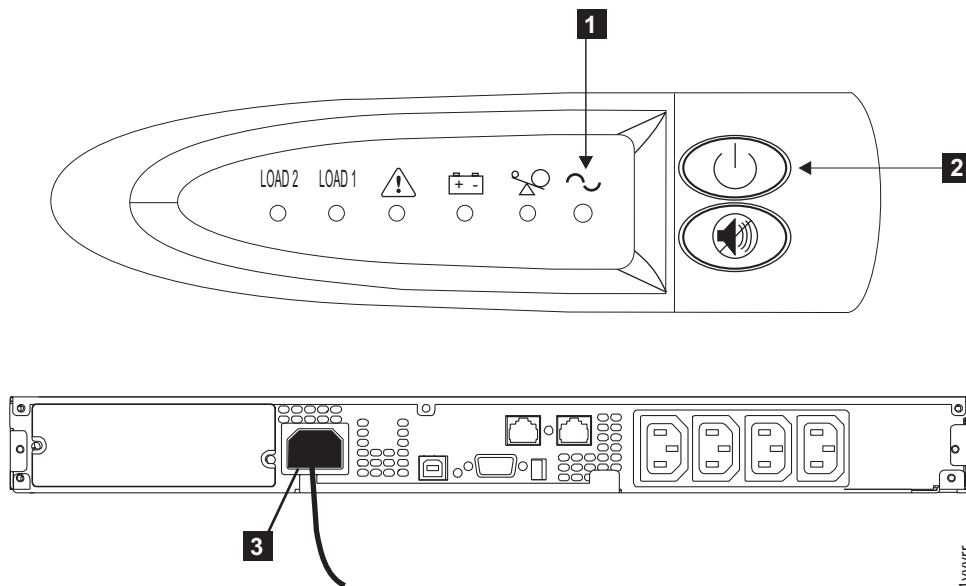


Figure 220. Front and back panels for the 2145 UPS-1U

- 1** Power-on indicator
- 2** On/off button
- 3** Power cable

3. Disconnect the power cable from the main power source **3**.
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 the 2145 UPS-1U on, press and hold the on/off button **2** until the 2145 UPS-1U power button **1** is illuminated (approximately five seconds). 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.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385

Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

Removing the 2145 UPS-1U battery

Follow all safety notices when you are removing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

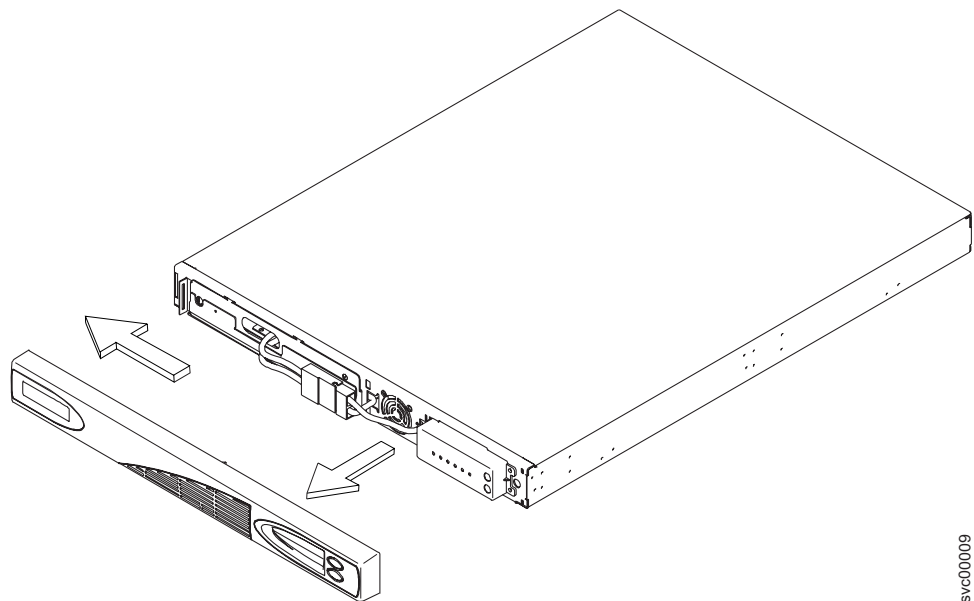
Perform the following steps to remove the 2145 UPS-1U battery:

1. Ensure the SAN Volume Controller connected to the UPS is powered off. Use the instructions in “MAP 5350: Powering off a SAN Volume Controller node” on page 300 to power off the node if it is not already off.

Note: There is no need to power 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 221.

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.



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Figure 221. Removing the 2145 UPS-1U front panel

3. Disconnect the internal battery connector, circled in Figure 222.

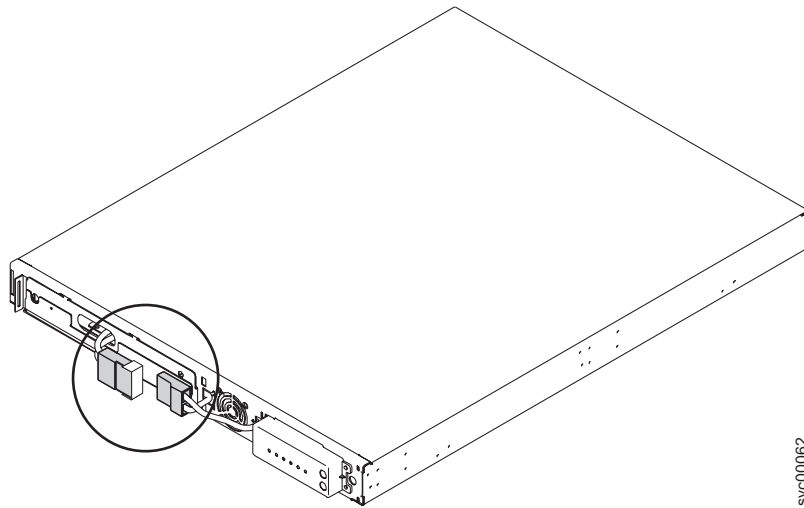


Figure 222. The 2145 UPS-1U internal battery connector with protective tape

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 223, and remove it, laying it on a flat surface.

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.

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C004)

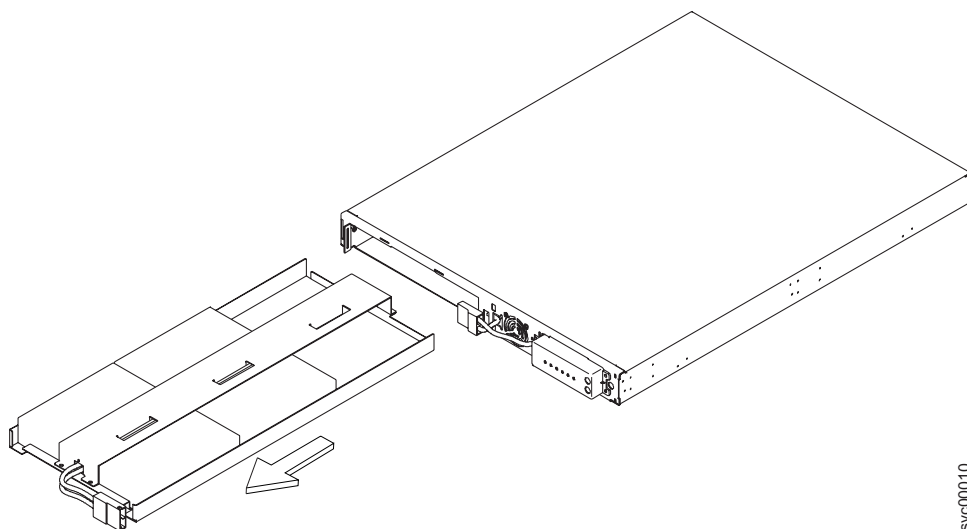
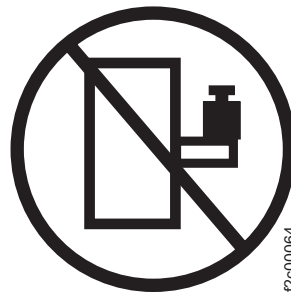


Figure 223. Removing the 2145 UPS-1U battery

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

- 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)

Related tasks

"Removing the 2145 UPS-1U" on page 479

Before you remove the 2145 uninterruptible power supply-1U (2145 UPS-1U), read all safety notices.

"Replacing the 2145 UPS-1U" on page 483

You can replace the 2145 uninterruptible power supply-1U (2145 UPS-1U) only after you remove the previous uninterruptible power supply (UPS).

Related reference

"Controls and indicators for the 2145 UPS-1U" on page 78

All controls for the 2145 uninterruptible power supply-1U (2145 UPS-1U) are located on the front panel assembly.

Replacing the 2145 UPS-1U battery

Follow all safety notices when you are replacing the 2145 uninterruptible power supply-1U (2145 UPS-1U) battery.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

This task assumes that you have disconnected the 2145 UPS-1U battery and have powered off the SAN Volume Controller. Perform the following steps to replace the 2145 UPS-1U battery:

1. Slide the battery into the 2145 UPS-1U, as shown in Figure 224.

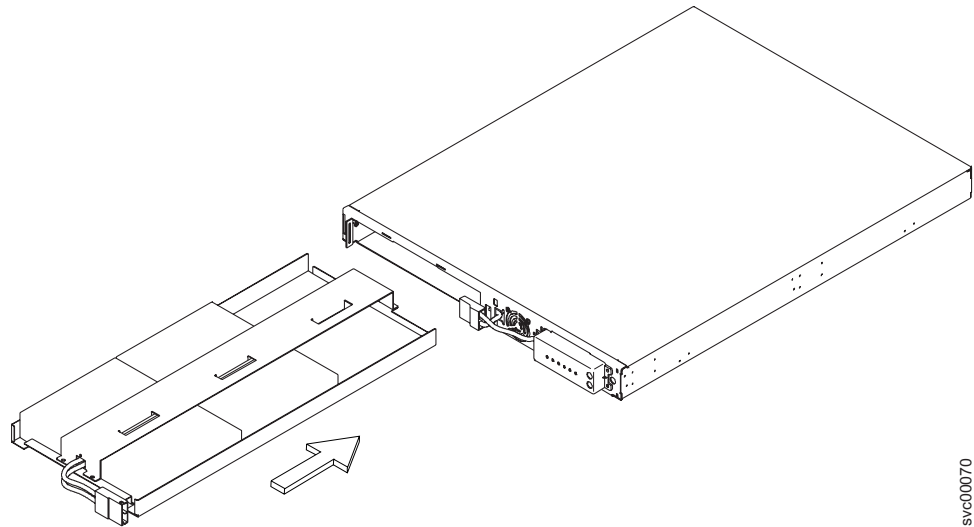


Figure 224. Replacing the 2145 UPS-1U battery

svc00070

DANGER

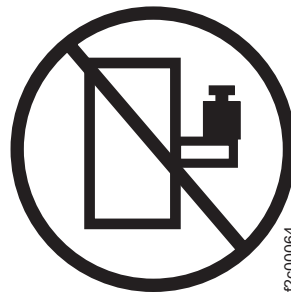
- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, 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)

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)

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 226 on page 500. 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.

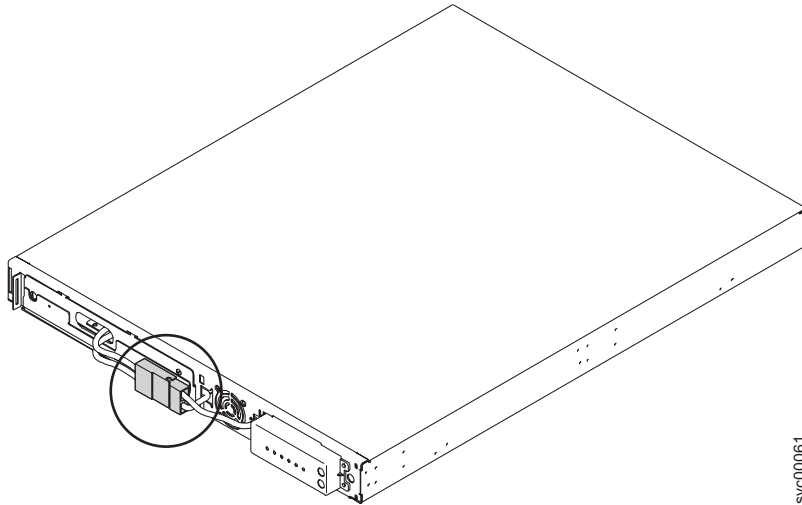


Figure 225. The 2145 UPS-1U internal battery connector

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 226.

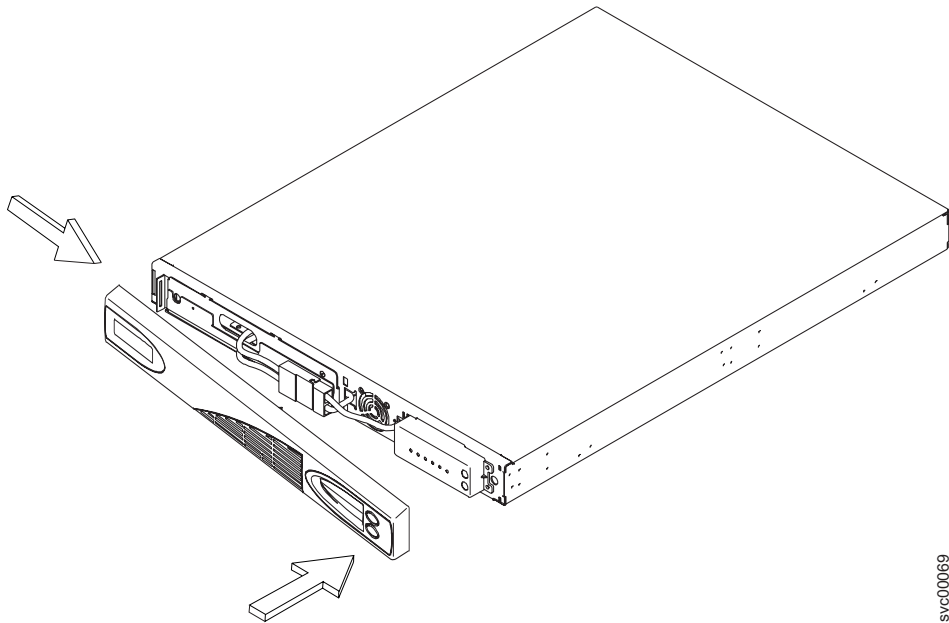


Figure 226. Replacing the 2145 UPS-1U front panel

5. Ensure the 2145 UPS-1U is powered on. Power on the SAN Volume Controller.

Note: If the new battery does not have enough charge to support the actions required during a power failure, the SAN Volume Controller node will pause with Charging displayed on its front panel until sufficient charge is available. If there is sufficient charge to support the actions required during a single power failure, but not sufficient charge to support two power failures, the node will start and join the cluster but will display Recovering on its front panel.

Removing and replacing 2145 UPS parts

The remove and replace procedures for the 2145 UPS field replaceable units are described in the topics which follow.

Removing the 2145 UPS

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

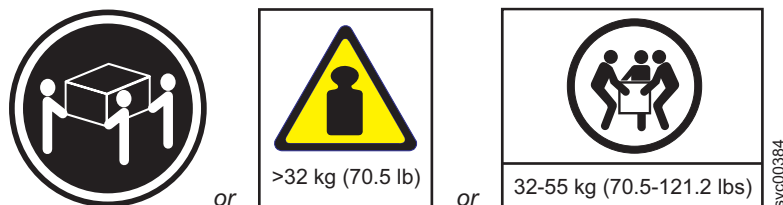
DANGER

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:



The weight of this part or unit is between 32 and 55 kg (70.5 and 121.2 lb). It takes three persons to safely lift this part or unit. (C010)

Perform the following steps to remove the 2145 UPS:

Attention: Check to make sure that any SAN Volume Controller that is powered by this 2145 UPS is shut down and powered off, prior to step 1. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

1. At the front of the 2145 UPS, press and hold the off button (**1** in Figure 227) for approximately five seconds or until the long beep stops.

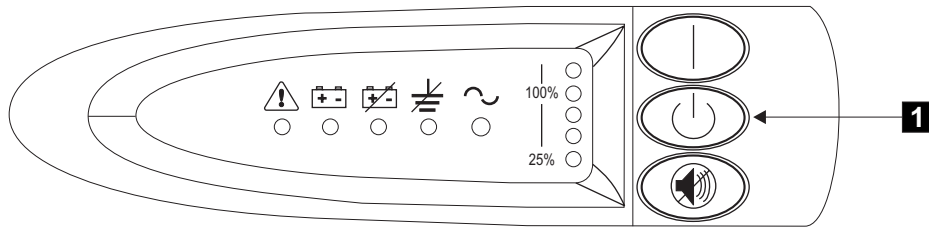


Figure 227. 2145 uninterruptible power supply front panel assembly

2. At the back of the 2145 UPS (Figure 228), disconnect the power cables of the SAN Volume Controller **3**.
3. Disconnect the signal cables (**1** in Figure 228).
4. Disconnect the main power cable (**2** in Figure 228).

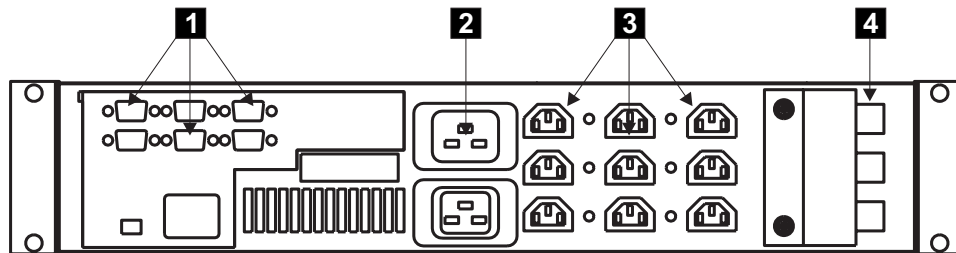


Figure 228. 2145 uninterruptible power supply (rear view)

5. Remove the battery from the 2145 UPS. See “Removing the 2145 UPS battery” on page 513.
6. Remove the electronics assembly from the 2145 UPS. See “Removing the 2145 UPS electronics” on page 510.
7. At the front of the 2145 UPS, unscrew the mounting screws (**1** in Figure 229 on page 503).

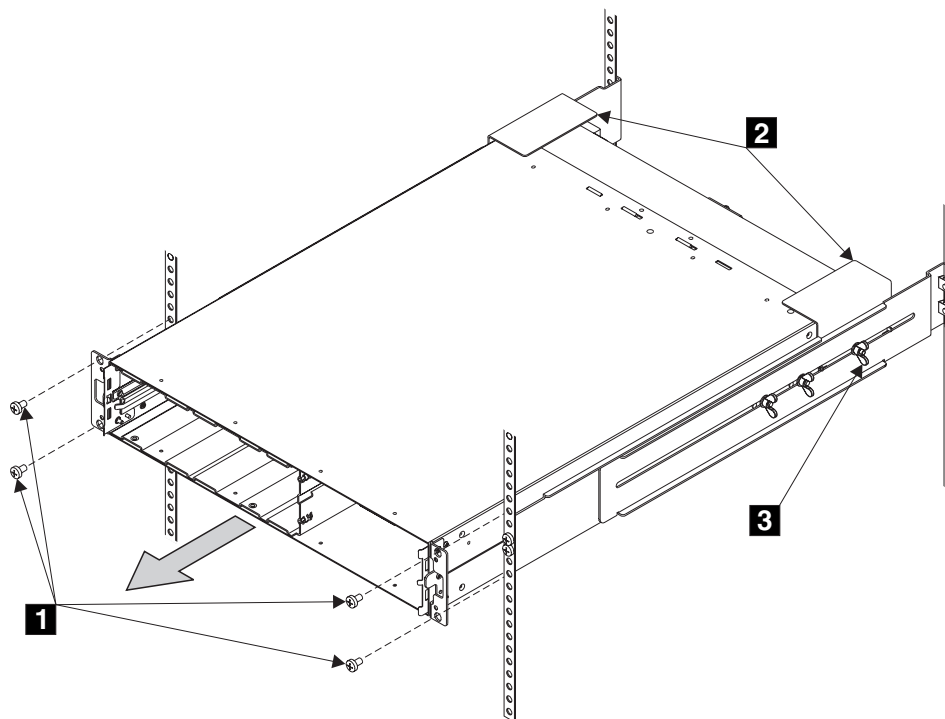


Figure 229. Removing the 2145 uninterruptible power supply

8. At the back of the rack, push the 2145 UPS forward approximately 5 cm (2 in) to enable you to pull it from the rack.
9. Go to the front of the rack.
10. With aid from another service representative, pull the 2145 UPS forward and remove it from the rack.
11. Replace the 2145 UPS. See “Replacing the 2145 UPS.”

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Removing the 2145 UPS battery” on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

“Replacing the 2145 UPS”

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

Replacing the 2145 UPS

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

Use the reference numbers in parentheses, for example (1), at the end of each notice to find the matching translated notice. For all danger, caution, and attention notices, see the *IBM Systems Safety Notices*.

CAUTION:

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)

Perform the following steps to replace the 2145 UPS:

1. Reduce the weight of the 2145 UPS by removing the battery assembly first before removing the unit from the shipping carton. Perform the following steps to remove the battery assembly:
 - a. Open the top of the shipping carton and then, with the assistance of another service representative, grip the flaps on either side of the 2145 UPS. See Figure 230.



Figure 230. Two persons unboxing a 2145 UPS

- b. Slide the 2145 UPS to the end of the carton and rest its front edge on the edge of the carton as shown. See Figure 231.



Figure 231. Slide the 2145 UPS to the edge of the carton

- c. Remove the two bolts **1** and additional nut **2** on the left side of the bracket. See Figure 232.

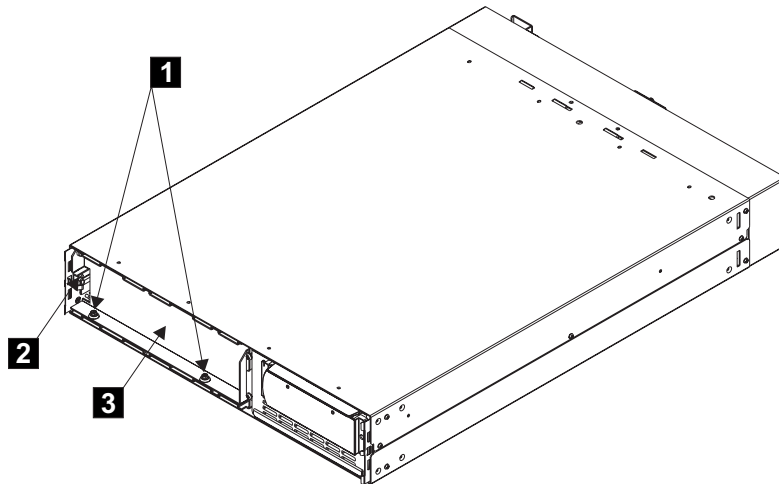


Figure 232. Remove the battery retaining bracket

- d. Remove the battery retaining bracket **3**.
- e. Grip the tab on the front of the battery and pull the battery forward until it can be accessed by two service representatives.
- f. With the assistance of another service representative, lift the battery assembly clear of the 2145 UPS and place it to one side.

Note: The cover for the 2145 UPS is not installed: it is included in the box with the 2145 UPS. Install the front cover after you have completed the other installation steps.

2. With the assistance of another service representative, lift the 2145 UPS onto a flat, stable surface.
3. Remove the electronic assembly from the 2145 UPS:
 - a. Remove the two screws **1** (see Figure 233).

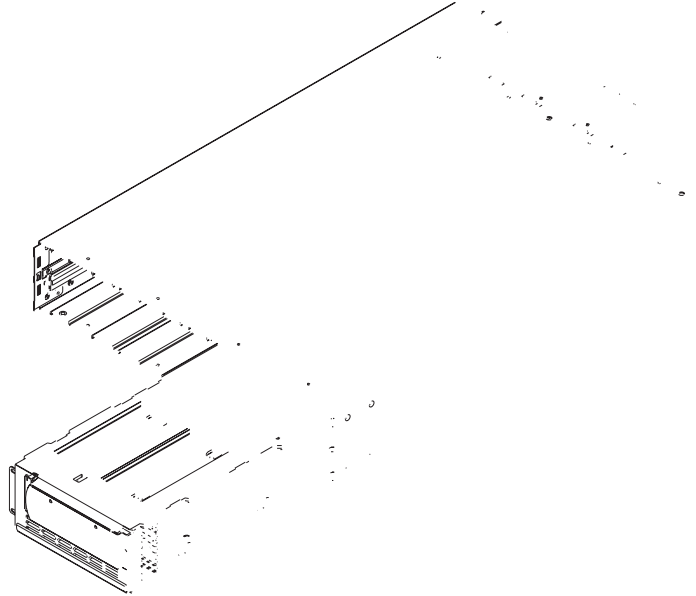


Figure 233. Removing the 2145 UPS electronics assembly

- b. Pull the electronics assembly **2** out of the 2145 UPS, and put it to one side.
4. Stand at the front of the rack and, with aid from another service representative, place the back of the 2145 UPS onto the support rails, and then slide the 2145 UPS into the rack.
5. Install the front flathead screws **1** (see Figure 234 on page 507).

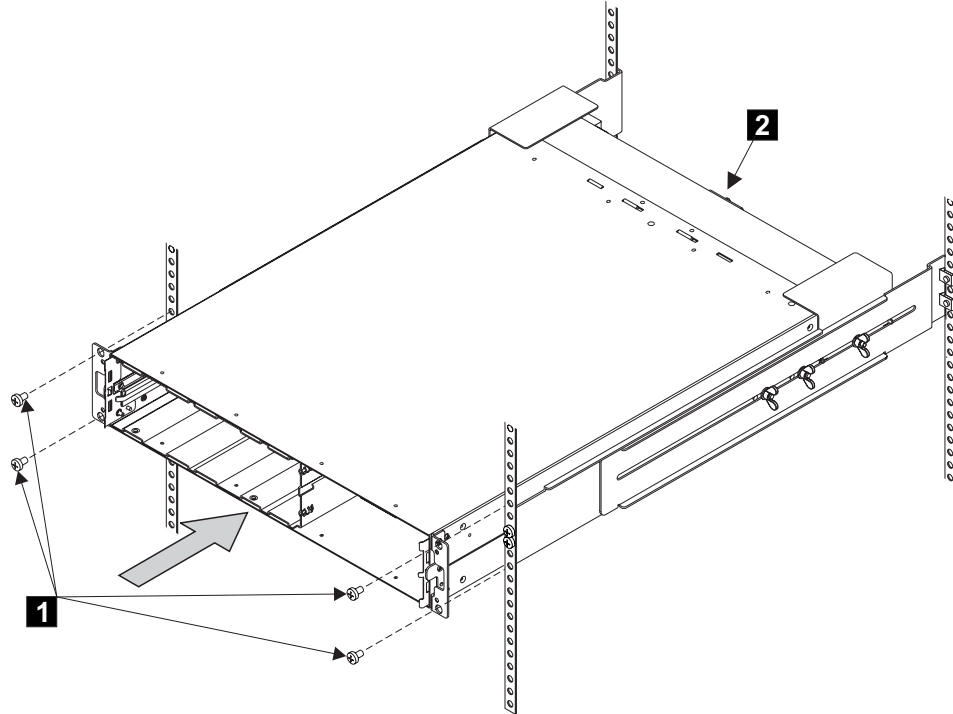


Figure 234. Replacing the 2145 UPS into a rack

6. With aid from another service representative, perform the following steps:
 - a. Install the battery.
 - b. Install the electronics assembly.

Note: A grounding screw feature is provided on the back of the 2145 UPS so that you can attach a ground bonding wire if required by local wiring codes. Since the safety of the 2145 UPS chassis is maintained through the input line power cord, you are usually not required to use this additional grounding screw feature.

7. Reconnect the signal cables.

Attention: When reinstalling the signal cables, use only the top row of serial connectors. Installing signal cables in the bottom row of serial connectors causes the 2145 UPS to malfunction.

8. Install the front panel.
9. At the back of the 2145 UPS, plug the 2145 UPS main power cable into the power socket, **1** in Figure 235 on page 508.

Note: The 2145 UPS is intended to maintain power on SAN Volume Controller nodes until data can be saved to the local hard disk drive. Only SAN Volume Controller nodes can be plugged in to the 2145 UPS, or the SAN Volume Controller cluster malfunctions.

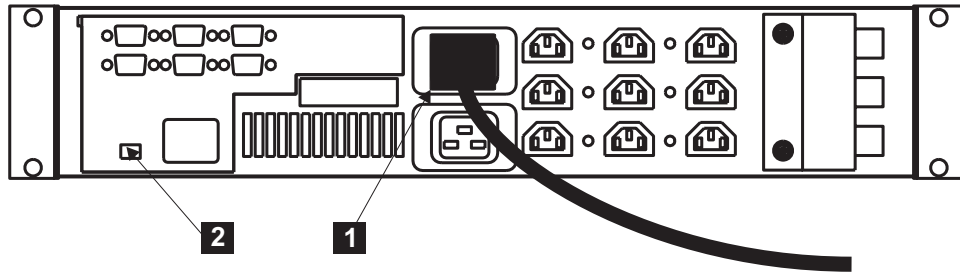


Figure 235. Installing the 2145 UPS power cable

Attention: If possible, ensure that the two UPSs are not connected to the same power source.

Note: The 2145 UPS requires a dedicated branch circuit that meets the following specifications:

- One 15 A circuit breaker in each branch circuit supplies the power to a 2145 UPS
 - Single-phase
 - 50 or 60 Hz
 - 200 – 240 Volt
10. All the front panel indicators (see Figure 236) flash for a short time while the 2145 UPS runs a self test. When the test is complete, the mode indicator flashes to show that the 2145 UPS is in standby mode.
- Press and hold the on button until you hear the 2145 UPS beep (approximately one second). The mode indicator stops flashing and the load level indicators display the percentage of load that is being supplied by the 2145 UPS. The 2145 UPS is now in normal mode and is charging its battery.

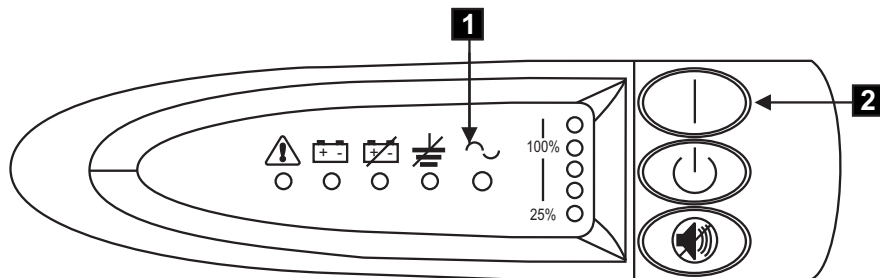


Figure 236. Power switch and indicators of the 2145 UPS

1 Mode indicator

2 On button

11. Install the front cover.

Related tasks

“Removing the 2145 UPS electronics” on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

“Removing the 2145 UPS battery” on page 513

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

Removing the power cable from the 2145 UPS

You can replace the power cable from the 2145 uninterruptible power supply (2145 UPS) if you are having problems with the power supply and suspect that the power cable is defective.

Perform the following steps to remove the power cable:

1. Remove the power from each SAN Volume Controller. See MAP 5350 for information about “MAP 5350: Powering off a SAN Volume Controller node” on page 300 about removing the power cable from the SAN Volume Controller.
2. Press and hold the off switch **2**. A long beep sounds for approximately five seconds. When the beep stops, release the switch. The mode indicator **1** flashes and the 2145 UPS enters standby mode.

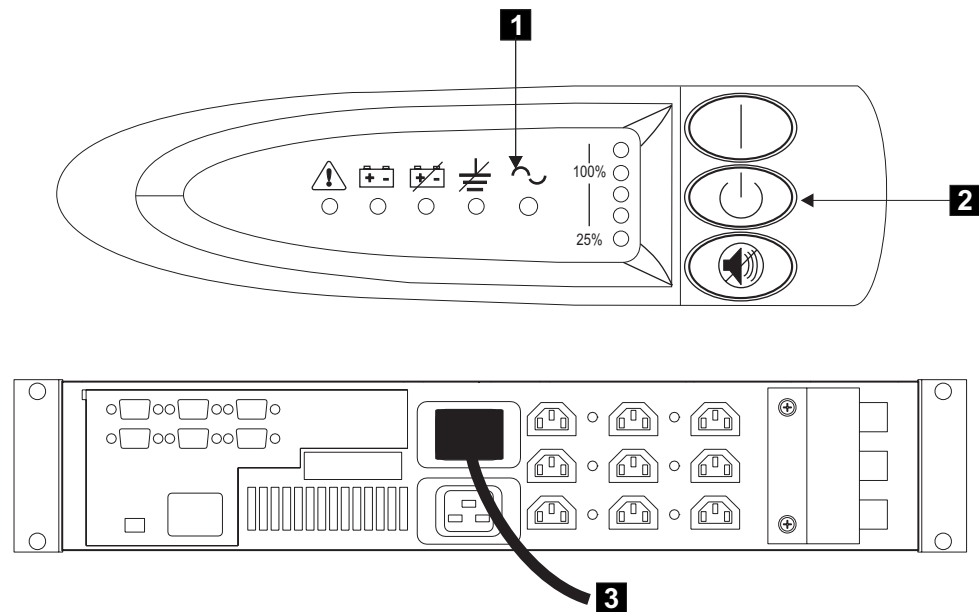


Figure 237. Front and back view of the 2145 UPS

- 1** Mode indicator
- 2** Off switch
- 3** Power cable

3. Unplug the power cable **3** from the main power source.
4. Reinstall the power cable (or replace it) to return power to the 2145 UPS. The 2145 UPS runs a self-test and enters standby mode.
5. Press and hold the on switch until, after approximately one second, the 2145 UPS beeps. The mode indicator stops flashing and the load-level indicators show the percentage of load that the 2145 UPS supplies.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300
MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing and replacing the SAN Volume Controller power cable assembly” on page 385
Make sure that power to the SAN Volume Controller is turned off before you remove the power cable assembly.

Removing the 2145 UPS electronics

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

Follow all safety notices when removing the 2145 uninterruptible power supply (2145 UPS) electronics assembly.

Important: Check to make sure that any SAN Volume Controller that is powered by this 2145 UPS is shut down and powered off, prior to step 1. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

Perform the following steps to remove the 2145 UPS electronic assembly:

1. At the front of the 2145 UPS, press and hold the off button for approximately five seconds, or until the long beep stops. See the related documentation for removing the 2145 UPS.
2. At the back of the 2145 UPS, disconnect the signal cables **1**, which are shown in Figure 238.

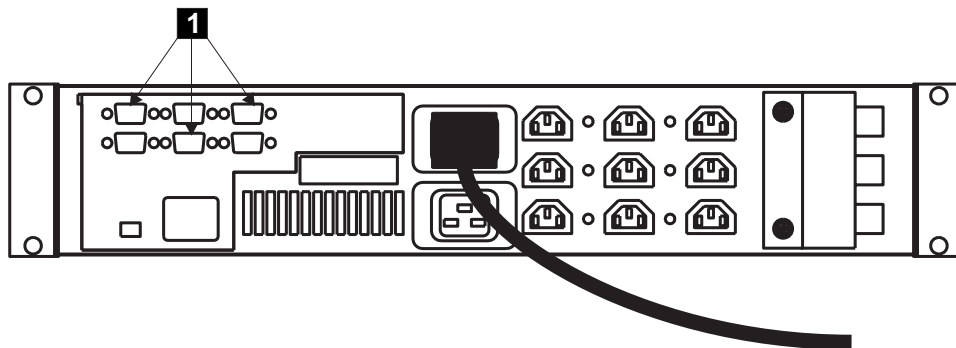


Figure 238. Disconnecting the 2145 UPS signal cables

3. Remove the front panel by pressing the sides inward and pulling both ends towards you, as shown in Figure 239 on page 511.

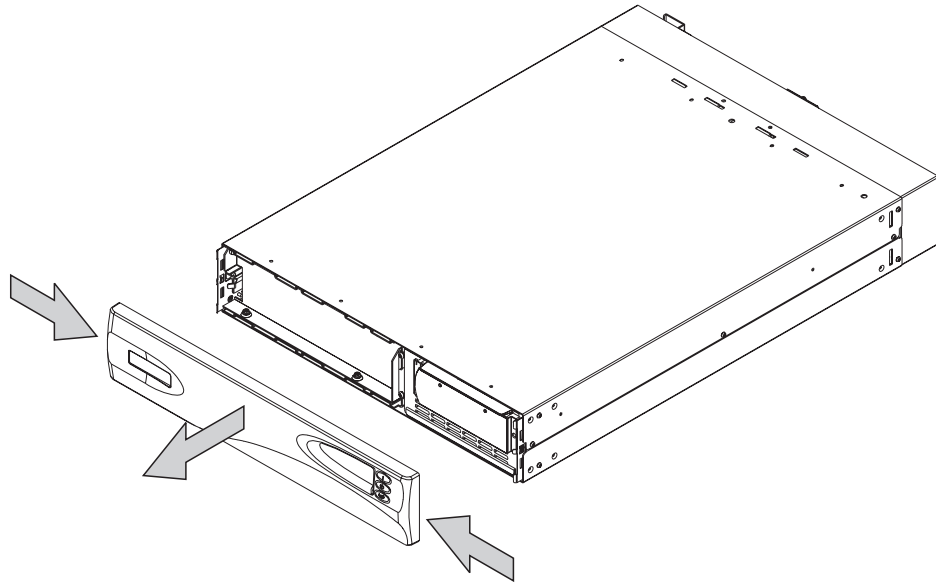


Figure 239. Removing the front panel of the 2145 UPS

4. Remove the two screws (**1** in Figure 240).

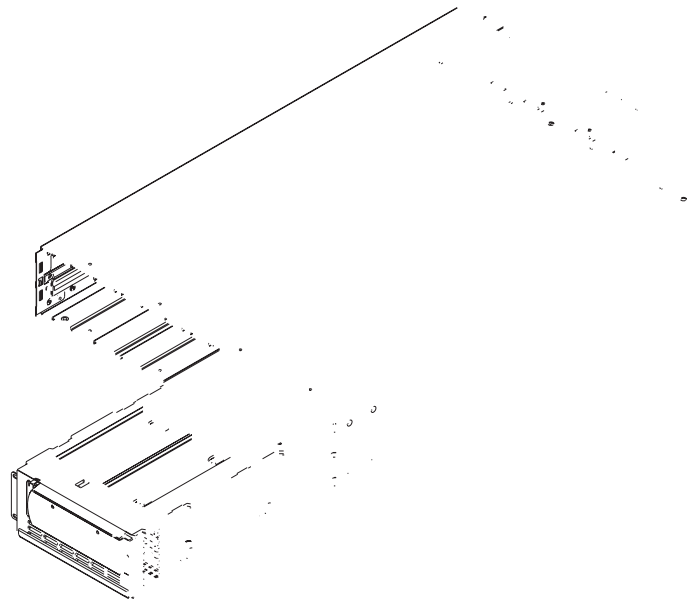


Figure 240. Removing the electronics unit from the 2145 UPS

5. Pull the electronics assembly (**2** in Figure 240) out from the 2145 UPS.

Related tasks

“MAP 5350: Powering off a SAN Volume Controller node” on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host’s access to disks.

“Removing the 2145 UPS” on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

Related reference

“Controls and indicators for the 2145 UPS” on page 83

All controls for the 2145 uninterruptible power supply (2145 UPS) are located on the front panel assembly.

Replacing the 2145 UPS electronics

During routine maintenance, you might have to replace the 2145 UPS electronics assembly.

Follow all safety notices when replacing the 2145 uninterruptible power supply (2145 UPS) electronics assembly.

Attention: When reinstalling the signal cables, use only the top row of serial connectors. Installing signal cables in the bottom row of serial connectors causes the 2145 UPS to malfunction.

Important: Check to make sure that any SAN Volume Controller that is powered by this 2145 UPS is shut down and powered off, prior to step 1.

Perform the following steps to replace the 2145 UPS electronic assembly:

1. Replace the two screws in the front of the 2145 UPS. (**1** in Figure 241).

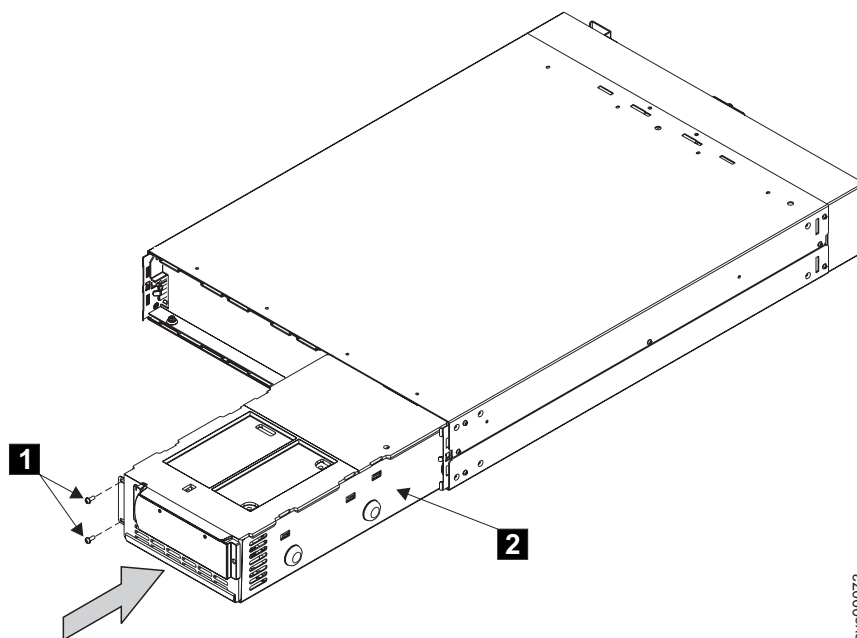
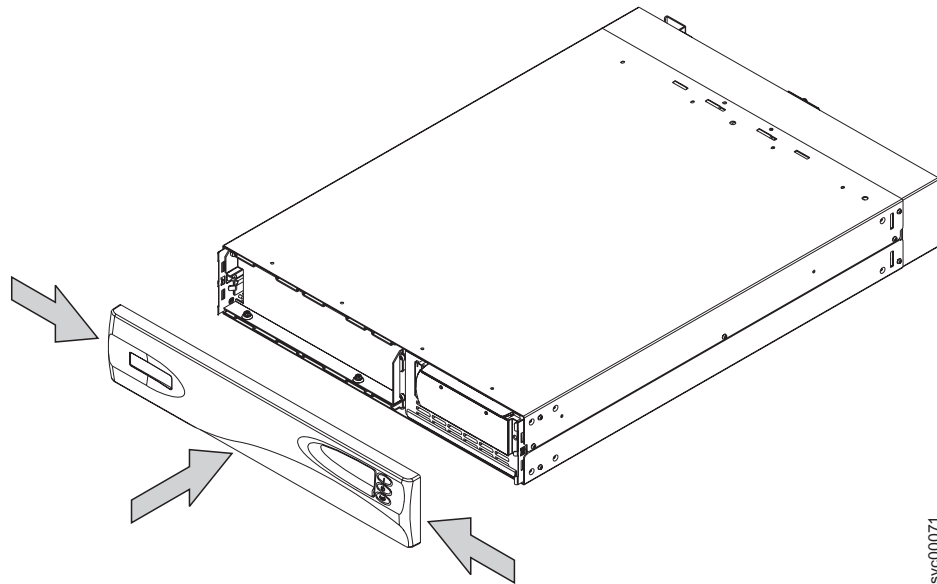


Figure 241. Replacing the electronics unit from the 2145 UPS

2. Insert the electronics assembly (**2** in Figure 241) into the 2145 UPS.
3. Replace the front panel by pressing the sides inward and pushing both ends towards the 2145 UPS, as shown in Figure 242 on page 513.



svc00071

Figure 242. Replacing the 2145 UPS front panel

4. At the back of the 2145 UPS, connect the signal cables (1 in Figure 243).

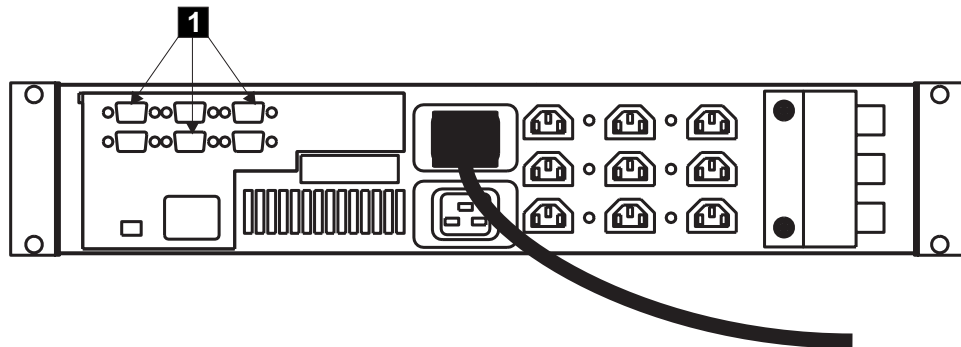


Figure 243. Connecting the 2145 UPS signal cables

5. At the front of the 2145 UPS, press and hold the on button until you hear a beep (approximately one second). The mode indicator stops flashing, and the load-level indicators display the percentage of load that is being applied to the 2145 UPS. See the related documentation at the end of this topic for information about the 2145 UPS controls and indicators.

Related reference

“Controls and indicators for the 2145 UPS” on page 83

All controls for the 2145 uninterruptible power supply (2145 UPS) are located on the front panel assembly.

Removing the 2145 UPS battery

Follow all safety notices when you are removing the 2145 uninterruptible power supply (2145 UPS) battery.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

Important: Check to make sure that any SAN Volume Controller that is powered by this 2145 UPS is shut down and powered off, prior to step 1. See “MAP 5350: Powering off a SAN Volume Controller node” on page 300.

Perform the following steps to remove the 2145 UPS battery assembly:

1. At the front of the 2145 UPS, press and hold the off button (**1** in Figure 244) for approximately five seconds or until the long beep stops.

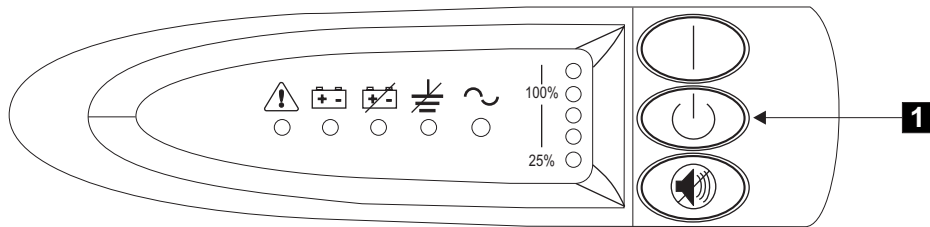


Figure 244. 2145 uninterruptible power supply front panel assembly

2. Remove the front panel by pressing the sides inward, and pulling on both ends towards you, as shown in Figure 245.

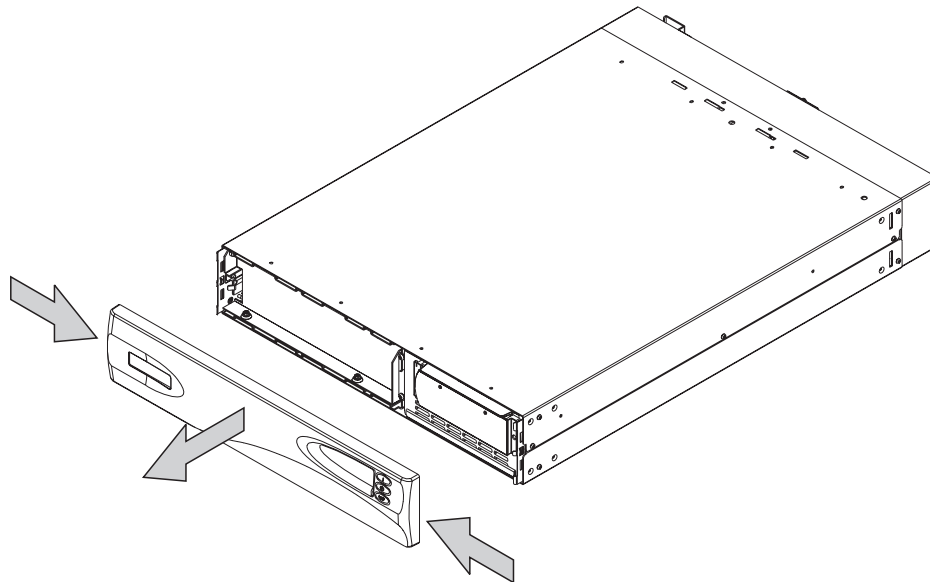


Figure 245. Removing the 2145 UPS front panel

3. Perform the following steps to remove the battery retaining bracket:
 - a. Remove the two bolts (**1** in Figure 246 on page 515).
 - b. Remove the hex nut (**2** in Figure 246 on page 515).
 - c. Remove the battery retaining bracket (**3** in Figure 246 on page 515).

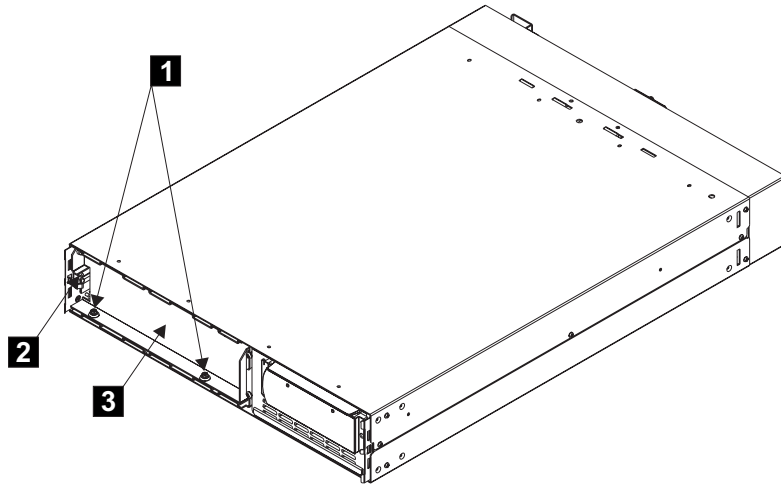


Figure 246. Fastening the battery retaining bracket

4. Remove the battery plate, to access to the battery, as shown in Figure 247.

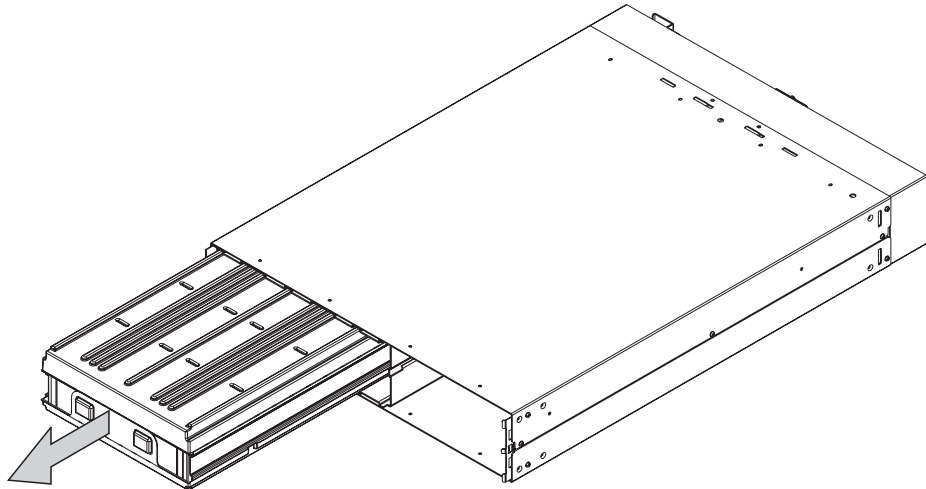


Figure 247. Removing the 2145 UPS battery

5. Grab the tabs on the battery assembly and pull the battery outward to allow two people to access it for removal.

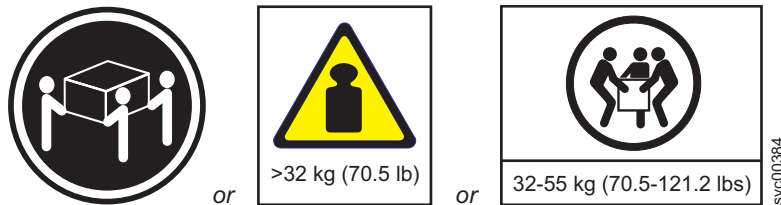
DANGER

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:



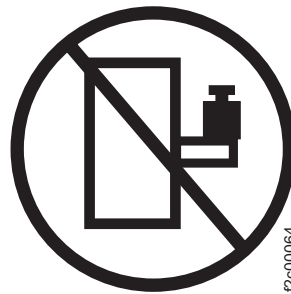
The weight of this part or unit is between 32 and 55 kg (70.5 and 121.2 lb). It takes three persons to safely lift this part or unit. (C010)

6. With the help from another service support representative, pull the battery out onto a flat, stable surface.

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

- 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:

The battery is a lithium ion battery. To avoid possible explosion, do not burn. Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call.

(C007)

Related tasks

"MAP 5350: Powering off a SAN Volume Controller node" on page 300

MAP 5350: Powering off a SAN Volume Controller node helps you power off a single SAN Volume Controller node to perform a service action without disrupting the host's access to disks.

"Removing the 2145 UPS" on page 501

Before you begin to remove the 2145 uninterruptible power supply (2145 UPS), read all safety notices.

"Removing the 2145 UPS electronics" on page 510

During routine maintenance, you might have to remove the 2145 UPS electronics assembly.

"Replacing the 2145 UPS" on page 503

You can replace the 2145 uninterruptible power supply (2145 UPS) after first removing the current 2145 UPS.

Related reference

"Controls and indicators for the 2145 UPS" on page 83

All controls for the 2145 uninterruptible power supply (2145 UPS) are located on the front panel assembly.

Replacing the 2145 UPS battery

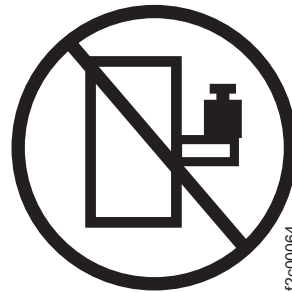
Follow all safety notices when you are replacing the 2145 uninterruptible power supply (2145 UPS) battery.

For all danger, caution, attention notices, see *IBM Systems Safety Notices*. Use the reference numbers in parentheses; for example (1), at the end of each notice to find the matching translated notice.

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

- 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)

DANGER

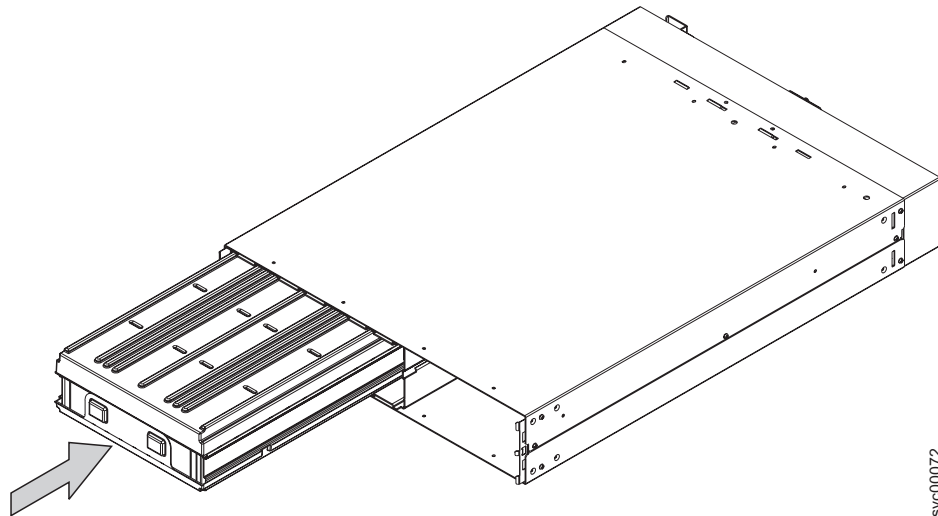
Uninterruptible power supply (UPS) units contain specific hazardous materials. Observe the following precautions if your product contains a UPS:

- 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)

Perform the following steps to replace the 2145 UPS battery assembly:

1. With the help from another service support representative, grab the tabs on the battery assembly and gently push the battery in to the 2145 UPS.
2. Replace the battery plate, as shown in Figure 248 on page 521.



svc00072

Figure 248. Replacing the battery plate

3. Perform the following steps to replace the battery retaining bracket:
 - a. Replace the battery retaining bracket (**3** in Figure 249).
 - b. Replace the hex nut **2**.
 - c. Replace the two bolts **1**.

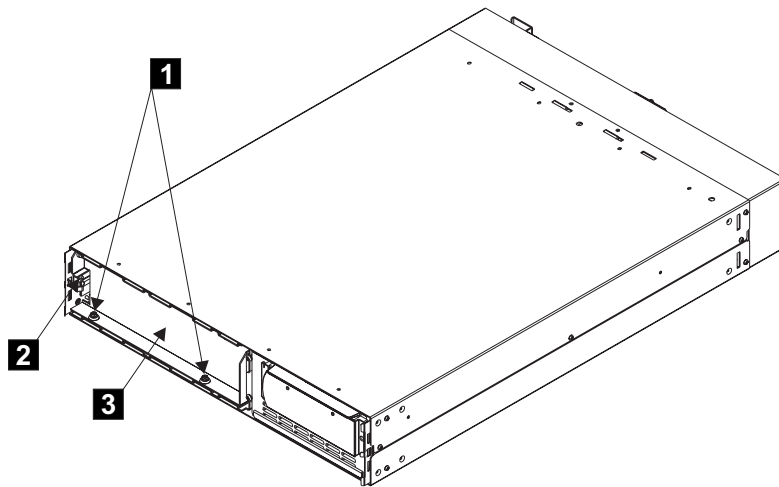


Figure 249. Fastening the battery retaining bracket

4. Replace the front panel by pressing the sides inward, and pushing on both ends towards the 2145 UPS, as shown in Figure 250 on page 522).

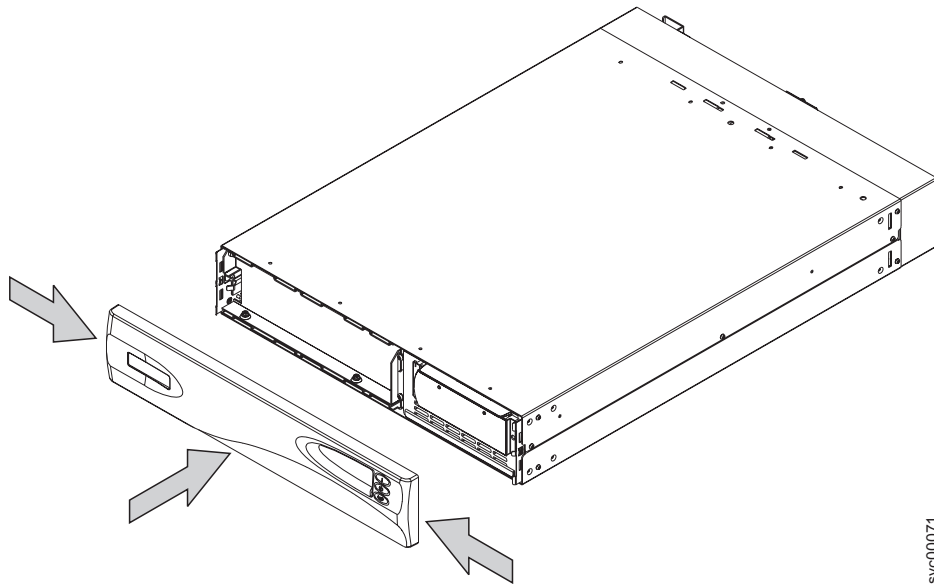


Figure 250. Replacing the 2145 UPS front panel

5. At the front of the 2145 UPS, press and hold the on button until you hear a beep (approximately one second). The mode indicator stops flashing, and the load-level indicators display the percentage of load that is being applied to the 2145 UPS. See the related documentation for the 2145 UPS controls and indicators.

Removing the support rails for a 2145 UPS

You may be required to remove the support rails for the 2145 uninterruptible power supply (2145 UPS).

The support rails for a 2145 UPS can be removed by performing the following steps:

1. Go to the left-hand support rail.
2. Loosen the two adjustment wing nuts **2** (Figure 251 on page 523).

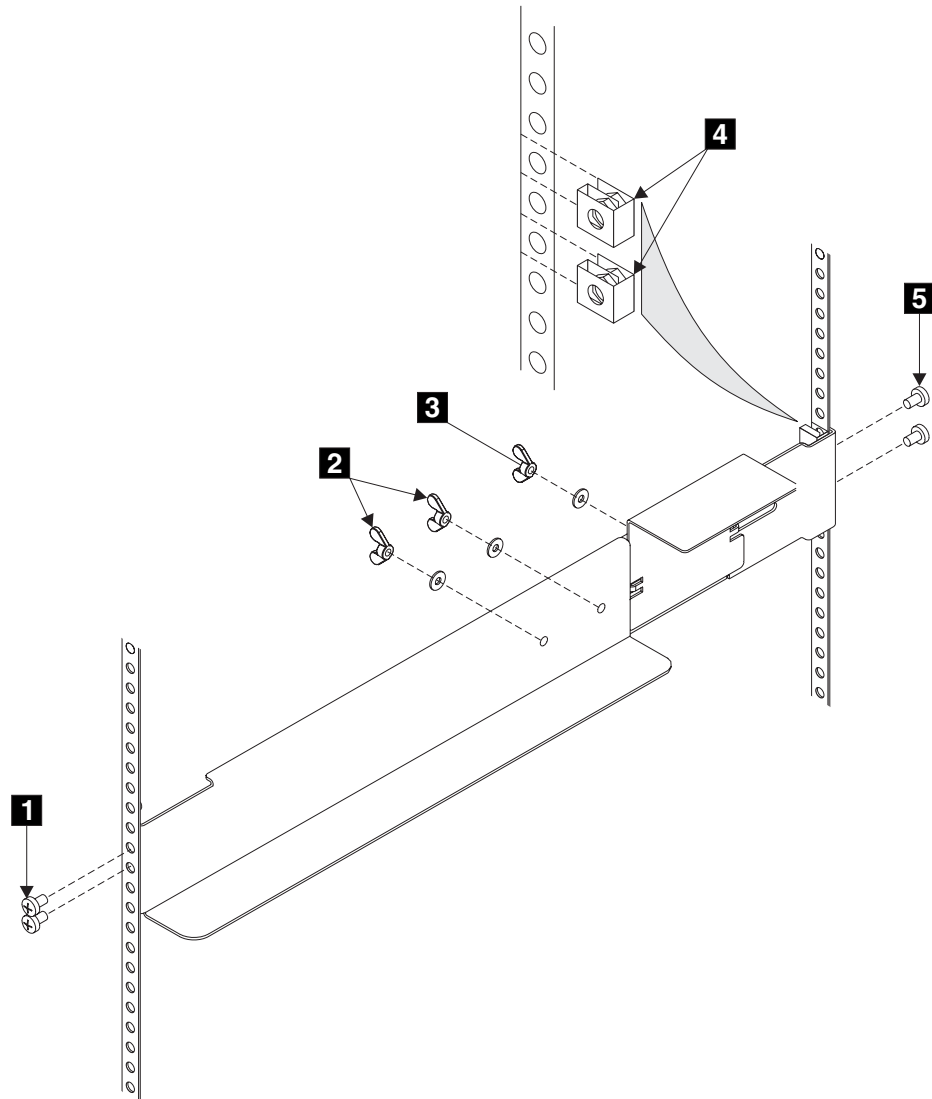


Figure 251. Removing support rails for a 2145 UPS from the rack

3. Remove the back screws **5**.
4. Remove the front screws **1**.
5. Remove the rail from the rack.
6. Remove the two clip nuts **4**.

Related tasks

“Installing the support rails for a 2145 UPS”

You must install the support rails in the rack before installing the 2145 uninterruptible power supply (2145 UPS).

Installing the support rails for a 2145 UPS

You must install the support rails in the rack before installing the 2145 uninterruptible power supply (2145 UPS).

Before you install the support rails, determine where the 2145 UPSs are to be installed in the rack. Complete the following prerequisites before you install the support rails:

- Use the user's hardware location chart, which you downloaded from <http://www.ibm.com/storage/support/2145>, to determine where in the rack that you want to install the 2145 UPS.
- Discard the two handles and their associated nuts that are shipped with the support rails.
- At the back of the rack, observe the Electronic Industries Alliance (EIA) positions and determine where you are going to install the 2145 UPS. Always install the 2145 UPS into the lowest available position in the rack. The only device that can be beneath a 2145 UPS is another UPS. The bottom of the flange of the support rail must align with the EIA mark on the rack.

Note: The user can already have installed in the rack a 2145 UPS with available spare capacity. Therefore, the SAN Volume Controller 2145-4F2 might be delivered without a 2145 UPS.

Perform the following steps for each rail:

1. Attach nut clips **4** to the rack (see Figure 252 on page 525). These nut clips must align with the second and fourth holes of the support rail flange.

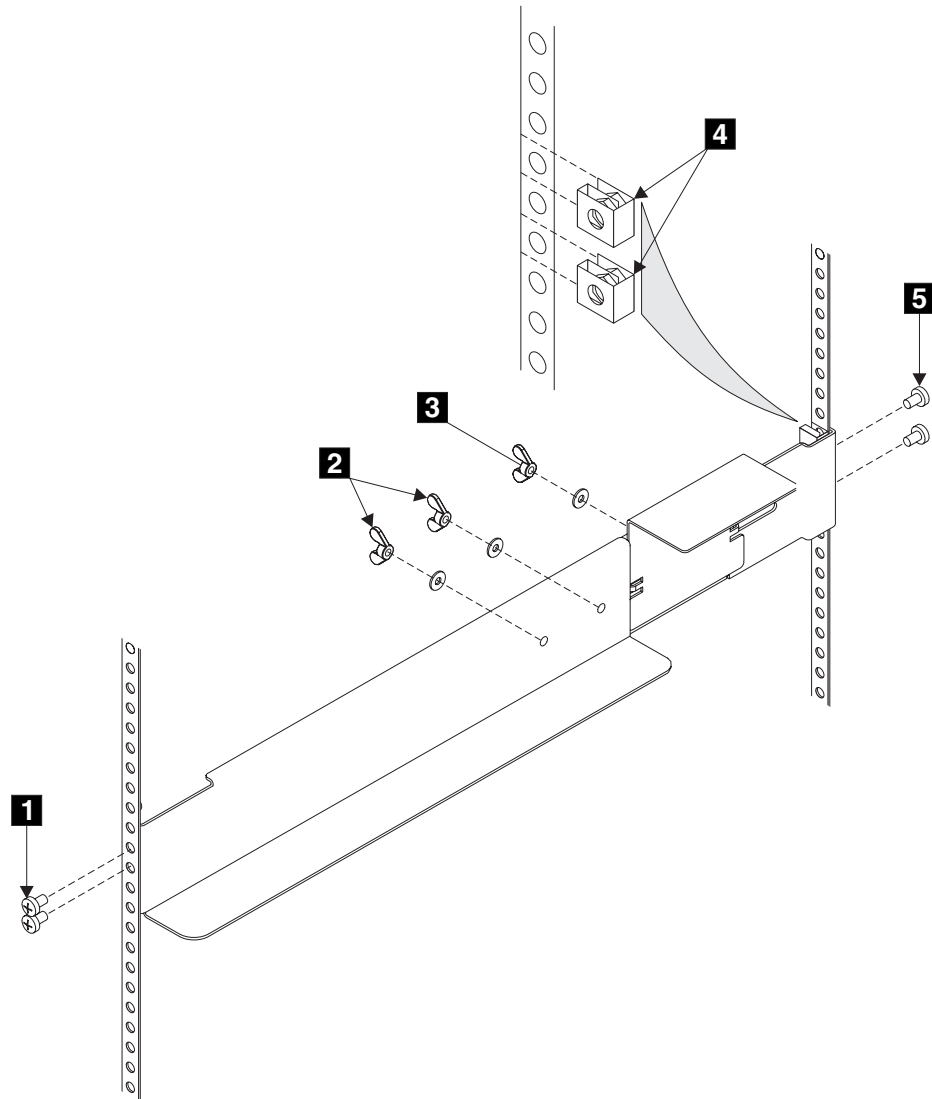


Figure 252. Installing support rails for a 2145 UPS into the rack

2. Loosen the two wing nuts **2**.
 3. Loosen the wing nut **3** and slide the bracket toward the back of the rail.
 4. Remain at the back of the rack holding the support rail in position in the rack, and then install and fully tighten the two mounting screws **5**.
 5. Go to the front of the rack.
 6. Extend the support rail toward the front of the rack.
- Note:** Hold the support rail in position until you have completed step 8.
7. Ensure that the support rail is horizontal (a level might be useful here).
 8. Install the two mounting screws **1** into the third and fourth holes of the support rail flange. Fully tighten the screws.
 9. Fully tighten the two wing nuts **2**.
 10. Loosen the wing nut **3** and slide the bracket toward the front of the rail as far as it will go, with the front edge of the bracket against the back-end of the front support rail.

11. Fully tighten the wing nut **3**.

Note: You must perform all of the previous steps for each rail.

Related tasks

“Removing the support rails for a 2145 UPS” on page 522

You may be required to remove the support rails for the 2145 uninterruptible power supply (2145 UPS).

Appendix A. Parts catalog

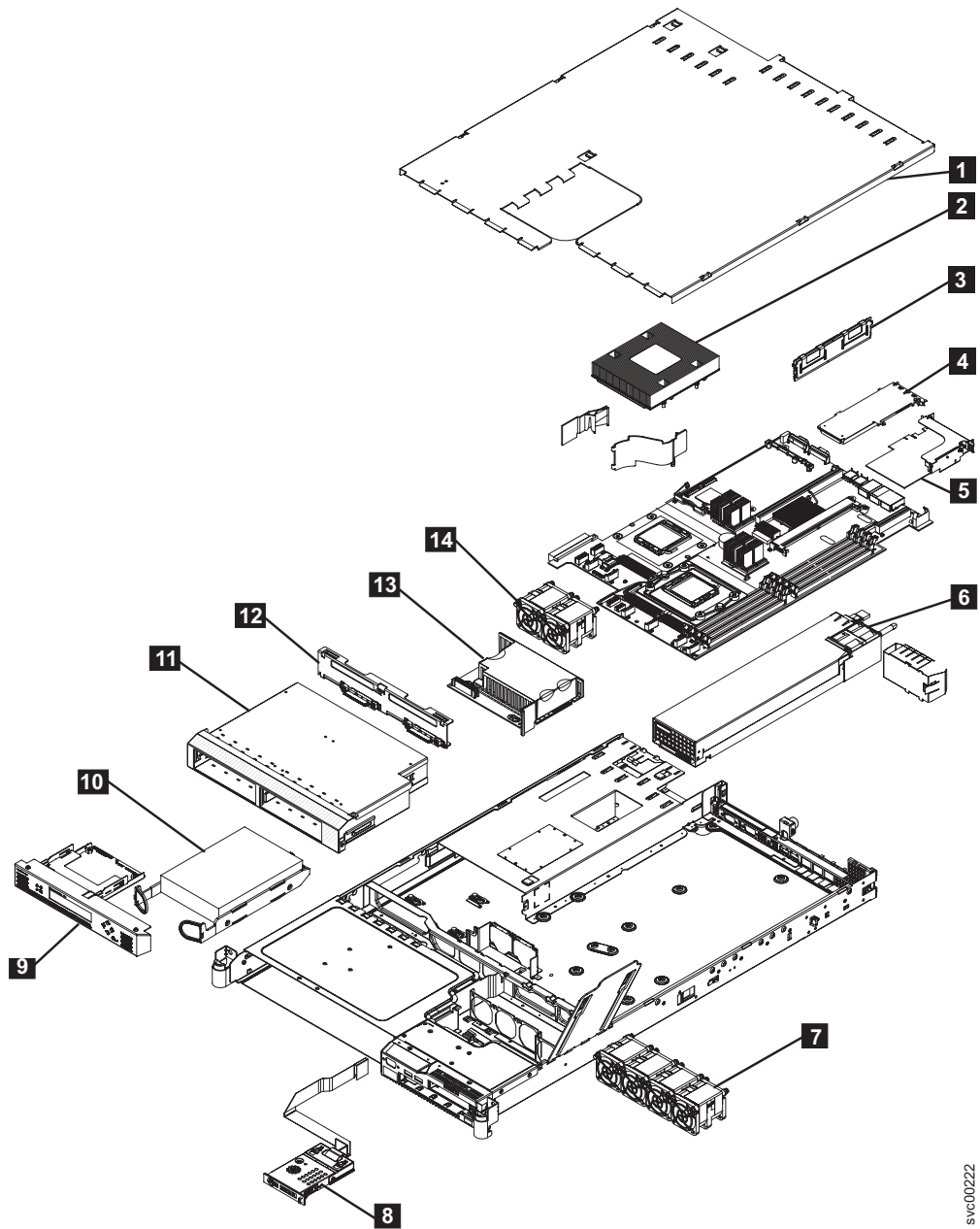
Part numbers are available for the different parts and field replaceable units (FRUs) of the SAN Volume Controller and the uninterruptible power supply.

Assembly 1: SAN Volume Controller 2145-8G4

You may need to replace a SAN Volume Controller 2145-8G4 field replaceable unit (FRU).

Information about the parts of the SAN Volume Controller 2145-8G4 is displayed in Table 23 on page 528.

Figure 253 on page 528 shows the different parts that make up the SAN Volume Controller 2145-8G4.



svc00222

Figure 253. Exploded view of the hardware for the SAN Volume Controller 2145-8G4

- Table 23 describes the different part numbers in reference to Figure 253.
- The frame assembly (Table 23) comprises all of the parts except for the SAN Volume Controller 2145-8G4 service controller and fibre-channel cards. These parts are listed in Table 24 on page 529.
- There are a number of FRUs available that are not referenced by any SAN Volume Controller 2145-8G4 service procedures. Those FRUs are listed in Table 25 on page 529.

Table 23. Assembly 1: SAN Volume Controller 2145-8G4 frame assembly

Assembly index	Part number	Units	Description
-	31P0906	1	Frame assembly
-1	43W0609	1	Top cover

Table 23. Assembly 1: SAN Volume Controller 2145-8G4 frame assembly (continued)

Assembly index	Part number	Units	Description
-2	42C4228	2	Microprocessor, 2.33 GHz Woodcrest with heatsink
-3	39M5784	8	Memory, 1 GB ECC DRR2
-5	32R2883	1	Riser card, PCI Express (Slot 1)
-6	39Y7189	1	Power supply, 670 watt
-7 and -14	26K8083	6	Fan assembly
-	33F8354	1	Battery, 3.0V
-8	43W0625	1	Operator information panel
-10	31P0994	1	160GB SATA disk drive in simple swap carrier
-11	32R2823	1	Simple-swap SATA disk drive cage
-12	26K8060	1	SATA cable assembly, with backplate
-13	39Y6972	1	Power backplane

Table 24. Items not included in the frame assembly

Assembly index	Part number	Units	Description
-	39Y9510	1	Kit, toolless rail
-4	31P0937	1	4-port fibre-channel host bus adapter
-9	31P0908	1	Service controller
-	31P0763	1	Power cable assembly (SVC to UPS)
-	31P0910	1	Cable retainer assembly
-	39M5700		External Fibre Channel cable, LC-LC, 5.0 m (16.4 ft)
-	39M5701		External Fibre Channel cable, LC-LC, 25.0 m (82 ft)

Table 25. FRUs that are not referenced by SAN Volume Controller 2145-8G4 service procedures

Part number	Quantity	Description
26K8058	2	Front panel USB cable
32R2820	1	3.5 in. SATA service label

Table 25. FRUs that are not referenced by SAN Volume Controller 2145-8G4 service procedures (continued)

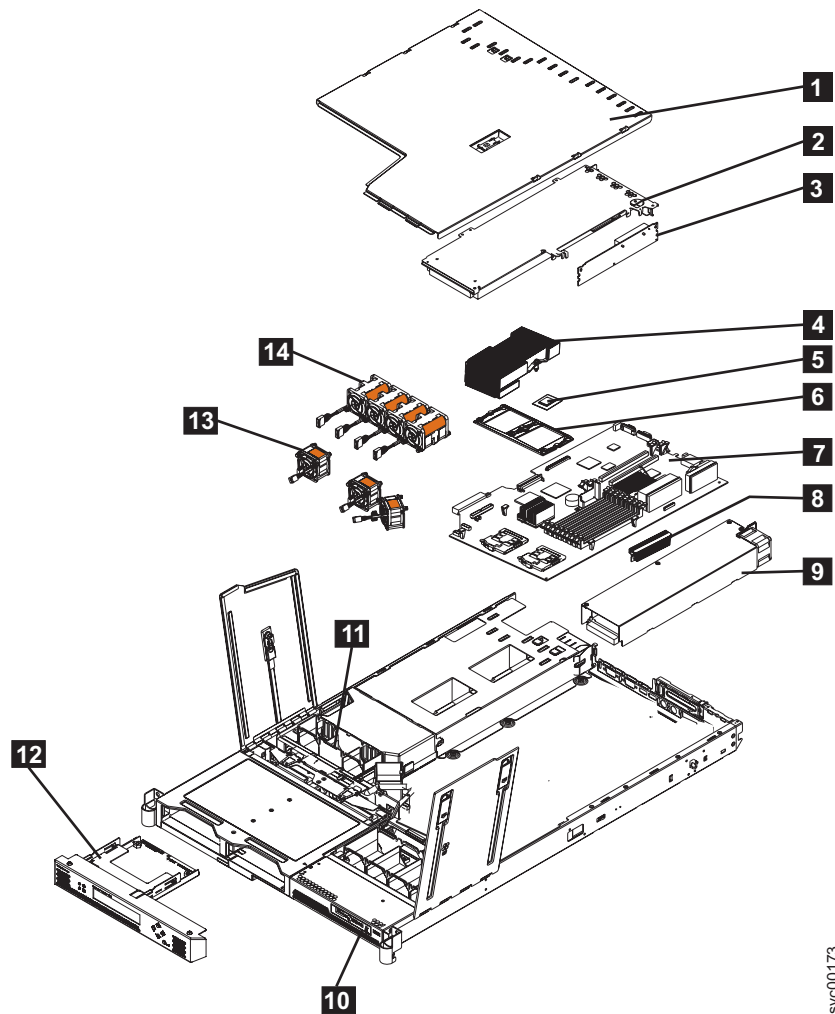
Part number	Quantity	Description
39Y9420	1	Air flow parts
39Y9423	2	Heat sink assembly
39Y9507	1	Media bezel assembly
43W0610	1	Service labels assembly
43W5890	1	SATA planar
39Y9522	1	Main panel weldment
42C3983	1	Optical interposer card
43V4869	1	CRU/FRU label
39Y9507	1	Media bezel assembly
32R2823	1	3.5 in. SATA cartridge assembly

Assembly 2: SAN Volume Controller 2145-8F4

You may need to replace a SAN Volume Controller 2145-8F4 field replaceable unit (FRU).

Information about the parts of the SAN Volume Controller 2145-8F4 is displayed in Table 26 on page 531.

The following graphic shows the different parts that make up the SAN Volume Controller 2145-8F4.



svc00173

The following table describes the different part numbers in reference to the previous graphic. The frame assembly (Table 26) comprises all of the parts except the service controller and fibre-channel cards. These parts are listed in Table 27 on page 532.

Table 26. Assembly 2: SAN Volume Controller 2145-8F4 frame assembly

Assembly index	Part number	Units	Description
1-	31P0705	1	Frame assembly
-	31P0769	1	80GB SATA HDD
-1	23K4219	1	Top cover
-3	90P1956	1	Riser card, PCI Express
-4	39R9058	2	Heat sink
-5	13M8293	2	Microprocessor, 3.0 GHz
-6	90P5282	1	Heat sink retention module
-	90P5284	1	Chassis
-	23K4209	1	Cage assembly

Table 26. Assembly 2: SAN Volume Controller 2145-8F4 frame assembly (continued)

Assembly index	Part number	Units	Description
-7	39Y6958	1	System board
-8	39Y7261	2	Voltage regulator module (VRM), 1U/75A
-9	39Y7169	1	Power supply, 585 watt
-	40K8157	1	Power backplane
-	33F8354	1	Battery, 3.0V
-	40K8160	1	Cable, fan power
-	40K8159	1	Cable, signal, front panel
-10	39Y6912	1	Operator information panel
-11	40K8156	1	Fan holder with fan backplanes
-13	40K8139	3	Fan, 40×40×28
-14	40K8140	4	Fan, 40×40×56
-	73P2870	8	Memory, 1 GB ECC DRR2

Table 27. Items not included in the frame assembly

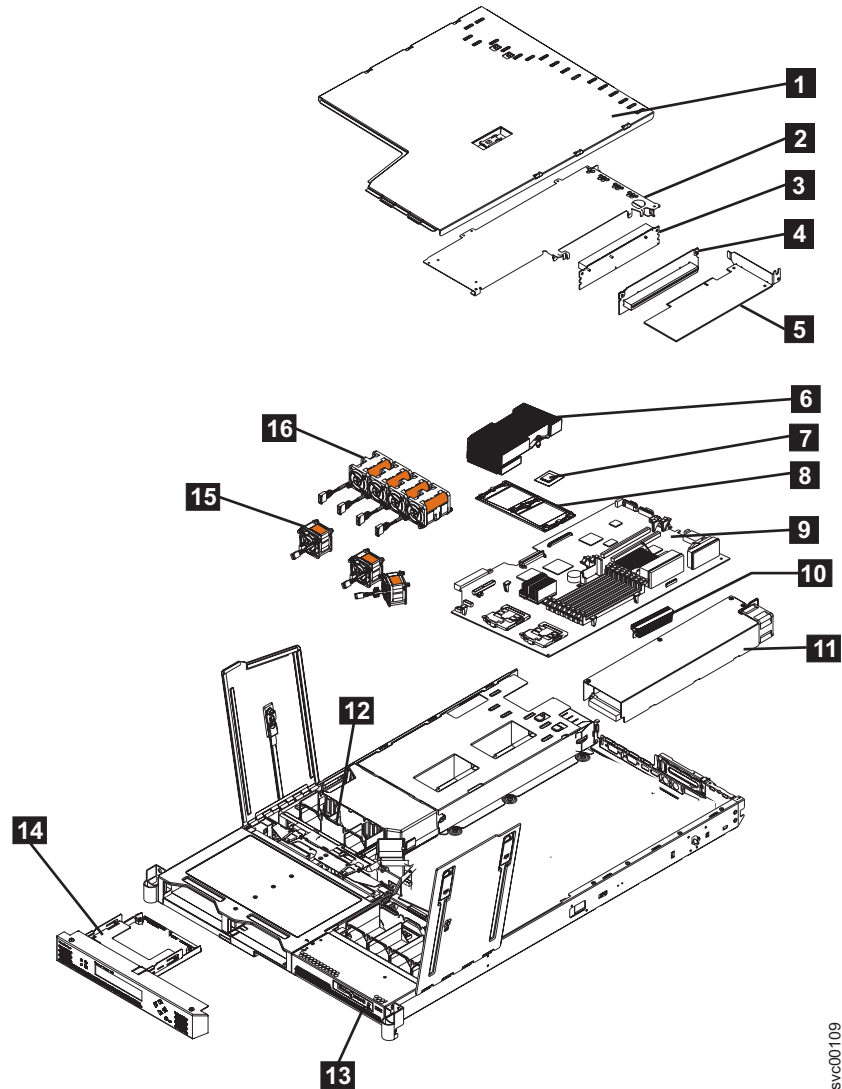
Assembly index	Part number	Units	Description
-2	31P0714	1	4-port fibre-channel host bus adapter
-12	31P0708	1	Service controller
-	23K4218	1	Kit, toolless rail
-	31P0763	1	Power cable assembly (SVC to UPS)
-	31P0715	1	Cable Retainer
-	39M5699		External Fibre Channel cable, LC-LC, 1.0 m (3.3 ft)
-	39M5700		External Fibre Channel cable, LC-LC, 5.0 m (16.4 ft)
-	39M5701		External Fibre Channel cable, LC-LC, 25.0 m (82 ft)
-	12R9321		External Fibre Channel cable, LC-SC/LC, 1.0 m (3.3 ft)

Assembly 3: SAN Volume Controller 2145-8F2

You may need to replace a SAN Volume Controller 2145-8F2 field replaceable unit (FRU).

Information about the parts of the SAN Volume Controller 2145-8F2 is displayed in Table 28.

The following graphic shows the different parts that make up the SAN Volume Controller 2145-8F2.



svc00109

The following table describes the different part numbers in reference to the previous graphic. The frame assembly (Table 28) comprises all of the parts except the service controller and fibre-channel cards. These parts are listed in Table 29 on page 534.

Table 28. Assembly 3: SAN Volume Controller 2145-8F2 frame assembly

Assembly index	Part number	Units	Description
1-	64P7934	1	Frame assembly

Table 28. Assembly 3: SAN Volume Controller 2145-8F2 frame assembly (continued)

Assembly index	Part number	Units	Description
-1	23K4219	1	Top cover
-	64P8332	1	80GB SATA HDD
-3	23K4211	1	Riser card, PCI (full height)
-4	90P1957	1	Riser card, PCI (low profile)
-6	90P5281	2	Heat sink
-7	13M8293	2	Microprocessor, 3.0 GHz
-8	90P5282	1	Heat sink retention module
-	90P5284	1	Chassis
-	23K4209	1	Cage assembly
-9	32R1730	1	System board
-10	24R2698	2	VRM, 1U/75A
-11	24R2640	1	Power supply assembly
-	23K4515	1	Power backplane
-	33F8354	1	Battery, 3.0V
-	33P2352	1	Cable, fan power
-	25R4052	1	Cable, signal, front panel
-12	23K4992	1	Fan holder with fan backplanes
-13	23K4490	1	Operator information panel
-15	23K4217	3	Fan, 40×40×28
-16	33P2335	4	Fan, 40×40×56
-	73P2870	8	Memory, 1 GB ECC DRR2

Table 29. Items not included in the frame assembly

Assembly index	Part number	Units	Description
-2	64P7783	1	Fibre-channel HBA (full height)
-5	64P7813	1	Fibre-channel HBA (low profile)
-14	64P7874	1	Service controller
-	64P7940	1	Input power cable assembly, (SAN Volume Controller 2145-8F2 to 2145 UPS-1U)
-	23K4218	1	Kit, toolless rail

Table 29. Items not included in the frame assembly (continued)

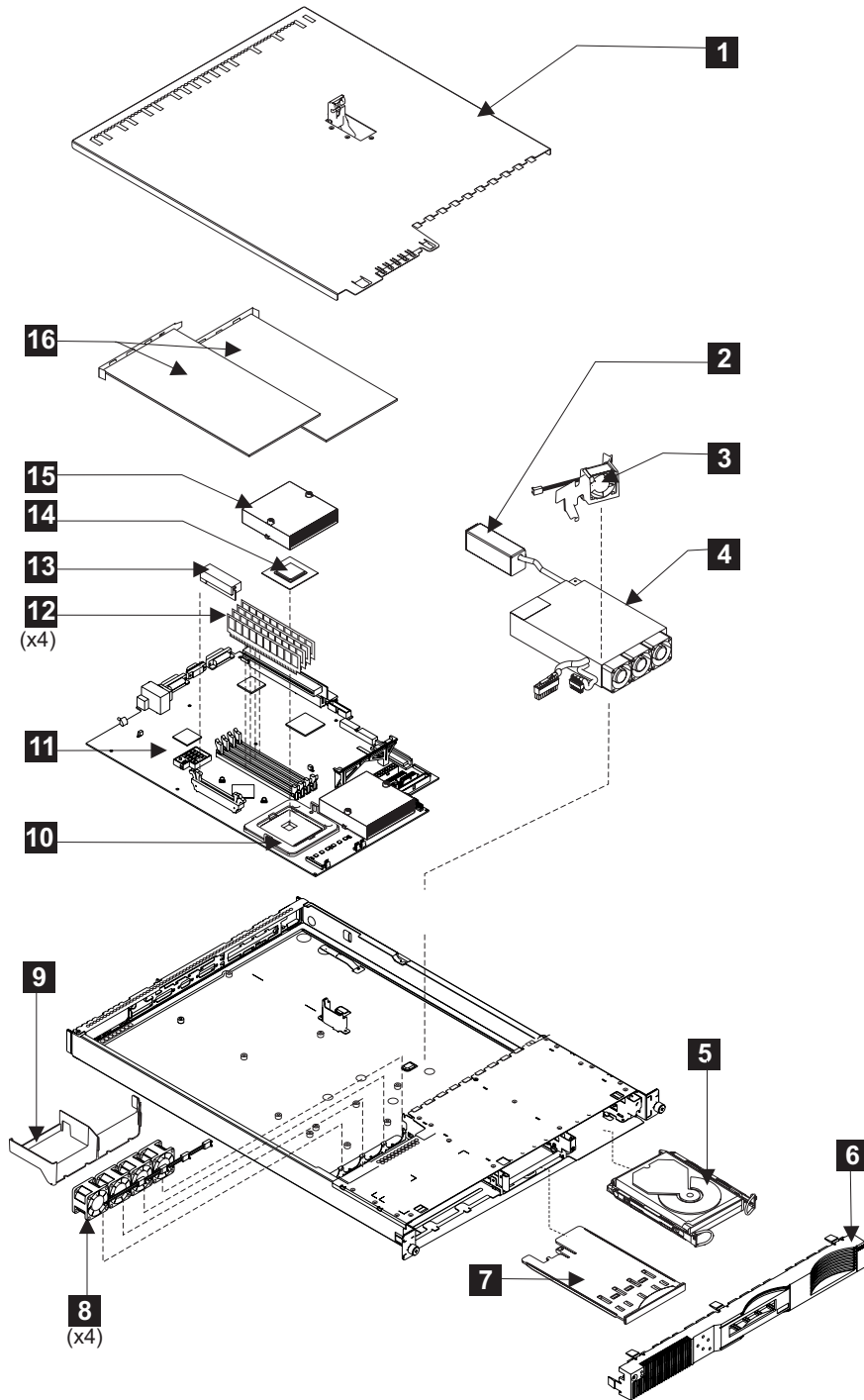
Assembly index	Part number	Units	Description
-	39M5699		External Fibre Channel cable, LC-LC, 1.0 m (3.3 ft)
-	39M5700		External Fibre Channel cable, LC-LC, 5.0 m (16.4 ft)
-	39M5701		External Fibre Channel cable, LC-LC, 25.0 m (82 ft)
-	12R9321		External Fibre Channel cable, LC-SC/LC, 1.0 m (3.3 ft)

Assembly 4: SAN Volume Controller 2145-4F2

You may need to replace a SAN Volume Controller 2145-4F2 field replaceable unit (FRU).

Information about the parts of the SAN Volume Controller 2145-4F2 is displayed in Table 30 on page 536.

The following graphic shows the different parts that make up the SAN Volume Controller 2145-8F2.



The following table describes the different part numbers in reference to the previous graphic.

Table 30. Assembly 4: SAN Volume Controller 2145-4F2

Assembly index	Part number	Units	Description
2-	64P7793	1	Frame assembly
-1	24P0708	1	Top cover
-9	24P0742	1	Baffle
-6	64P7858	1	Front panel assembly

Table 30. Assembly 4: SAN Volume Controller 2145-4F2 (continued)

Assembly index	Part number	Units	Description
-7	64P7785	1	Service controller
-5	24P3704	1	36 GB disk drive assembly
-	18P6414	1	Cable, SCSI power
-	27H0776	1	Cable, SCSI signal
-	32P1928	1	Rail kit for disk drive assembly (contains rails with screws)
-8	24P1118	4	Microprocessor fan assembly
-3	00N6991	1	Disk drive fan and bracket assembly
-11	64P7826*	1	System board assembly kit
-12	09N4308	4	Memory module
-	33F8354	1	CMOS battery
-16	64P7783	2	Fibre-channel adapter assembly
-4	49P2090	1	Power supply assembly
-	24P1121	1	SAN Volume Controller support rail kit
-	64P7940	1	Power cable assembly, SAN Volume Controller to uninterruptible power supply
-	39M5699	AR	External Fibre Channel cable, LC-LC, 1.0 m (3.3 ft)
-	19K1268	AR	External Fibre Channel cable, LC-SC/LC, 1.0 m (3.3 ft)
-	39M5700	AR	External Fibre Channel cable, LC-LC, 5.0 m (16.4 ft)
-	39M5701	AR	External Fibre Channel cable, LC-LC, 25.0 m (82 ft)
-	18P5055	AR	Ethernet cable, 2 m (6.5 ft)
-	18P5056	AR	Ethernet cable, 13 m (42 ft)

* If you need to order a system board assembly kit, first check the system board

part number in the vital product data for the failed node. Perform the following steps to find the system board part number:

1. Start the SAN Volume Controller 2145-4F2.
2. Display the vital product data for the failed node. See the topic for viewing the vital product data.
3. Note the system board part number. If the part number is 64P7826, order "System Board Assembly kit part number 64P7826." If this part number is not available, part number 64P7994 may be used as a substitute. If you order part number 64P7994, order the "System Board Assembly kit part number 64P7994."

Assembly 5: Redundant ac power switch

There is a single FRU assembly for the redundant ac power feature. It consists of the switch and two input power cables

The following graphic shows the redundant ac power switch.

Table 31 lists the part numbers for the redundant ac power switch.



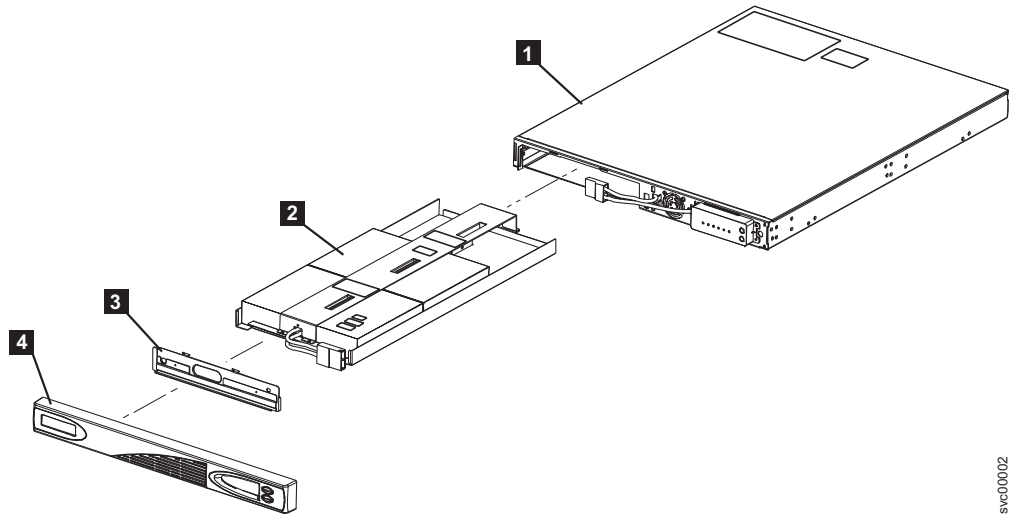
Table 31. Assembly 5: Redundant ac power switch

Part number	Units	Description
31P0896	1	Redundant ac power switch assembly

Assembly 6: 2145 UPS-1U

The 2145 uninterruptible power supply-1U (2145 UPS-1U) is constructed from four separate parts.

The following graphic shows the parts that make up the 2145 UPS-1U.



svc00002

Table 32 describes the different part numbers in reference to the previous graphic.

Table 32. Assembly 6: 2145 UPS-1U

Assembly index	Part number	Units	Description
3-	31P0875	1	Uninterruptible power supply assembly
-1	Not available (this item cannot be ordered and is supplied as part of the UPS assembly)	1	Chassis assembly
-2	31P0710	1	Battery pack assembly
-3	Not available (this item cannot be ordered and is supplied as part of the UPS assembly)	1	Battery plate
-4	31P0709	1	Front panel
-	31P1060	1	UPS cable retention bracket kit
-	31P0711	1	Support rail kit, contains rails, nut clips, and screws
-	39M5376	1	Input power cable, power distribution unit to uninterruptible power supply.
-	39M5116	1	Main power cable for the United States.

Power cables for the 2145 UPS-1U

If you do not connect the 2145 uninterruptible power supply-1U (2145 UPS-1U) to a rack power distribution unit (PDU) or redundant ac power switch, you must follow your country or region's power requirements to choose the appropriate power cable for the 2145 UPS-1U.

The 2145 UPS-1U is supplied with an IEC 320-C13 to C14 jumper to connect it to a rack PDU. You can also use this cable to connect the 2145 UPS-1U to the redundant ac power switch.

The following table lists the power cable requirements for your country or region:

Country or region	Length	Connection type (attached plug designed for 200 - 240 V ac input)	Part number
United States of America (Chicago), Canada, Mexico	1.8 m (6 ft)	NEMA L6-15P	39M5115
Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela	2.8 m (9 ft)	NEMA L6-15P	39M5116
Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macao S.A.R. of China, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe	2.8 m (9 ft)	CEE 7-VII	39M5123

Country or region	Length	Connection type (attached plug designed for 200 - 240 V ac input)	Part number
Antigua, Bahrain, Brunei, Channel Islands, Hong Kong S.A.R. of China, Cyprus, Dubai, Fiji, Ghana, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia	2.8 m (9 ft)	BS 1363/A	39M5151
Argentina	2.8 m (9 ft)	IRAM 2073	39M5068
Argentina, Australia, New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa	2.8 m (9 ft)	AS/NZS 3112/2000	39M5102
Bangladesh, Burma, Pakistan, South Africa, Sri Lanka	2.8 m (9 ft)	SABS 164	39M5144
Chile, Ethiopia, Italy, Libya, Somalia	2.8 m (9 ft)	CEI 23-16	39M5165
China (PRC)	2.8 m (9 ft)	GB 2099.1	39M5206
Denmark	2.8 m (9 ft)	DK2-5a	39M5130
Israel	2.8 m (9 ft)	SI 32	39M5172
Liechtenstein, Switzerland	2.8 m (9 ft)	IEC 60884 Stnd. Sheet 416534?2 (CH Type 12)	39M5158
Thailand	2.8 m (9 ft)	NEMA 6-15P	39M5095

Assembly 7: 2145 UPS

The 2145 uninterruptible power supply (2145 UPS) is constructed from four separate parts.

The following graphic displays the different parts that make up the 2145 UPS.

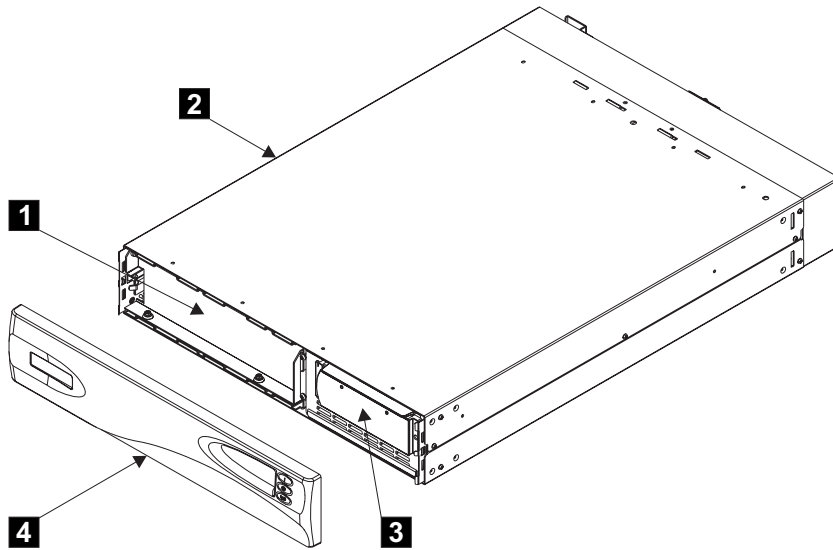


Table 33 describes the different part numbers in reference to the previous graphic.

Table 33. Assembly 7: 2145 UPS

Assembly index	Part number	Units	Description
4-	64P8103	1	Uninterruptible power supply assembly
-4	18P5865	1	Front panel
-3	64P8104	1	Electronics assembly
-1	18P5880	1	Battery assembly
-	21P7220	1	Support rail kit, contains rails, nut clips, and screws
-	18P5138	1	Input power cable, power distribution unit to uninterruptible power supply.
-	12J5119	1	Main power cable for the United States.

Power cables for the 2145 UPS

You must follow the power requirements of your country or region to choose the appropriate power cable for the 2145 uninterruptible power supply (2145 UPS).

The following table lists the power cable requirements for your country or region:

Country or region	Length	Connection type (attached plug designed for 200 - 240 V ac input)	Part number
Afghanistan, Albania, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe	2.5 m (8 ft)	CEE7	55H6643
Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Denmark, Dubai, Fiji, Ghana, Hong Kong S.A.R. of the PRC, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia	2.5 m (8 ft)	IEC 309	36L8822
Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa	2.5 m (8 ft)	L6-20P	12J5118
Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela	2.5 m (8 ft)	NEMA L6-15P	12J5119
Bangladesh, Burma, Pakistan, South Africa, Sri Lanka	2.5 m (8 ft)	SABS 164	12J5124
Thailand	2.5 m (8 ft)	NEMA 6-15P	12J5120
United States of America (Chicago), Canada, Mexico	1.8 m (6 ft)	NEMA L6-15P	14F1549

Appendix B. Websphere and CIM Logging

You can obtain log files for the Websphere Application Server and the Common Information Model (CIM). Instructions are supplied in the following topics.

Websphere Application Server logging

The Websphere Application Server (WAS) produces log files from the master console that can help with problem determination.

The WAS collects trace data and writes the information to log files stored in the *WASbasedirectory*\logs\server1 directory, where *WASbasedirectory* is the directory that you chose for the WAS.

Enabling Websphere Application Server logging

You can enable WAS logging and create the trace.log file by performing the following steps:

1. Open the command-line application and change the directory to the WAS bin directory:

```
cd WASbasedirectory\bin
```

2. Issue the following command:

```
wsadmin -connType NONE -c "$AdminControl setAttribute [$AdminControl  
completeObjectName type=TraceService,process=server1,*]  
traceSpecification ConsoleTrace=all=enabled"
```

A successfully enabled logging session is indicated by an entry in the trace.log file similar to the following:

```
[5/21/03 14:31:13:874 PDT] 2ff3581b ManagerAdmin I TRAS0018I: The trace  
state has changed. The new trace state is ConsoleTrace=all=enabled
```

Disabling Websphere Application Server logging

You can disable the WAS logging by following these steps:

1. Open the command-line application and change the directory to the WAS bin directory:

```
cd WASbasedirectory\bin
```

2. Issue the following command:

```
wsadmin -connType NONE -c "$AdminControl setAttribute [$AdminControl  
completeObjectName type=TraceService,process=server1,*]  
traceSpecification  
ConsoleTrace=event=disabled:ConsoleTrace=debug=disabled"
```

A successfully disabled logging session is indicated with an entry in the SystemOut.log file similar to the following:

```
[5/21/03 14:38:57:400 PDT] 2ff3581b ManagerAdmin I TRAS0018I: The trace  
state has changed. The new trace state is *=all=disabled
```

Note: Logging enabled in the graphical user interface (GUI) application impact the performance of the GUI. Logging must be disabled where performance is a concern.

Common information model provider logging

The Common Information Model (CIM) can produce log files that can help with problem determination.

The CIM collects data and produces log files when you enable the logging function. Logging can be done at the following levels:

- DEBUG_MIN
- DEBUG_MID
- DEBUG_MAX

You can attain the lowest level of logging by specifying DEBUG_MIN, with the highest level DEBUG_MAX.

Enabling CIM provider logging

You can enable the CIM to produce log files by performing the following steps:

1. Stop CIMOM:
 - a. Go to Control Panel on the master console system and select **Administrative Tools** → **Services**.
 - b. Right-click **IBM CIM Object Manager** and select **Stop**.
2. Edit the logger.properties file:
 - a. Go to the C:\Program Files\IBM\svconsole\cimom directory and open the logger.properties file in a text editor.
 - b. Edit the following entries to the desired level:
 - message.logger.level=
 - service.logger.level=
 - security.logger.level=
 - trace.logger.level=
3. Start CIMOM:
 - a. Go to Control Panel **Administrative Tools** → **Services**.
 - b. Right-click **IBM CIM Object Manager** and select **Start**.

The most recent debug and trace output is in the providerTrace.log file that is located in the C:\Program Files\IBM\svconsole\cimom directory. Historic trace data is written to the providerTrace[x].log

Disabling CIM provider logging

You can disable the CIM logging by performing the following steps:

1. Stop CIMOM:
 - a. Go to Control Panel **Administrative Tools** → **Services**.
 - b. Right-click **IBM CIM Object Manager** and select **Stop**.
2. Edit the logger.properties file:
 - a. Go to the C:\Program Files\IBM\svconsole\cimom directory and open the logger.properties file in a text editor.
 - b. Edit the entries to mirror the debug levels below:

- message.logger.level=DEBUG_MIN
- service.logger.level=DEBUG_MIN
- security.logger.level=DEBUG_MIN
- trace.logger.level=DEBUG_MIN

3. Start CIMOM:

- a. Go to Control Panel **Administrative Tools** → **Services**.
- b. Right-click **IBM CIM Object Manager** and select **Start**.

Note: Logging enabled in the CIM Provider impacts the performance of the GUI. Logging must be disabled where performance is a concern.

Appendix C. Fitting the service controller ATA cable

You must position the ATA (Advanced Technology Attachment) cable correctly when you fit it in the SAN Volume Controller 2145-4F2 to avoid damaging the cable.

The ATA cable connects the service controller to the SAN Volume Controller 2145-4F2 system board. If you place the ATA cable incorrectly when installing, the disk drive fan rests against the ATA cable and, subsequently, damages the cable (see Figure 254).

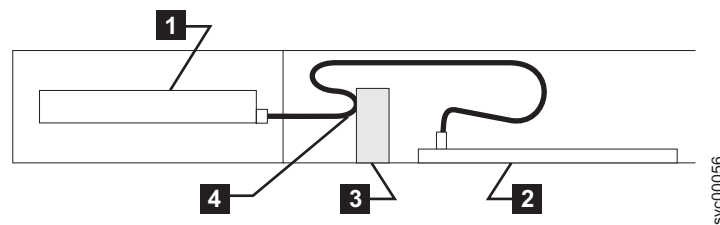


Figure 254. Incorrect placement of the ATA cable in the SAN Volume Controller 2145-4F2

- 1** Service controller
- 2** System board
- 3** Disk fan
- 4** ATA cable pushed into disk fan

To avoid damaging the ATA cable, ensure that it is routed in a loop under the service controller (see Figure 255). This allows the excess cable to be positioned correctly when the service controller is pushed into position.

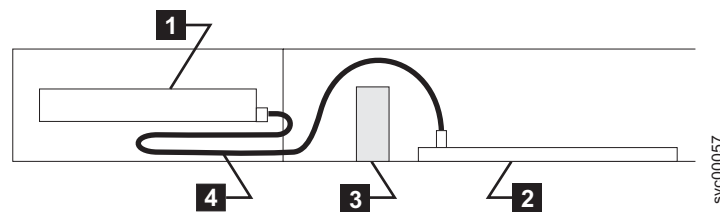


Figure 255. Proper placement of the ATA cable in the SAN Volume Controller 2145-4F2

- 1** Service controller
- 2** System board
- 3** Disk fan
- 4** ATA cable correctly positioned

Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully.

Features

These are the major accessibility features in the SAN Volume Controller Console :

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen. The following screen readers have been tested: WebKing v5.5 and Window-Eyes v5.5.
- You can operate all features using the keyboard instead of the mouse.
- You can change the initial delay and repeat rate of the up and down buttons to two seconds when you use the front panel of the SAN Volume Controller to set or change an IP address. This feature is documented in the applicable sections of the SAN Volume Controller publications.

Navigating by keyboard

You can use keys or key combinations to perform operations and initiate many menu actions that can also be done through mouse actions. You can navigate the SAN Volume Controller Console and help system from the keyboard by using the following key combinations:

- To traverse to the next link, button, or topic, press Tab inside a frame (page).
- To expand or collapse a tree node, press → or ←, respectively.
- To move to the next topic node, press V or Tab.
- To move to the previous topic node, press ^ or Shift+Tab.
- To scroll all the way up or down, press Home or End, respectively.
- To go back, press Alt+←.
- To go forward, press Alt+→.
- To go to the next frame, press Ctrl+Tab.
- To move to the previous frame, press Shift+Ctrl+Tab.
- To print the current page or active frame, press Ctrl+P.
- To select, press Enter.

Accessing the publications

You can view the publications for the SAN Volume Controller in Adobe Portable Document Format (PDF) using the Adobe Acrobat Reader. The PDFs are provided at the following Web site:

<http://www.ibm.com/storage/support/2145>

Related reference

“SAN Volume Controller library and related publications” on page xvi
A list of other publications that are related to this product are provided to you for your reference.

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f2c00790

Glossary

This glossary includes terms for the IBM System Storage SAN Volume Controller.

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See Refers the reader to one of two kinds of related information:

- A term that is the expanded form of an abbreviation or acronym. This expanded form of the term contains the full definition.
- A synonym or more preferred term.

See also

Refers the reader to one or more related terms.

Contrast with

Refers the reader to a term that has an opposite or substantively different meaning.

Numerics

2145 A hardware machine type for the IBM System Storage SAN Volume Controller. Models of the SAN Volume Controller are expressed as the number 2145 followed by "-xxx", such as 2145-8G4. Hardware models for the 2145 include 2145-4F2, 2145-8F2, 2145-8F4, and 2145-8G4.

A

access mode

One of three different modes in which a logical unit (LU) in a disk controller system can operate. See also *image mode*, *managed space mode*, and *unconfigured mode*.

Address Resolution Protocol (ARP)

A protocol that dynamically maps an IP address to a network adapter address in a local area network.

agent code

An open-systems standard that interprets Common Information Model (CIM) requests and responses as they transfer between the client application and the device.

application server

A host that is attached to the storage area network (SAN) and that runs applications.

ARP See *Address Resolution Protocol*.

array An ordered collection, or group, of physical storage devices that are used to define logical volumes or devices.

association

A class that contains two references that define a relationship between two referenced objects.

asymmetric virtualization

A virtualization technique in which the virtualization engine is outside the data path and performs a metadata-style service. The metadata server contains all the mapping and locking tables while the storage devices contain only data. See also *symmetric virtualization*.

auxiliary virtual disk

The virtual disk that contains a backup copy of the data and that is used in disaster recovery scenarios. See also *master virtual disk*.

availability

The ability of a system to continue working, with perhaps a decrease in performance, after individual components fail.

B**bandwidth**

The range of frequencies an electronic system can transmit or receive. The greater the bandwidth of a system, the more information the system can transfer in a given period of time.

bitmap

A coded representation in which each bit, or group of bits, represents or corresponds to an item; for example, a configuration of bits in main storage in which each bit indicates whether a peripheral device or a storage block is available or in which each group of bits corresponds to one pixel of a display image.

blade One component in a system that is designed to accept some number of components (blades). Blades could be individual servers that plug into a multiprocessing system or individual port cards that add connectivity to a switch. A blade is typically a hot-swappable hardware device.

block A unit of data storage on a disk drive.

block virtualization

The act of applying virtualization to one or more block-based (storage) services for the purpose of providing a new aggregated, higher-level, richer, simpler, or secure block service to clients. Block virtualization functions can be nested. A disk drive, RAID system, or volume manager all perform some form of block-address to (different) block-address mapping or aggregation. See also *virtualization*.

Boolean

Pertaining to the processes used in the algebra formulated by George Boole.

C

cache A high-speed memory or storage device used to reduce the effective time required to read data from or write data to lower-speed memory or a device. Read cache holds data in anticipation that it will be requested by a client. Write cache holds data written by a client until it can be safely stored on more permanent storage media such as disk or tape.

Call Home

A communication service that links a machine to a service provider. The

machine can use this link to place a call to IBM or to another service provider when service is required. With access to the machine, service personnel can perform service tasks, such as viewing error and problem logs or initiating trace and dump retrievals.

cascading

The process of connecting two or more fibre-channel hubs or switches together to increase the number of ports or extend distances.

CIM See *Common Information Model*.

CIM object manager (CIMOM)

The common conceptual framework for data management that receives, validates, and authenticates the CIM requests from the client application. It then directs the requests to the appropriate component or service provider.

CIMOM

See *CIM object manager*.

class The definition of an object within a specific hierarchy. A class can have properties and methods and can serve as the target of an association.

CLI See *command line interface*.

client A computer system or process that requests a service of another computer system or process that is typically referred to as a server. Multiple clients can share access to a common server.

client application

A storage management program that initiates Common Information Model (CIM) requests to the CIM agent for the device.

cluster

In SAN Volume Controller, up to four pairs of nodes that provide a single configuration and service interface.

command line-interface (CLI)

A type of computer interface in which the input command is a string of text characters.

Common Information Model (CIM)

A set of standards developed by the Distributed Management Task Force (DMTF). CIM provides a conceptual framework for storage management and an open approach to the design and implementation of storage systems, applications, databases, networks, and devices.

concurrent maintenance

Service that is performed on a unit while it is operational.

In SAN Volume Controller, the ability for one node in the cluster to be turned off for maintenance without interrupting access to the VDisk data provided by the cluster.

configuration node

A node that acts as the focal point for configuration commands and manages the data that describes the cluster configuration.

connected

In a Global Mirror relationship, pertaining to the status condition that occurs when two clusters can communicate.

consistency group

A group of copy relationships between virtual disks that are managed as a single entity.

consistent copy

In a Metro or Global Mirror relationship, a copy of a secondary virtual disk (VDisk) that is identical to the primary VDisk from the viewpoint of a host system, even if a power failure occurred while I/O activity was in progress.

consistent-stopped

In a Global Mirror relationship, the state that occurs when the secondary virtual disk (VDisk) contains a consistent image, but the image might be out-of-date with respect to the primary VDisk. This state can happen when a relationship was in the consistent-synchronized state when an error occurred that forced a freeze of the consistency group. This state can also happen when a relationship is created with the create-consistent flag set to TRUE.

consistent-synchronized

In a Global Mirror relationship, the status condition that occurs when the primary virtual disk (VDisk) is accessible for read and write I/O operations. The secondary VDisk is accessible for read-only I/O operations. See also *primary virtual disk* and *secondary virtual disk*.

container

A data storage location; for example, a file, directory, or device.

A software object that holds or organizes other software objects or entities.

copied

In a FlashCopy mapping, a state that indicates that a copy has been started after the copy relationship was created. The copy process is complete and the target disk has no further dependence on the source disk.

copying

A status condition that describes the state of a pair of virtual disks (VDisks) that have a copy relationship. The copy process has been started but the two virtual disks are not yet synchronized.

Copy Services

The services that enable you to copy virtual disks (VDisks): FlashCopy, Metro, and Global Mirror.

counterpart SAN

A nonredundant portion of a redundant storage area network (SAN). A counterpart SAN provides all the connectivity of the redundant SAN but without the redundancy. Each counterpart SANs provides an alternate path for each SAN-attached device. See also *redundant SAN*.

cross-volume consistency

In SAN Volume Controller, a consistency group property that guarantees consistency between virtual disks when an application issues dependent write operations that span multiple virtual disks.

D**data migration**

The movement of data from one physical location to another without disrupting I/O operations.

degraded

Pertaining to a valid configuration that has suffered a failure but continues to be supported and legal. Typically, a repair action can be performed on a degraded configuration to restore it to a valid configuration.

dense wavelength division multiplexing (DWDM)

A technology that places many optical signals onto one single-mode fiber using slightly different optical frequencies. DWDM enables many data streams to be transferred in parallel.

dependent write operations

A set of write operations that must be applied in the correct order to maintain cross-volume consistency.

destage

A write command initiated by the cache to flush data to disk storage.

device In the CIM Agent, the storage server that processes and hosts client application requests.

IBM definition: A piece of equipment that is used with the computer and does not generally interact directly with the system, but is controlled by a controller.

HP definition: In its physical form, a magnetic disk that can be attached to a SCSI bus. The term is also used to indicate a physical device that has been made part of a controller configuration; that is, a physical device that is known to the controller. Units (virtual disks) can be created from devices after the devices have been made known to the controller.

device provider

A device-specific handler that serves as a plug-in for the Common Information Model (CIM); that is, the CIM object manager (CIMOM) uses the handler to interface with the device.

directed maintenance procedures

The set of maintenance procedures that can be run for a cluster. These procedures are run from within the SAN Volume Controller application and are documented in the *IBM System Storage SAN Volume Controller: Service Guide*.

disconnected

In a Metro or Global Mirror relationship, pertains to two clusters when they cannot communicate.

discovery

The automatic detection of a network topology change, for example, new and deleted nodes or links.

disk controller

A device that coordinates and controls the operation of one or more disk drives and synchronizes the operation of the drives with the operation of the system as a whole. Disk controllers provide the storage that the cluster detects as managed disks (MDisks).

disk drive

A disk-based, nonvolatile, storage medium.

disk zone

A zone defined in the storage area network (SAN) fabric in which the SAN Volume Controller can detect and address the logical units that the disk controllers present.

Distributed Management Task Force (DMTF)

An organization that defines standards for the management of distributed systems. See also *Common Information Model*.

DMP See *directed maintenance procedures*.

DMTF

See *Distributed Management Task Force*.

domain name server

In the Internet suite of protocols, a server program that supplies name-to-address conversion by mapping domain names to IP addresses.

DRAM

See *dynamic random access memory*.

DWDM

See *dense wavelength division multiplexing*.

dynamic random access memory (DRAM)

A storage in which the cells require repetitive application of control signals to retain stored data.

E

EC See *engineering change*.

EIA See *Electronic Industries Alliance*.

Electronic Industries Alliance (EIA)

An alliance of four trade associations: The Electronic Components, Assemblies & Materials Association (ECA); the Government Electronics and Information Technology Association (GEIA); the JEDEC Solid State Technology Association (JEDEC); and the Telecommunications Industry Association (TIA). Prior to 1998, EIA was the Electronic Industries Association and the group dates back to 1924.

empty In a Global Mirror relationship, a status condition that exists when the consistency group contains no relationships.

engineering change (EC)

A correction for a defect of hardware or software that is applied to a product.

error code

A value that identifies an error condition.

ESS See *IBM TotalStorage[®] Enterprise Storage Server[®]*.

exclude

To remove a managed disk (MDisk) from a cluster because of certain error conditions.

excluded

In SAN Volume Controller, the status of a managed disk that the cluster has removed from use after repeated access errors.

extent A unit of data that manages the mapping of data between managed disks and virtual disks.

F

fabric In fibre-channel technology, a routing structure, such as a switch, that receives addressed information and routes it to the appropriate destination. A fabric can consist of more than one switch. When multiple fibre-channel switches are interconnected, they are described as cascading. See also *cascading*.

fabric port (F_port)

A port that is part of a fibre-channel fabric. An F_port on a fibre-channel fabric connects to the node port (N_port) on a node.

failover

In SAN Volume Controller, the function that occurs when one redundant part of the system takes over the workload of another part of the system that has failed.

FCIP See *Fibre Channel over IP*.

fibre channel

A technology for transmitting data between computer devices at a data rate of up to 4 Gbps. It is especially suited for attaching computer servers to shared storage devices and for interconnecting storage controllers and drives.

fibre-channel extender

A device that extends a fibre-channel link over a greater distance than is supported by the standard, usually a number of miles or kilometers. Devices must be deployed in pairs at each end of a link.

Fibre Channel over IP (FCIP)

A network storage technology that combines the features of the Fibre Channel Protocol and the Internet Protocol (IP) to connect distributed SANs over large distances.

Fibre Channel Protocol (FCP)

A protocol that is used in fibre-channel communications with five layers that define how fibre-channel ports interact through their physical links to communicate with other ports.

field replaceable unit (FRU)

An assembly that is replaced in its entirety when any one of its components fails. An IBM service representative performs the replacement. In some cases, a field replaceable unit might contain other field replaceable units.

FlashCopy mapping

A relationship between two virtual disks.

FlashCopy relationship

See *FlashCopy mapping*.

FlashCopy service

In SAN Volume Controller, a copy service that duplicates the contents of a source virtual disk (VDisk) to a target VDisk. In the process, the original contents of the target VDisk are lost. See also *point-in-time copy*.

F_port See *fabric port*.

FRU See *field replaceable unit*.

G**gateway**

An entity that operates above the link layer and translates, when required, the interface and protocol used by one network into those used by another distinct network.

GB See *gigabyte*.

GBIC See *gigabit interface converter*.

gigabit interface converter (GBIC)

An interface module that converts the light stream from a fibre-channel cable into electronic signals for use by the network interface card.

gigabyte (GB)

In decimal notation, 1 073 741 824 bytes.

Global Mirror

An asynchronous copy service that enables host data on a particular source virtual disk (VDisk) to be copied to the target VDisk that is designated in the relationship.

grain In a FlashCopy bitmap, the unit of data represented by a single bit.

GUI See *graphical user interface*.

graphical user interface (GUI)

A type of computer interface that presents a visual metaphor of a real-world scene, often of a desktop, by combining high-resolution graphics, pointing devices, menu bars and other menus, overlapping windows, icons and the object-action relationship.

H**hardcoded**

Pertaining to software instructions that are statically encoded and not intended to be altered.

HBA See *host bus adapter*.

HLUN

See *virtual disk*.

host An open-systems computer that is connected to the SAN Volume Controller through a fibre-channel interface.

host bus adapter (HBA)

In SAN Volume Controller, an interface card that connects a host bus, such as a peripheral component interconnect (PCI) bus, to the storage area network.

host ID

In SAN Volume Controller, a numeric identifier assigned to a group of host fibre-channel ports for the purpose of logical unit number (LUN) mapping. For each host ID, there is a separate mapping of Small Computer System Interface (SCSI) IDs to virtual disks (VDisks).

host zone

A zone defined in the storage area network (SAN) fabric in which the hosts can address the SAN Volume Controllers.

hub A fibre-channel device that connects nodes into a logical loop by using a physical star topology. Hubs will automatically recognize an active node and insert the node into the loop. A node that fails or is powered off is automatically removed from the loop.

A communications infrastructure device to which nodes on a multi-point bus or loop are physically connected. Commonly used in Ethernet and fibre-channel networks to improve the manageability of physical cables. Hubs maintain the logical loop topology of the network of which they are a part, while creating a "hub and spoke" physical star layout. Unlike

switches, hubs do not aggregate bandwidth. Hubs typically support the addition or removal of nodes from the bus while it is operating. (S)
Contrast with *switch*.

I

ID See *identifier*.

identifier (ID)

A sequence of bits or characters that identifies a user, program device, or system to another user, program device, or system.

idle In a FlashCopy mapping, the state that occurs when the source and target virtual disks (VDisks) act as independent VDIsks even if a mapping exists between the two. Read and write caching is enabled for both the source and the target.

idling The status of a pair of virtual disks (VDisks) that have a defined copy relationship for which no copy activity has yet been started.

In a Metro or Global Mirror relationship, the state that indicates that the master virtual disks (VDisks) and auxiliary VDIsks are operating in the primary role. Consequently, both VDIsks are accessible for write I/O operations.

idling-disconnected

In a Global Mirror relationship, the state that occurs when the virtual disks (VDisks) in this half of the consistency group are all operating in the primary role and can accept read or write I/O operations.

illegal configuration

A configuration that will not operate and will generate an error code to indicate the cause of the problem.

image mode

An access mode that establishes a one-to-one mapping of extents in the managed disk (MDisk) with the extents in the virtual disk (VDisk). See also *managed space mode* and *unconfigured mode*.

image VDisk

A virtual disk (VDisk) in which there is a direct block-for-block translation from the managed disk (MDisk) to the VDisk.

IML See *initial microcode load*.

inconsistent

In a Metro or Global Mirror relationship, pertaining to a secondary virtual disk (VDisk) that is being synchronized with the primary VDisk.

inconsistent-copying

In a Global Mirror relationship, the state that occurs when the primary virtual disk (VDisk) is accessible for read and write input/output (I/O) operations, but the secondary VDisk is not accessible for either. This state occurs after a **start** command is issued to a consistency group that is in the inconsistent-stopped state. This state also occurs when a **start** command is issued, with the force option, to a consistency group that is in the idling or consistent-stopped state.

inconsistent-disconnected

In a Global Mirror relationship, a state that occurs when the virtual disks (VDisks) in the half of the consistency group that is operating in the secondary role are not accessible for either read or write I/O operations.

inconsistent-stopped

In a Global Mirror relationship, the state that occurs when the primary virtual disk (VDisk) is accessible for read and write input/output (I/O) operations, but the secondary VDisk is not accessible for either read or write I/O operations.

indication

An object representation of an event.

initial microcode load (IML)

In SAN Volume Controller, the process by which the run-time code and data for a node are loaded into memory and initialized.

initiator

The system component that originates an I/O command over an I/O bus or network. I/O adapters, network interface cards, and intelligent controller device I/O bus control ASICs are typical initiators. (S) See also *logical unit number*.

input/output (I/O)

Pertaining to a functional unit or communication path involved in an input process, an output process, or both, concurrently or not, and to the data involved in such a process.

instance

An individual object that is a member of some class. In object-oriented programming, an object is created by instantiating a class.

integrity

The ability of a system to either return only correct data or respond that it cannot return correct data.

Internet Protocol (IP)

In the Internet suite of protocols, a connectionless protocol that routes data through a network or interconnected networks and acts as an intermediary between the higher protocol layers and the physical network.

interswitch link (ISL)

The physical connection that carries a protocol for interconnecting multiple routers and switches in a storage area network.

I/O See *input/output*.

I/O group

A collection of virtual disks (VDisks) and node relationships that present a common interface to host systems.

I/O throttling rate

The maximum rate at which an I/O transaction is accepted for this virtual disk (VDisk).

IP See *Internet Protocol*.

IP address

The unique 32-bit address that specifies the location of each device or workstation in the Internet. For example, 9.67.97.103 is an IP address.

ISL See *interswitch link*.

ISL hop

Considering all pairs of node ports (N-ports) in a fabric and measuring distance only in terms of interswitch links (ISLs) in the fabric, the number

of ISLs traversed is the number of ISL hops on the shortest route between the pair of nodes that are farthest apart in the fabric.

J

JBOD (just a bunch of disks)

IBM definition: See *non-RAID*.

HP definition: A group of single-device logical units not configured into any other container type.

L

LBA See *logical block address*.

least recently used (LRU)

An algorithm used to identify and make available the cache space that contains the least-recently used data.

line card

See *blade*.

local fabric

In SAN Volume Controller, those storage area network (SAN) components (such as switches and cables) that connect the components (nodes, hosts, switches) of the local cluster together.

local/remote fabric interconnect

The storage area network (SAN) components that are used to connect the local and remote fabrics together.

logical block address (LBA)

The block number on a disk.

logical unit (LU)

An entity to which Small Computer System Interface (SCSI) commands are addressed, such as a virtual disk (VDisk) or managed disk (MDisk).

logical unit number (LUN)

The SCSI identifier of a logical unit within a target. (S)

longitudinal redundancy check (LRC)

A method of error checking during data transfer that involves checking parity.

LRC See *longitudinal redundancy check*.

LRU See *least recently used*.

LU See *logical unit*.

LUN See *logical unit number*.

LUN masking

A process that allows or prevents I/O to the disk drives through the host-bus-adaptor (HBA) device or operating-system device driver.

M

managed disk (MDisk)

A Small Computer System Interface (SCSI) logical unit that a redundant array of independent disks (RAID) controller provides and a cluster manages. The MDisk is not visible to host systems on the storage area network (SAN).

managed disk group

A collection of managed disks (MDisks) that, as a unit, contain all the data for a specified set of virtual disks (VDisks).

managed space mode

An access mode that enables virtualization functions to be performed. See also *image mode* and *unconfigured mode*.

Management Information Base (MIB)

Simple Network Management Protocol (SNMP) units of managed information that specifically describe an aspect of a system, such as the system name, hardware number, or communications configuration. A collection of related MIB objects is defined as a MIB.

mapping

See *FlashCopy mapping*.

master console

A single point from which to manage the IBM System Storage SAN Volume Controller. The master console can be purchased as software that is installed and configured on a server or as a hardware platform with the operating system and master console software preinstalled.

master virtual disk

The virtual disk (VDisk) that contains a production copy of the data and that an application accesses. See also *auxiliary virtual disk*.

MB See *megabyte*.

MDisk

See *managed disk*.

megabyte (MB)

In decimal notation, 1 048 576 bytes.

mesh configuration

A network that contains a number of small SAN switches configured to create a larger switched network. With this configuration, four or more switches are connected together in a loop with some of the paths short circuiting the loop. An example of this configuration is to have four switches connected together in a loop with ISLs for one of the diagonals.

method

A way to implement a function on a class.

Metro Mirror

A synchronous copy service that enables host data on a particular source virtual disk (VDisk) to be copied to the target VDisk that is designated in the relationship.

MIB See *Management Information Base*.

migration

See *data migration*.

mirrorset

IBM definition: See *RAID-1*.

HP definition: A RAID storageset of two or more physical disks that maintain a complete and independent copy of the data from the virtual disk. This type of storageset has the advantage of being highly reliable and extremely tolerant of device failure. Raid level 1 storagesets are referred to as mirrorsets.

N

namespace

The scope within which a Common Information Model (CIM) schema applies.

node One SAN Volume Controller. Each node provides virtualization, cache, and Copy Services to the storage area network (SAN).

node name

A name identifier associated with a node. (SNIA)

node port (N_port)

A port that connects a node to a fabric or to another node. N_ports connect to fabric ports (F_ports) or to other N_ports of other nodes. N_ports handle creation, detection, and flow of message units to and from the connected systems. N_ports are end points in point-to-point links.

node rescue

In SAN Volume Controller, the process by which a node that has no valid software installed on its hard disk drive can copy the software from another node connected to the same fibre-channel fabric.

non-RAID

Disks that are not in a redundant array of independent disks (RAID). HP definition: See *JBOD*.

N_port

See *node port*.

O

object In object-oriented design or programming, a concrete realization of a class that consists of data and the operations associated with that data.

object model

A representation, such as a diagram, of objects in a given system. Using symbols similar to standard flowchart symbols, an object model depicts the classes the objects belong to, their associations with each other, the attributes that make them unique, and the operations that the objects can perform and that can be performed on them.

object name

An object that consists of a namespace path and a model path. The namespace path provides access to the Common Information Model (CIM) implementation managed by the CIM Agent, and the model path provides navigation within the implementation.

object path

An object that consists of a namespace path and a model path. The namespace path provides access to the Common Information Model (CIM) implementation managed by the CIM Agent, and the model path provides navigation within the implementation.

offline

Pertaining to the operation of a functional unit or device that is not under the continual control of the system or of a host.

online Pertaining to the operation of a functional unit or device that is under the continual control of the system or of a host.

operating set

In SAN Volume Controller, the set of nodes that are operating together to deliver storage services.

oversubscription

The ratio of the sum of the traffic that is on the initiator N-node connections to the traffic that is on the most heavily loaded interswitch links (ISLs), where more than one ISL is connected in parallel between these switches. This definition assumes a symmetrical network and a specific workload that is applied equally from all initiators and sent equally to all targets. See also *symmetrical network*.

P**partition**

IBM definition: A logical division of storage on a fixed disk.

HP definition: A logical division of a container represented to the host as a logical unit.

partner node

The other node that is in the I/O group to which this node belongs.

partnership

In Metro or Global Mirror operations, the relationship between two clusters. In a cluster partnership, one cluster is defined as the local cluster and the other cluster as the remote cluster.

paused

In SAN Volume Controller, the process by which the cache component quiesces all ongoing I/O activity below the cache layer.

pend To cause to wait for an event.

petabyte (PB)

In decimal notation, 1 125 899 906 842 624 bytes.

PDU See *power distribution unit*.

PLUN See *managed disk*.

point-in-time copy

The instantaneous copy that the FlashCopy service makes of the source virtual disk (VDisk). In some contexts, this copy is known as a T_0 copy.

port The physical entity within a host, SAN Volume Controller, or disk controller system that performs the data communication (transmitting and receiving) over the fibre channel.

port ID

An identifier associated with a port.

power distribution unit (PDU)

A device that distributes electrical power to multiple devices in the rack. It typically is rack-mounted and provides circuit breakers and transient voltage suppression.

power-on self-test

A diagnostic test that servers or computers run when they are turned on.

prepared

In a Global Mirror relationship, the state that occurs when the mapping is ready to start. While in this state, the target virtual disk (VDisk) is offline.

preparing

In a Global Mirror relationship, the state that occurs when any changed write data for the source virtual disk (VDisk) is flushed from the cache. Any read or write data for the target VDisk is discarded from the cache.

primary virtual disk

In a Metro or Global Mirror relationship, the target of write operations issued by the host application.

property

In the Common Information Model (CIM), an attribute that is used to characterize instances of a class.

PuTTY

A client program that allows you to run remote sessions on your computer through specific network protocols, such as SSH, Telnet, and Rlogin.

Q**qualifier**

A value that provides additional information about a class, association, indication, method, method parameter, instance, property, or reference.

quorum

A set of nodes that operates as a cluster. Each node has a connection to every other node in the cluster. If a connection failure causes the cluster to split into two or more groups of nodes that have full connection within the group, the quorum is the group that is selected to operate as the cluster. Typically, this is the larger group of nodes, but the quorum disk serves as a tiebreaker if the groups are the same size.

queue depth

The number of I/O operations that can be run in parallel on a device.

quorum disk

A managed disk (MDisk) that contains a reserved area that is used exclusively for cluster management. The quorum disk is accessed in the event that it is necessary to determine which half of the cluster continues to read and write data.

quorum index

The pointer that indicates the order used to resolve a tie. Nodes attempt to lock the first quorum disk (index 0), followed by the next disk (index 1), and finally the last disk (index 2). The tie is broken by the node that locks them first.

R

rack A free-standing framework that holds the devices and card enclosure.

RAID See *redundant array of independent disks*.

RAID 0

IBM definition: RAID 0 allows a number of disk drives to be combined and presented as one large disk. RAID 0 does not provide any data redundancy. If one drive fails, all data is lost.

HP definition: A RAID storageset that stripes data across an array of disk drives. A single logical disk spans multiple physical disks, allowing parallel data processing for increased I/O performance. While the

performance characteristics of RAID level 0 is excellent, this RAID level is the only one that does not provide redundancy. Raid level 0 storagesets are referred to as stripesets.

RAID 1

SNIA dictionary definition: A form of storage array in which two or more identical copies of data are maintained on separate media. (S)

IBM definition: A form of storage array in which two or more identical copies of data are maintained on separate media. Also known as mirrorset.

HP definition: See *mirrorset*.

RAID 5

SNIA definition: A form of parity RAID in which the disks operate independently, the data strip size is no smaller than the exported block size, and parity check data is distributed across the array's disks. (S)

IBM definition: See the SNIA definition.

HP definition: A specially developed RAID storageset that stripes data and parity across three or more members in a disk array. A RAIDset combines the best characteristics of RAID level 3 and RAID level 5. A RAIDset is the best choice for most applications with small to medium I/O requests, unless the application is write intensive. A RAIDset is sometimes called parity RAID. RAID level 3/5 storagesets are referred to as RAIDsets.

RAID 10

A type of RAID that optimizes high performance while maintaining fault tolerance for up to two failed disk drives by striping volume data across several disk drives and mirroring the first set of disk drives on an identical set.

redundant ac power switch

A device that provides input power redundancy by attaching a SAN Volume Controller to two independent power sources. If the main source becomes unavailable, the redundant ac power switch automatically provides power from a secondary (backup) source. When power is restored, the redundant ac power switch automatically changes back to the main power source.

redundant array of independent disks (RAID)

A collection of two or more disk drives that present the image of a single disk drive to the system. In the event of a single device failure, the data can be read or regenerated from the other disk drives in the array.

redundant SAN

A storage area network (SAN) configuration in which any one single component might fail, but connectivity between the devices within the SAN is maintained, possibly with degraded performance. This configuration is normally achieved by splitting the SAN into two, independent, counterpart SANs. See also *counterpart SAN*.

reference

A pointer to another instance that defines the role and scope of an object in an association.

rejected

A status condition that describes a node that the cluster software has removed from the working set of nodes in the cluster.

relationship

In Metro or Global Mirror, the association between a master virtual disk (VDisk) and an auxiliary VDisk. These VDIsks also have the attributes of a primary or secondary VDisk. See also *auxiliary virtual disk*, *master virtual disk*, *primary virtual disk*, and *secondary virtual disk*.

reliability

The ability of a system to continue to return data even if a component fails.

remote fabric

In Global Mirror, the storage area network (SAN) components (switches and cables) that connect the components (nodes, hosts, and switches) of the remote cluster.

roles

Authorization is based on roles that map to the administrator and service roles in an installation. The switch translates these roles into SAN Volume Controller administrator and service user IDs when a connection is made to the node for the SAN Volume Controller.

S

SAN See *storage area network*.

SAN Volume Controller fibre-channel port fan in

The number of hosts that can see any one SAN Volume Controller port.

SATA See *Serial Advanced Technology Attachment*.

schema

A group of object classes defined for and applicable to a single namespace. Within the CIM Agent, the supported schemas are the ones that are loaded through the managed object format (MOF).

SCSI See *Small Computer Systems Interface*.

SCSI back-end layer

The layer in a Small Computer Systems Interface (SCSI) network that performs the following functions: controls access to individual disk controller systems that are managed by the cluster; receives requests from the virtualization layer, processes them, and sends them to managed disks; addresses SCSI-3 commands to the disk controller systems on the storage area network (SAN).

SCSI front-end layer

The layer in a Small Computer Systems Interface (SCSI) network that receives I/O commands sent from hosts and provides the SCSI-3 interface to hosts. SCSI logical unit numbers (LUNs) are mapped to virtual disks (VDisks) in this layer as well. Thus, the layer converts SCSI read and write commands that are addressed to LUNs into commands that are addressed to specific VDIsks.

SDD See *subsystem device driver (SDD)*.

secondary virtual disk

In Metro or Global Mirror, the virtual disk (VDisk) in a relationship that contains a copy of data written by the host application to the primary VDisk.

Secure Shell (SSH)

A program to log in to another computer over a network, to execute commands in a remote machine, and to move files from one machine to another.

sequential VDisk

A virtual disk that uses extents from a single managed disk.

Serial Advanced Technology Attachment (SATA)

The evolution of the ATA interface from a parallel bus to serial connection architecture. (S)

Serial ATA

See *Serial Advanced Technology Attachment*.

server In a network, the hardware or software that provides facilities to other stations; for example, a file server, a printer server, a mail server. The station making the request of the server is usually called the client.

Service Location Protocol (SLP)

In the Internet suite of protocols, a protocol that identifies and uses network hosts without having to designate a specific network host name.

Simple Mail Transfer Protocol (SMTP)

An Internet application protocol for transferring mail among users of the Internet. SMTP specifies the mail exchange sequences and message format. It assumes that the Transmission Control Protocol (TCP) is the underlying protocol.

Simple Network Management Protocol (SNMP)

In the Internet suite of protocols, a network management protocol that is used to monitor routers and attached networks. SNMP is an application-layer protocol. Information on devices managed is defined and stored in the application's Management Information Base (MIB).

SLP See *Service Location Protocol*.

Small Computer System Interface (SCSI)

A standard hardware interface that enables a variety of peripheral devices to communicate with one another.

SMI-S See *Storage Management Initiative Specification*.

SMTP See *Simple Mail Transfer Protocol*.

SNIA See *Storage Networking Industry Association*.

SNMP

See *Simple Network Management Protocol*.

SSH See *Secure Shell*.

stand-alone relationship

In FlashCopy, Metro Mirror, and Global Mirror, relationships that do not belong to a consistency group and that have a null consistency group attribute.

stop A configuration command that is used to stop the activity for all copy relationships in a consistency group.

stopped

The status of a pair of virtual disks (VDisks) that have a copy relationship that the user has temporarily broken because of a problem.

storage area network (SAN)

A network whose primary purpose is the transfer of data between computer systems and storage elements and among storage elements. A SAN consists of a communication infrastructure, which provides physical connections, and a management layer, which organizes the connections, storage elements, and computer systems so that data transfer is secure and robust. (S)

Storage Management Initiative Specification (SMI-S)

A design specification developed by the Storage Networking Industry Association (SNIA) that specifies a secure and reliable interface that allows storage management systems to identify, classify, monitor, and control physical and logical resources in a storage area network. The interface is intended as a solution that integrates the various devices to be managed in a storage area network (SAN) and the tools used to manage them.

Storage Networking Industry Association (SNIA)

An association of producers and consumers of storage networking products whose goal is to further storage networking technology and applications. See www.snia.org.

striped

Pertains to a virtual disk (VDisk) that is created from multiple managed disks (MDisks) that are in the MDisk group. Extents are allocated on the MDisks in the order specified.

stripeset

See *RAID 0*.

subsystem device driver (SDD)

An IBM pseudo device driver designed to support the multipath configuration environments in IBM products.

superuser authority

The level of access required to add users.

suspended

The status of a pair of virtual disks (VDisks) that have a copy relationship that has been temporarily broken because of a problem.

switch

A network infrastructure component to which multiple nodes attach. Unlike hubs, switches typically have internal bandwidth that is a multiple of link bandwidth, and the ability to rapidly switch node connections from one to another. A typical switch can accommodate several simultaneous full link bandwidth transmissions between different pairs of nodes. (S)
Contrast with *hub*.

symmetrical network

A network in which all the initiators are connected at the same level and all the controllers are connected at the same level.

symmetric virtualization

A virtualization technique in which the physical storage in the form of Redundant Array of Independent Disks (RAID) is split into smaller chunks of storage known as *extents*. These extents are then concatenated, using various policies, to make virtual disks (VDisks). See also *asymmetric virtualization*.

synchronized

In Metro or Global Mirror, the status condition that exists when both virtual disks (VDisks) of a pair that has a copy relationship contain the same data.

system

A functional unit, consisting of one or more computers and associated software, that uses common storage for all or part of a program and also for all or part of the data necessary for the execution of the program. A computer system can be a stand-alone unit, or it can consist of multiple connected units.

T**terabyte**

In decimal notation, 1 099 511 628 000 bytes.

topology

The logical layout of the components of a computer system or network and their interconnections. Topology deals with questions of what components are directly connected to other components from the standpoint of being able to communicate. It does not deal with questions of physical location of components or interconnecting cables. (S)

IBM TotalStorage Enterprise Storage Server (ESS)

An IBM product that provides an intelligent disk-storage subsystem across an enterprise.

trigger

To initiate or reinstate copying between a pair of virtual disks (VDisks) that have a copy relationship.

U

UID See *unique identifier*.

unconfigured mode

A mode in which I/O operations cannot be performed. See also *image mode* and *managed space mode*.

uninterruptible power supply (UPS)

A device that is connected between a computer and its power source that protects the computer against blackouts, brownouts, and power surges. The uninterruptible power supply contains a power sensor to monitor the supply and a battery to provide power until an orderly shutdown of the system can be performed.

unique identifier (UID)

An identifier that is assigned to storage system logical units when they are created. It is used to identify the logical unit regardless of the logical unit number (LUN), status of the logical unit, or whether alternate paths exist to the same device. Typically, a UID is only used once.

unmanaged

An access mode that pertains to a managed disk (MDisk) that is not used by the cluster.

UPS See *uninterruptible power supply*.

V

valid configuration

A configuration that is supported.

VDisk See *virtual disk*.

virtual disk (VDisk)

In SAN Volume Controller, a device that host systems attached to the storage area network (SAN) recognize as a Small Computer System Interface (SCSI) disk.

virtualization

In the storage industry, a concept in which a pool of storage is created that contains several disk subsystems. The subsystems can be from various vendors. The pool can be split into virtual disks that are visible to the host systems that use them.

virtualized storage

Physical storage that has virtualization techniques applied to it by a virtualization engine.

virtual storage area network (VSAN)

A fabric within the SAN.

vital product data (VPD)

Information that uniquely defines system, hardware, software, and microcode elements of a processing system.

VLUN See *managed disk*.

VPD See *vital product data*.

VSAN See *virtual storage area network*.

W

WBEM

See *Web-Based Enterprise Management*.

Web-Based Enterprise Management (WBEM)

A tiered, enterprise-management architecture that was developed by the Distributed Management Task Force (DMTF). This architecture provides the management design framework that consists of devices, device providers, the object manager, and the messaging protocol for the communication between client applications and the object manager.

worldwide node name (WWNN)

An identifier for an object that is globally unique. WWNNs are used by Fibre Channel and other standards.

worldwide port name (WWPN)

A unique 64-bit identifier that is associated with a fibre-channel adapter port. The WWPN is assigned in an implementation- and protocol-independent manner.

WWNN

See *worldwide node name*.

WWPN

See *worldwide port name*.

Z

zoning

In fibre-channel environments, the grouping of multiple ports to form a virtual, private, storage network. Ports that are members of a zone can communicate with each other, but are isolated from ports in other zones.

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