V-Series Systems
Hardware Maintenance Guide

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Part number 210-00975_A0
July 2006

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Preface

About this guide

This guide describes how to monitor, troubleshoot, and perform maintenance for NetApp® V-Series systems.

Note

This document does not contain information about the V3000 systems.

Audience

This guide is for users who are familiar with operating systems, such as UNIX®, Windows® 95, Windows NT®, Windows 2000, and Windows XP, and who will be deploying V-Series systems. This guide does not discuss basic system or network administration topics, such as IP addressing, routing, and network topology; it emphasizes the characteristics of the V-Series systems.

Terminology

This guide uses the term “type” to mean pressing one or more keys on the keyboard. It uses the term “enter” to mean pressing one or more keys and then pressing the Enter key.

This guide uses the following terms:

- *Storage subsystem* refers to your disk array
- *Node* refers to either the local or partner V-Series system.
- *Cluster* refers to local and partner nodes directly connected to each other.

Command conventions

You can enter commands on the system console or from any client that has access to the system using Telnet. In examples of commands executed on a UNIX workstation, the command syntax and output might differ, depending on your version of UNIX.

Keyboard conventions

When describing key combinations, this guide uses the hyphen (-) to separate individual keys. For example, “Ctrl-D” means pressing the “Control” and “D” keys simultaneously. Also, this guide uses the term “Enter” to refer to the key that generates a carriage return, although the key is named “Return” on some keyboards.

Typographic conventions

The following table describes typographic conventions used in this guide.

Convention	Type of information
Italic font	Words or characters that require special attention. Placeholders for information you must supply. For example, if the guide says to enter the `arp -d` *hostname* command, you enter the characters "arp -d" followed by the actual name of the host. Book titles in cross-references.
`Monospaced` font	Command and daemon names. Information displayed on the system console or other computer monitors. The contents of files.
`Bold monospaced` font	Words or characters you type. What you type is always shown in lowercase letters, unless you must type it in uppercase letters.

Special messages

This guide contains special messages that are described as follows:

Note

A note contains important information that helps you install or operate the system efficiently.

Attention

Attention contains instructions that you must follow to avoid damage to the equipment, a system crash, or loss of data.

Safety Information (Sicherheitshinweise)

Safety rules

All products are Class 1 laser devices, except the NVRAM5 cluster media converter, which is Class 1M. You must follow these safety rules when working with this equipment:

WARNING
Failure to follow these directions could result in bodily harm or death.

- When using an NVRAM5 cluster media converter, the storage system must be installed in a restricted access location.
- **Switzerland only—for FAS900, GF900, R200, and C6200 systems:** This equipment relies on fuses/circuit breakers in the building installation for overcurrent protection. Each power supply must receive power from a separately dedicated outlet with a 10A fuse/circuit breaker.
- When installing disk shelves and a storage system into a movable cabinet or rack, install from the bottom up for best stability.
- DC-based systems must be installed in a restricted access location and the two input power terminals for the DC power supply must be connected to separate isolated branch circuits.
- To reduce the risk of personal injury or equipment damage, allow internal components time to cool before touching them and ensure that the equipment is properly supported or braced when installing options.
- This equipment is designed for connection to a grounded outlet. The grounding type plug is an important safety feature. To avoid the risk of electrical shock or damage to the equipment, do not disable this feature.
- This equipment has one or more replaceable batteries. There is danger of explosion if the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

For units with multiple power cords

If your storage system or disk shelf has multiple power cords and you need to turn the unit off, heed the following warning:

WARNING
This unit has more than one power supply cord. To reduce the risk of electrical shock, disconnect all power supply cords before servicing.

Sicherheitsvorgaben

Alle Produkte sind Lasergeräte der Klasse 1, mit Ausnahme des NVRAM5 Cluster-Medienkonverters, der in Klasse 1M fällt. Beim Einsatz dieser Geräte sind die Sicherheitsvorschriften zu beachten:

Vorsicht

Nichtbeachtung dieser Vorschriften kann zu Verletzungen oder Tod führen.

- Bei der Verwendung eines NVRAM5 Cluster-Medienkonverters muss das Speichersystem an einem Standort mit beschränktem Zugriff installiert werden.
- **Nur für die Schweiz - Systeme FAS900, GF900, R200 und C6200:** Diese Geräte erfordern den Festeinbau von Sicherungen zum Überstromschutz. Jeder Netzanschluss muss mit Strom aus getrennten, speziell für diesen Zweck vorgesehenen Steckdosen versorgt werden, die jeweils mit einer 10A-Sicherung geschützt sind.
- Werden die Plattenregale und das Speichersystem in einen beweglichen Schrank oder Turm eingebaut, ist wegen der höheren Stabilität der Einbau von unten nach oben vorzunehmen.
- Gleichstrom-Systeme müssen an Betriebsstaette mit beschraenktem Zutritt installiert sein und die beiden Eingangsstromklemmen für das Gleichstrom-Netzteil müssen an separate und isolierte Abzweigleitungen angeschlossen sein.
- Zum Schutz vor Körperverletzung oder Sachschäden am Gerät lassen Sie die inneren Bauteile stets vor dem Berühren abkühlen. Sorgen Sie dafür, dass das Gerät richtig abgestützt ist oder fest aufrecht steht, bevor Sie neues Zubehör einbauen.
- Dieses Gerät ist für die Einspeisung aus einer geerdeten Netzverbindung ausgelegt. Der Netzstecker mit Erdungsvorrichtung ist ein wichtiger Sicherheitsschutz. Zum Schutz vor elektrischem Schlag oder Sachschäden am Gerät die Erdung nicht abschalten.
- Das Gerät ist mit einer oder mehreren auswechselbaren Batterien ausgestattet. Bei unsachgemäßem Auswechseln der Batterie besteht Explosionsgefahr. Batterien nur mit dem vom Hersteller empfohlenen Typ oder entsprechenden Typen ersetzen. Gebrauchte Batterien sind gemäß den Anweisungen des Herstellers zu entsorgen.

Für Geräte mit mehrfachen Netzanschlussleitungen

Wenn Ihr Speichersystem oder Plattenregal über mehrere Stromkabel verfügt und Sie die Einheit ausschalten müssen, folgenden Warnhinweis beachten:

ACHTUNG

Gerät besitzt zwei Netzanschlussleitungen. Vor Wartung alle Anschlüsse vom Netz trennen.

Monitoring the GF825 or GF900 V-Series System 1

About this chapter

This chapter lists error messages you might encounter during the boot process. It also describes the location of the LEDs and how to interpret the information they provide.

Topics in this chapter

This chapter discusses the following topics:

Where to get more information

The following table lists the guides that can help you with some of the corrective actions.

If you are troubleshooting...	Then see...
V-Series system hardware problems and need to open your V-Series system	This guide
Software problems	The *Data ONTAP® System Administrator's Guide*

Data ONTAP Versions

Data ONTAP versions up to 7.1 are supported on GF825 and GF825c models. Data ONTAP 7.2 is not supported.

Startup error messages

Startup sequence

When you apply power to the your V-Series system after following the installation and configuration process, it verifies the hardware that is in the system, loads the operating system, and displays two types of startup informational and error messages on the system console:

- Power-On Self-Test (POST) messages
- Boot messages

POST messages

POST is a series of tests run from the motherboard PROM. These tests check the hardware on the motherboard and differ depending on your system configuration. The following series of messages are examples of POST messages displayed on the console.

Header:

Intel Open Firmware by FirmWorks

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Firmware release x.x_in

POST messages:

Memory size is 6GB

Testing SIO

Testing LCD

Probing devices

Testing 512MB

Complete

Finding image...

Starting

Note

Your V-Series system LCD displays only the POST messages without the preceding header.

Boot messages

After the boot is successfully completed, the V-Series system displays boot messages on the system console. The following message is an example of the boot message that appears on the system console of a GF940 V-Series system at first boot. The exact boot messages that appear on your system console depend on your system configuration.

Boot messages

NetApp Release x.x.x: Thu January 10 04:06:00: PST 2002
Copyright (c) 1992-200x Network Appliance, Inc.
Starting boot on Thu January 10 23:42:47 GMT 200x
System ID: 0016777216 ()

slot 0: System Board

Processors: 1

Memory Size: 3072 MB

slot 0: 10/100 Ethernet Controller IV

e0 MAC Address: 00:00:4c:0f:2c:22 (auto-100tx-fd-up)

slot 0: NetApp ATA/IDE Adapter ata0a (1f0)

1 Disk: 0.2GB

slot 3: Fibre Channel Host Adapter 3

7 Disks: 119.0GB

1 shelf with EDM

slot 6: NVRAM

Memory Size: 256 MB

slot 6: NetApp ATA/IDE Adapter ata1a (9fe0)

1 Disk: 0.2GB

slot 11: 10/100/1000 Ethernet Controller IV

e11 MAC Address: 00:02:b3:8f:a4:e7 (auto-unknown-cfg_down)

Please enter the new hostname[ ]:

Types of startup error messages

You might encounter two groups of startup error messages during the boot process:

- POST error messages
- Boot error messages

Both error message types are displayed on the system console, and an email notification is sent out by your remote management card, if configured to do so.

For detailed information

For a detailed list of the startup error messages, see the following sections:

- "POST error messages" on page 6
- "Boot error messages" on page 14

POST error messages

POST error messages

The following table describes the extended POST error messages that might appear on the system console if your V-Series system encounters CPU-level system errors during the POST process.

If any Processor 2 error messages are displayed, power cycle the system. If the error message persists, replace the motherboard, as described in "Replacing the motherboard tray" on page 70.

Note

Always power-cycle your V-Series system when you receive any of the following errors. If the system repeats the error message, follow the corrective action for that error message.

Error message or code	Description	Corrective action
*BMC disable	The baseboard management card (BMC) is in a state where it cannot supply environmental data. The message can result from two conditions:	
	◆ The BMC has an internal error and might be able to supply correct environmental data. No further environmental error messages are displayed after this message.	Replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
	◆ The BMC is in Firmware Update Mode and does nothing else until removed from this mode. Other environmental messages follow this message.	Use your diagnostics to get the BMC out of the Firmware Update Mode.

Error message or code	Description	Corrective action
*Watchdog error	An error occurred during the testing of the Watchdog timer.	Replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
*Missing CF-card	The CompactFlash™ card is missing from the front of the machine. The kernel does not boot correctly.	Insert a valid CompactFlash card or replace the control panel subassembly, as described in "Replacing the control panel subassembly" on page 105 for the GF900 series and in "Replacing the CompactFlash reader subassembly" on page 157 for the GF825.
*Inv boot device	An error with the CompactFlash card occurred. This is usually caused by a card made by an unsupported manufacturer.	Insert a valid CompactFlash card.
*Boot device err	A CompactFlash card could not be found to boot from.	Insert a valid CompactFlash card.
**2.5V power bad* **3.3V power bad* **5V power bad* **+12V power bad* **-12V power bad*	One or more of the power voltages are bad. This could be due to a bad power supply or power-regulation device.	For the GF900 series, replace the motherboard, as described in "Replacing the motherboard tray" on page 70, or replace the memory card assembly, as described in "Replacing the memory card assembly" on page 75. For the GF825, replace the motherboard, as described in "Replacing the motherboard" on page 118, or replace the power supply, as described in "Replacing power supplies" on page 148.

Error message or code	Description	Corrective action
*Pwr Sup #1 bad	An error occurred within the power supply.	Replace the power supply, as described in “Replacing the power supplies” on page 101 for the GF900 series and in “Replacing power supplies” on page 148 for the GF825.
*Pwr Sup #2 bad	An error occurred within the power supply.	Replace the power supply, as described in “Replacing the power supplies” on page 101 for the GF900 series and in “Replacing power supplies” on page 148 for the GF825.
*Pwr Sup #1 out	The power supply is not connected to the system chassis.	Replace the power supply, as described in “Replacing the power supplies” on page 101 for the GF900 series and in “Replacing power supplies” on page 148 for GF825.
*Pwr Sup #2 out	The power supply is not connected to the system chassis.	Replace the power supply, as described in “Replacing the power supplies” on page 101 for the GF900 series and in “Replacing power supplies” on page 148 for GF825.
**Boot DeviceErr*	The CompactFlash card could not be found to boot from.	Insert a CompactFlash card.
**Clock invalid. Date reset*	The system real-time clock (RTC) contains an invalid date value. The system does not boot, but the date is reset to January 1, 1970, to enable a subsequent boot.	Replace your motherboard battery and reset the date immediately to avoid file system problems.

Error message or code	Description	Corrective action
**Clock dead*	The system RTC failed.	Replace the motherboard tray, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**Clock batt dead*	The system RTC failed and its battery expired.	Replace the failed motherboard battery, as described in "Replacing the motherboard lithium battery" on page 72 for the GF900 series and in "Replacing the motherboard lithium battery" on page 140 for the GF825, and reset the date immediately to avoid file system problems.
**Clock error*	The system RTC is not operating (counting) correctly.	Replace the motherboard tray, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**Clock reset*	The system RTC is not running. The system does not boot, but the date is reset to January 1, 1970, to enable a subsequent boot.	Reboot your V-Series system and reset the date immediately to avoid file system problems.
**CPU0 fan stopped*	The CPU cooling fan stopped spinning or is spinning too slowly. This can damage the CPU chip.	**1.** Power off the V-Series system. **2.** Make sure that the fan subassembly is plugged in. **3.** Replace the identified CPU fan/heat-sink assembly for the GF825, as described in"Replacing the CPU fan and heat-sink unit" on page 138.

Error message or code	Description	Corrective action
**CPU ucode err*	The CPU microcode update did not occur or, in a multiprocessor system, the microcode updates in the CPUs do not match; that is, they have different revisions.	Update the firmware to a version that contains an updated microcode database.
**CPU speed err*	The CPU's measured clock speed does not match the expected value for the V-Series system. This indicates problems with system clocks and/or buses.	Update the firmware to a version that contains an updated microcode database, or replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**CPU count err*	The number of CPUs found by the firmware does not correspond to the expected number, based on the system model.	Replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**FP button stuck*	The front panel Interrupt button is stuck.	**1.** Free the Interrupt button. **2.** Replace the LED/LCD subassembly. **3.** Replace the motherboard.
**LCD won't open* **LCD cmd stall* **LCD cursor err* **LCD data error*	The system LCD device is not operating correctly. All subsequent POST messages are displayed on the console.	Replace the control panel assembly, as described in "Replacing the control panel subassembly" on page 105 for the GF900 series and in "Replacing the CompactFlash reader subassembly" on page 157 for the GF825.

Error message or code	Description	Corrective action
**Env-A rupt err* **Env-B rupt err* **Env-C rupt err* **Env-D rupt err*	One of four environmental status monitors on your V-Series system cannot interrupt the processor, which prevents your V-Series system from properly monitoring its environmental health.	Replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**Env-A stat err* **Env-B stat err* **Env-C stat err* **Env-D stat err*	One of four environmental status monitors on your V-Series system indicates that it cannot properly monitor its environmental health.	Replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**No power info*	The system is clearly running but no information about the power supply is being reported. Something is wrong with the power supply or the status-reporting circuitry.	Replace the power supply, as described in "Replacing the power supplies" on page 101 for the GF900 series and in "Replacing power supplies" on page 148 for the GF825. If necessary, replace the motherboard tray, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**Onboard battery low*	The lithium battery on the motherboard is low.	Replace the lithium battery on the motherboard, as described in "Replacing the motherboard lithium battery" on page 72 for the GF900 series and "Replacing the motherboard lithium battery" on page 140 for the GF825.

Error message or code	Description	Corrective action
**Overtemp alert*	The internal temperature sensor detected a dangerously high temperature that can damage the system components inside the chassis.	1. Power down your V-Series system. 2. Reduce the ambient temperature to 40° C or lower. 3. Make sure that you have proper air circulation through your V-Series system. If the temperature inside your V-Series system is not excessively hot, the sensor itself might have failed. Replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**PCCRD init fail* **PCCRD reg error* **PCCRD seek err* **PCCRD track err* **PCCRD head err* **PCCRD format err* **PCCRD read err* **PCCRD setup err*	These messages indicate that the control panel assembly failed.	Replace the CompactFlash card, the control panel assembly, or the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.
**SIO error*	Your V-Series system SIO or ISA bridge chip failed its timer interrupt test. The system cannot operate properly without this function.	Replace the motherboard, as described in "Replacing the motherboard tray" on page 70 for the GF900 series and in "Replacing the motherboard" on page 118 for the GF825.

Error message or code	Description	Corrective action
**Watchdog failed*	Your V-Series system watchdog reset hardware, used to reset your V-Series system from a system hang condition, is not functioning properly.	Replace the motherboard, as described in “Replacing the motherboard tray” on page 70 for the GF900 series and in “Replacing the motherboard” on page 118 for the GF825.
**Fan(s) failed*	A fan in your V-Series system stopped and should be replaced as soon as possible. The system console displays information about which fan subassembly stopped.	Replace the fan, as described in “Replacing fan subassemblies” on page 97 for the GF900 series and in “Replacing the chassis fan subassembly” on page 144 for the GF825.
**Unknown System*	The system information in the backplane is incorrect.	Replace your V-Series system.
**Post error. Rebooting...*	BMC has taken a CPU out of operation. Open Firmware is rebooting the system.	If your system is in a reboot loop, press Delete to return to the OK prompt and run diagnostics on your system. If pressing the Delete key several times does not end the reboot loop, press Ctrl-Backspace.

Boot error messages

When boot error messages appear

Boot error messages might appear after the hardware passes all POSTs and your V-Series system begins to load the operating system.

Boot error messages

The following table describes the error messages that might appear on the LCD if your V-Series system encounters errors while starting up.

Boot error message	Explanation	Corrective action
No /etc/rc	The /etc/rc file is corrupted.	**1.** At the hostname> prompt, enter **`setup`**. **2.** As the system prompts for system configuration information, use the information for setting up your V-Series system configuration. For more information about your V-Series system setup program, see the *System Administration Guide*.
No /etc/rc, running setup	The system cannot find the /etc/rc file and automatically starts `setup`.	As the system prompts for system configuration information, use the information for setting up your V-Series system configuration. For more information about your V-Series system `setup` program, see the *System Administration Guide*.
Cannot initialize labels	When the system tries to create a new file system, it cannot initialize the disk labels.	Usually, you do not need to create and initialize a file system; see the *System Administration Guide* for more information.

Boot error message	Explanation	Corrective action
Cannot read labels	When your V-Series system tries to initialize a new file system, it has a problem reading the disk labels it wrote to the disks. This problem can be because the system failed to read the disk size, or the written disk labels were invalid.	Usually, you do not need to create and initialize a file system; see the Data ONTAP *System Administration Guide* for more information.
Dirty shutdown in degraded mode	The file system is inconsistent because you did not shut down the system cleanly when it was in degraded mode.	Contact your authorized reseller for instructions about repairing the file system.
No disk controllers	The system cannot detect any HBA.	Turn off your V-Series system power and verify that the HBAs and all other NICs are properly seated in the appropriate expansion slots.
Halted: Illegal configuration	Incorrect cluster configuration.	**1.** Check the console for details. **2.** Verify that all cables are correctly connected.

Boot error message	Explanation	Corrective action
File system may be scrambled	One of the following errors causes the file system to be inconsistent:	
	◆ An unclean shutdown when your V-Series system is in degraded mode and when NVRAM is not working.	Contact your authorized reseller to learn how to start the system from a system boot diskette and repair the file system.
	◆ The number of disks detected in the disk subsystem is different from the number of disks recorded in the disk labels. The system cannot start when more than one disk is missing.	Make sure that all disks on the system are properly installed in the disk subsystem.
	◆ The system encounters a read error while reconstructing parity.	Contact your authorized reseller for help.
	◆ A disk failed at the same time the system crashed.	Contact your authorized reseller to learn how to repair the file system.
Invalid PCI card slot %d	*%d*—The expansion slot number. The system detects a adapter that is not supported.	Replace the unsupported adapter with an adapter that is included in the configuration.
Configuration exceeds max PCI space	The memory space for mapping PCI adapters is exhausted, because either ◆ There are too many PCI adapters in the system. ◆ An adapter is demanding too many resources.	Verify that all expansion adapters in your V-Series system are supported. Contact your authorized reseller for help. Have a list ready of all expansion adapters installed in your V-Series system.
No network interfaces	The system cannot detect any network interfaces.	**1.** Turn off the system and verify that all NICs are seated properly in the appropriate expansion slots. **2.** Run diagnostics to check the onboard Ethernet port.

Boot error message	Explanation	Corrective action
NVRAM: wrong pci slot	The system cannot detect the NVRAM adapter.	◆ For a GF920, GF940 or GF960 make sure that the NVRAM4 adapter is securely installed in slot 7 or the NVRAM5 adapter is securely installed in slot 11. ◆ For a GF980 in a stand-alone configuration, make sure that the NVRAM5 adapter is securely installed in expansion slot 10. ◆ For a GF980 in a clustered configuration, make sure that the NVRAM5 adapter is securely installed in expansion slot 11.
No NVRAM present	*n*—The serial number of the NVRAM adapter. The NVRAM adapter is an early revision that cannot be used with the system.	Check the console for information about which revision of the NVRAM adapter is required. Replace the NVRAM adapter.
NVRAM #n downrev	*%d*—The amount of memory on the NVRAM adapter. The specified size is not supported.	Verify that the system has 256 MB of NVRAM.
Replace NVRAM batteries	The NVRAM battery is low. The system shuts down immediately.	Replace the battery.
Replace %s	*%s*—The number of NVRAM batteries. The GF825 V-Series system has a single NVRAM battery.	Replace the battery.
Unsupported NVRAM size %dMB	*%d*—The amount of memory on the NVRAM adapter. The specified size is not supported.	Verify that the system has 128 MB of NVRAM.

Remote management card e-mail notifications

When the remote management card sends out e-mail notification

You can configure your remote management card to send e-mail to designated e-mail addresses, in addition to your Autosupport recipient. When enabled, your remote management card sends e-mail notification to you if your system fails.

The following message is a sample e-mail notification sent by your remote management card:

Subject: RMC ALERT 00000 03200 Down system

Message: 03200 24-jan-2003 21:59:25 Down system

System Information

Server Name: RMC ALERT

Server URL: -

System Info:

SYSTEM_ID='0050383432'

SYS_SERIAL_NUM='30163'

MB_SERIAL_NUM='30063'

MODEL='GF960'

Server ID: 00000

Server IP:

Card Information

Card Name: RMC

Card URL: http://172.22.6.40

Card IP: 172.22.6.40

Card Serial Number: DE42090466

Card Version: RMC_NA_1.1

Contact: postmaster@lab.netapp.com

Location: hw-165

Phone Number: -

Note
You cannot use the remote management card to access your V-Series system.

Remote management card messages

The following table explains the error messages your remote management card sends.

Error message	Action
Down system	Gather information from your LCD and console.
Boot error	**1.** Gather information from your LCD and console. **2.** Check to see whether your CompactFlash unit is inserted correctly into the Control Panel Assembly.
POST error	**1.** Gather information from your LCD and console. **2.** Run diagnostics on your system.

Operational error messages

When operational error messages appear

These error messages might appear on the system console or LCD when the system is operating, when it is halted, or when it is restarting because of system problems.

Error messages

The following table describes other error messages that might appear on the LCD if your V-Series system encounters errors while starting up or during operation.

Error message	Explanation	Fatal?	Corrective action
Fans stopped; replace them	One of the fan subassemblies of your V-Series system failed.	No	Replace the failed fan subassembly as soon as possible.
Power supply degraded	One of the power supply units is turned off, was removed from your V-Series system, or failed.	No	Verify that both power supplies are installed and turned on. If you still get this error, replace the power supplies one at a time to determine the failed power supply.
CPU fan has failed	The CPU fan in a GF825 V-Series system failed. The system automatically shuts down.	Yes	Replace the CPU fan before you restart the system and run diagnostics.
Dumping core	The system is dumping core after a system crash.	Yes	Write down the system crash message on the system console and report the problem to your authorized reseller.
Error dumping core	The system cannot dump core during a system crash and restarts without dumping core.	Yes	Report the problem to your authorized reseller.

Error message	Explanation	Fatal?	Corrective action
Panicking	The system is crashing. If the system does not hang while crashing, the message `Dumping core` appears.	Yes	Report the problem to your authorized reseller.
System too hot	The temperature sensor indicates that the system temperature is too high.	Yes	Verify that the ventilation holes on the top cover of the system are not blocked. If the ventilation holes are not blocked and the problem persists, contact your authorized reseller for help.

Motherboard replacement error

When you replace your motherboard, your V-Series system does not recognize the LUNs assigned to it.

Corrective action: Perform a `disk reassign` command. Use the **`help`** command to get the exact syntax.

Cluster takeover or giveback failures

Correcting takeover or giveback failure

The following table describes tests you can run to determine why takeover or giveback failed and also provides information to correct the problem.

Note

You must reboot the cluster after completing each test.

To correct a takeover or giveback failure, complete the following steps.

Step	Action	
1	Check communication between the local and partner nodes by entering the following command and observing the messages: `cf status` **Results:** If there is a problem with cabling or the adapter, the appropriate message is displayed. Recable the IB cluster adapter or replace the adapter, as needed.	
2	**If the error message indicates...**	**Then...**
	An IB cluster adapter error	Check the IB cluster adapter cabling. Make sure that the cabling is correct and properly seated.
	A networking error	Check for network connectivity. See the Data ONTAP *System Administrator's Guide* for more information.
3	Reboot the cluster and rerun the takeover and giveback tests.	

Interpreting LED messages

Types of LEDs

Two sets of LEDs provide you with basic information about how your system is running. These sets give high-level device status at a glance, along with network activity:

- LEDs visible on the front of your V-Series system with the bezel in place
- LEDs visible on the back of your V-Series system

For detailed information

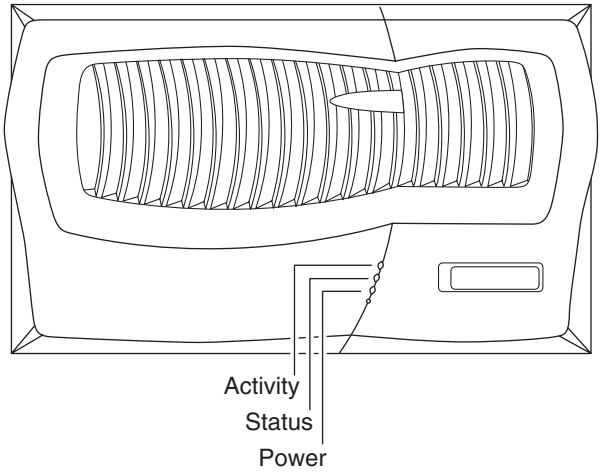
For detailed information about the LEDs, see the following sections:

- "Control panel assembly LEDs" on page 25
- "NVRAM5 adapter LEDs" on page 27
- "NVRAM5 media converter LEDs" on page 29
- "Fibre Channel HBA LEDs" on page 30
- "GbE NIC LEDs" on page 31
- "DAFS network adapter and IB cluster adapter LEDs" on page 34
- "Remote management card LEDs" on page 35
- "GF900 V-Series system power supply LEDs" on page 37
- "GF825 V-Series system power supply LEDs" on page 38

Control panel assembly LEDs

Location of the LEDs

Control panel assembly LEDs are visible from the front of your V-Series system.



What the LEDs mean

The following table explains the control panel assembly LEDs.

LED type	Status indicator	Description
Activity	Green	The system is operating and is active.
	Blinking	The system is actively processing data.
	Off	No activity is detected.

LED type	Status indicator	Description
Status	Green	The system is operating normally.
	Amber	The system halted or a fault occurred. The fault is displayed in the LCD. **Note** This LED remains lit during boot, while the operating system loads.
Power	Green	The system is receiving power.
	Off	The system is not receiving power.

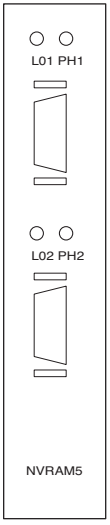
NVRAM5 adapter LEDs

About NVRAM5

The NVRAM5 adapter is also the cluster interconnect adapter when your appliance is in a clustered configuration. The NVRAM5 adapter is supported in the GF980 and all GF900 cluster configurations except MetroCluster.

Location of LEDs

The following illustration shows the LED locations for your NVRAM5 adapter. There are two sets of LEDs by each port that operate when you use NVRAM5 as a cluster interconnect adapter. There is also an internal red LED that you can see through the faceplate.



What the LEDs mean

The following table describes the LEDs for an NVRAM5 adapter.

LED type	Indicator	Status	Description
Internal	Red	Blinking	There is valid data in the NVRAM5. **Attention** This might occur if your system did not shut down properly, as in the case of a power failure or panic. The data is replayed when the system boots up again.
PH1	Green	On	The physical connection is working.
		Off	No physical connection.
LO1	Yellow	On	The logical connection is working.
		Off	No logical connection.

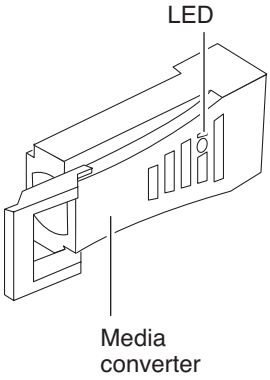
NVRAM5 media converter LEDs

About the media converter

The media converter enables you to use fiber cabling to cable your appliances in a clustered configuration.

Location of LEDs

The following illustration shows the LED locations for your NVRAM5 media converter.



Media converter LEDs

The following table describes the LEDs for an NVRAM5 media converter.

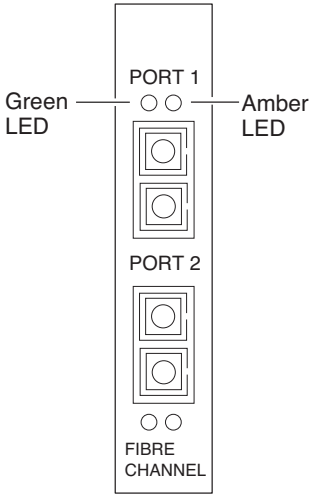
Indicator	Status	Description
Green	On	Normal operation.
Green/Amber	On	Power is present but link is down.
Green	Flickering or off	Power is present but link is down.

Fibre Channel HBA LEDs

Location of the LEDs

The dual-port Fibre Channel Host Bus Adapter (HBA) has two LEDs per port.

The following illustration shows the LED locations for a dual-port Fibre Channel HBA.



What the LEDs mean

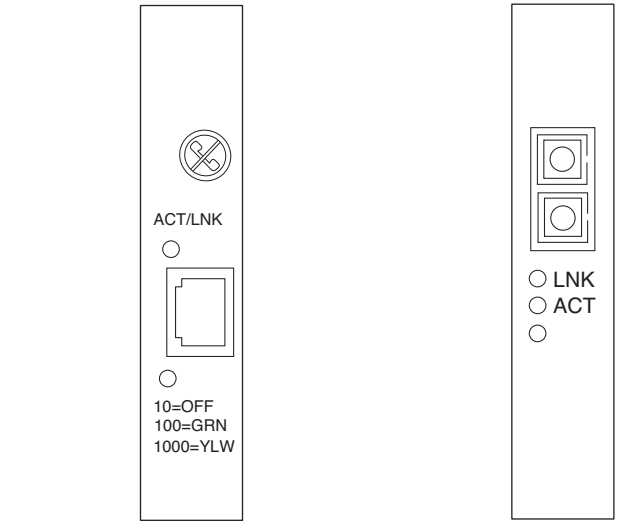
The following table explains what the LEDs on the dual-port Fibre Channel HBA mean.

Green	Amber	Indicates...
On	On	Power.
Off	Flashing	Loss of synch.
Off	On	Signal acquired.
On	Off	Ready.
Flashing	Flashing	Adapter firmware error.

GbE NIC LEDs

Location of the LEDs for single-port GbE NICs

The following illustration shows the location of LEDs for both the copper and fiber single-port GbE NICs.

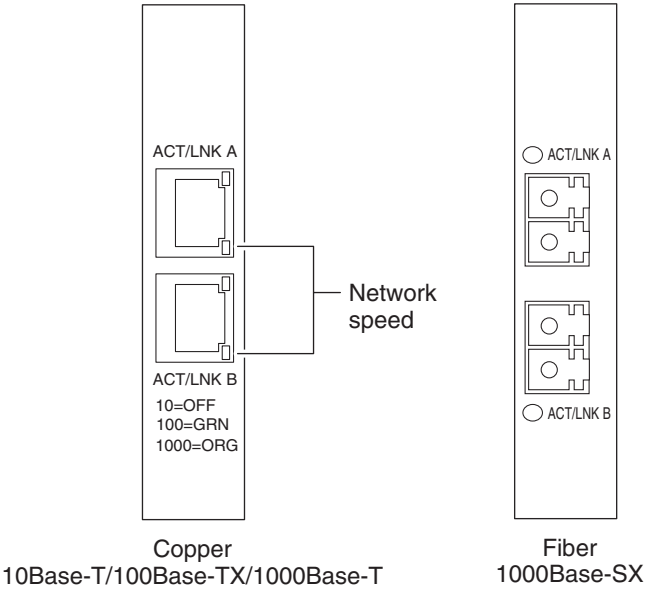


Copper
10Base-T/100Base-TX/1000Base-T

Fiber
1000Base-SX

Location of LEDS on multiport GbE NICs

The following illustration shows the location of LEDs for both the copper and fiber dual-port GbE NICs. The LEDs on the quad-port GbE NIC are the same as the LEDs on the dual-port GbE NIC.



What the copper GbE NIC LEDs mean

The following table explains what the LEDs on the copper GbE NIC mean.

Note

The LEDs on the quad-port GbE NIC are the same as the LEDs on the dual-port GbE NIC.

LED type	Status indicator	Description
ACT/LNK	Green	A valid network connection is established.
	Blinking green	There is data activity present.
	Off	There is no network connection present.

LED type	Status indicator	Description
10=OFF	Off	Data transmits at 10 Mbps.
100=GRN	Green	Data transmits at 100 Mbps.
1000=YLW	Yellow	Data transmits at 1000 Mbps.

What the fiber GbE NIC LEDs mean

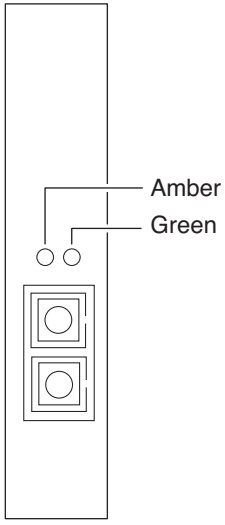
The following table explains what the LEDs on the fiber GbE NIC mean.

LED type	Status indicator	Description
LNK	On	A valid network connection is established.
	Off	There is no network connection present.
ACT	On	There is data activity present.
	Off	There is no network activity present.

DAFS network adapter and IB cluster adapter LEDs

Location of LEDs

The following illustration shows the location of the DAFS network adapter. The Infiniband (IB) cluster adapter has two ports and two sets of the same LEDs on the DAFS network adapter.



What the LEDs mean

The following table explains what the LEDs for a DAFS network adapter or IB cluster adapter mean.

Green	Amber	Indicates...
On	Off	Link.
Off	Off	No link.
Flashing	Off	HBA asserted/panicked.
On	Flashing or On	HBA transmitting/receiving data.

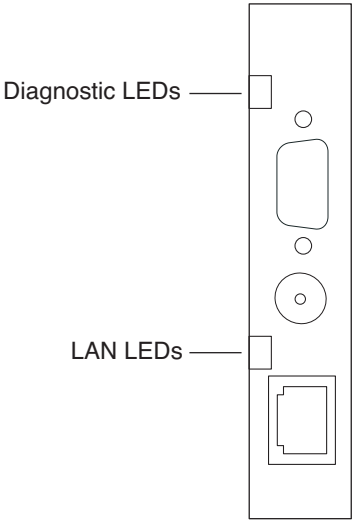
Remote management card LEDs

Location of LEDs

The following illustration shows the location of the remote management card LEDs.

Note

The GF825 does not support the remote management card.



What the LEDs mean

The following table explains what the LEDs on the remote management card mean.

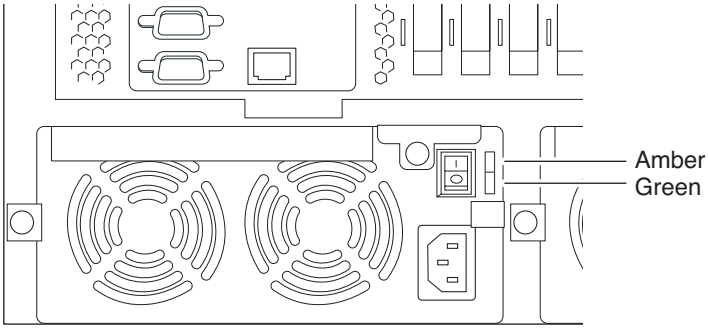
LED type	Status Indicator	Description
LAN connection LEDs	Green	The LAN connection is valid.
	Red	There is no connectivity present.

LED type	Status Indicator	Description
Diagnostic LEDs	Blinks code	This LED flashes red consecutively for the first digit of the code, then subsequently pauses and blinks once with a pause between blinks.
	3111	Error occurred during the LAN loopback test.
	4111	Incorrect data returned during the UART1 test (Universal Asynchronous Receiver/Transmitter).
	4112	No data returned during UART1 test.
	4211	Incorrect data returned during UART2 test.
	4212	No data returned during UART1 test.
	4311	Incorrect data returned during UART485 test.
	4312	No data returned during UART1 test.

GF900 V-Series system power supply LEDs

Location of LEDs

The following illustration shows the location of the LEDs on your V-Series system power supplies.



What the LEDs mean

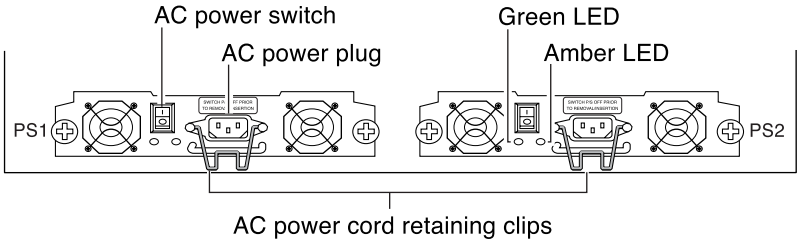
The following table explains what the LEDs on your V-Series system power supplies mean.

LED type	Amber	Green	Description
Power supply LED	On	On	The AC power source is good and is powering the system.
	Off	Blinking green	The AC power source is good and the power supply is in standby mode.
	On	Off	The AC power source is good, but no power is reaching the power supply or the power supply failed.
	On	Off	There is no power to this power supply.

GF825 V-Series system power supply LEDs

Location of LEDs

The following illustration shows the location of the power supply LEDs on your V-Series system back panel.



Description of LEDs

The following table explains what the power supply LEDs mean.

LED	Status indicator	Description
Amber	On	Power supply is receiving AC power.
	Off	AC power is not present.
Green	On	Power supply output is good.
	Off	Power supply output is bad.

Monitoring the GF270c V-Series System 2

About this chapter

This chapter describes how to monitor your V-Series system based on the error messages displayed on the console that is connected to your V-Series system. It also identifies the location of the various LEDs on your V-Series system.

Note

The quick reference cards in the slide-out tray at the base of the GF270c describe the functions of each LED on your V-Series system and the suggested course of action.

Topics in this chapter

This chapter discusses the following topics:

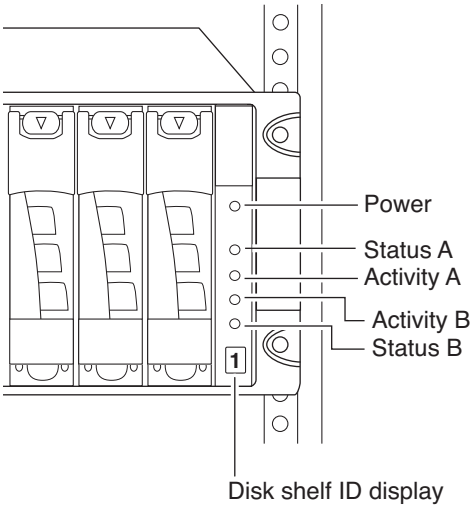
Monitoring the front operation panel

About monitoring the front operation panel

The front operation panel has five LEDs and a disk shelf ID display. The LEDs indicate whether your V-Series system is functioning normally or whether there are problems with the hardware. You can also identify any V-Series system hardware failure associated with the front operation panel of the V-Series system from the error messages displayed on your storage V-Series system console.

Location of LEDs

The following illustration shows the location of the disk shelf ID display and the front panel LEDs.



Interpreting the front panel LEDs

Use the following table to interpret the front panel LEDs.

Description	LEDs					Action item
	Power	**Activity A**	**Status A**	**Activity B**	**Status B**	
Normal operation	Green on	Green on or flashing	Amber off	Green on or flashing	Amber off	None.
System fault detected	Green on	Green on or flashing	Amber on	Green on or flashing	Amber off	**1.** Check the LEDs on the modules at the rear of the V-Series system. **2.** Check the system console for detailed messages. **3.** Run diagnostics on the system. See the *Diagnostics Guide* for more information. **4.** Contact NetApp technical support.
System fault detected	Green on	Green on or flashing	Amber off	Green on or flashing	Amber on	

Monitoring the power supply

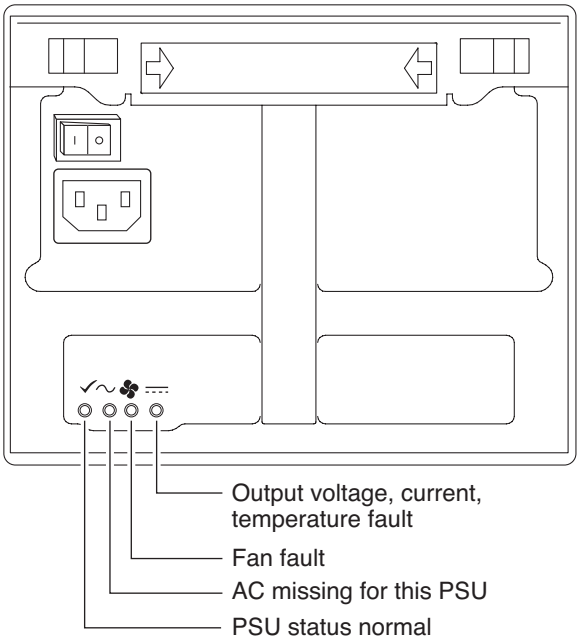
LEDs on the power supply

The GF270c power supply has four LEDs. The LEDs indicate whether the power supply or the integrated fan module is functioning normally or whether there are problems with the hardware. You can also identify any hardware failure associated with the power supplies from the error messages displayed on your V-Series system console.

A normal functioning power supply shows the “check mark” green LED on the far left as on, with the rest of the amber LEDs off. A power supply fault turns on the appropriate amber LED, and causes the check mark LED to turn off.

Location of LEDs

Each power supply is encased in a device carrier and housed at the rear of your V-Series system. The following illustration shows the location of the power supply LEDs.



Interpreting power supply LEDs

The following table describes how to interpret the power supply LEDs.

Fault condition	Description	LEDs			
		PSU status normal	AC missing for this PSU	Fan fault	Output voltage, current, temperature fault
N	Normal operation	On	Off	Off	Off
1	Power supply failure	Off	Off	Off	On
2	Fan failure	Off	Off	On	Off
3	No power to this PSU	Off	On	Off	On

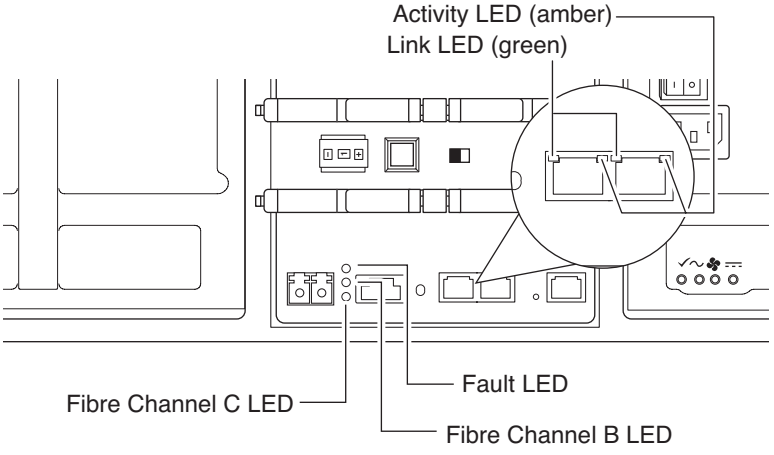
Monitoring the CPU module

LEDs on the CPU module

The CPU module has several LEDs. The LEDs indicate whether the CPU module, Fibre Channel ports, and network connections are functioning normally.

Location of LEDs on the CPU module

The following illustration shows the location of the Fibre Channel LEDs at the rear of the CPU module.



Interpreting Ethernet LEDs

Use the following table to interpret the Ethernet port LEDs on the CPU module.

Link LED (green)	Activity LED (amber)	State
Off	Off	Network connection is not present.
On	Off	Network connection is present but there is no data input or output occurring.
On	On/blinking	Network connection is present and data input and output is occurring.

Interpreting Fibre Channel LEDs

Use the following table to interpret the Fibre Channel LEDs on the CPU module.

Fault LED (amber)	Fibre Channel B LED (green)	Fibre Channel C LED (green)	State	Action
Off	On	On	Normal	None.
Off	Off	On	Loop B fault	Fibre Channel B loop is open and needs to be fixed.
Off	On	Off	Loop C fault	Fibre Channel C loop is open and needs to be fixed.
On	On	On	CPU module fault	Perform the following steps until the problem is resolved: **1.** Check the cables at the rear of the V-Series system. **2.** Make sure that the 1 Gb/ 2 Gb switches are set to 1 Gb. **3.** Check that the terminate switches are On. **4.** If Fibre Channel C port is unused, install the Fibre Channel terminator or ignore the Fibre Channel C LED. It is alright for the LED to be off if the port is not used. **5.** Run diagnostics to isolate the failure and decide whether CPU module replacement is necessary. See the *Diagnostics Guide* for more information. **6.** Replace the CPU module. See “Replacing the CPU module” on page 162. **7.** Contact NetApp technical support.
On	Off	On	Loop B fault and module fault	
On	On	Off	Loop C fault and module fault	

Troubleshooting and error messages

About troubleshooting

This section lists error messages you might encounter during the boot process.

Note

If you contact NetApp technical support, have the console messages available.

Topics in this section

This chapter discusses the following topics:

Where to get more information

The following table lists the documentation that can help you with some of the corrective actions.

If you are troubleshooting…	Then…
GF270c hardware problems and need to access your V-Series system	See Chapter 5, "Maintaining and Servicing the GF270c," on page 161.
Software problems	See the Data ONTAP *Storage Management Guide*.

Startup error messages

Startup sequence

When you apply power to your V-Series system, it verifies the hardware that is in the system, loads the operating system, and displays the Power-On Self-Test (POST) messages on the system console.

POST messages

POST is a series of tests run from the motherboard PROM. These tests check the hardware on the motherboard and differ depending on your system configuration. The following series of messages are examples of POST messages displayed on the console.

Header:

```
CFE version 1.1.0 based on Broadcom CFE: 1.0.35
Copyright (C) 2000,2001,2002,2003 Broadcom Corporation.
Portions Copyright (C) 2002,2003 Network Appliance Corporation.
```

POST messages:

```
HyperTransport: 400MHz
CPU type 0x1040102: 650MHz
Total memory: 0x40000000 bytes (1024MB)
Starting AUTOBOOT press any key to abort...
Loading: Failed.
Loading: 0xffffffff80001000/8604573 Entry at 0xffffffff80..
Starting program at 0xffffffff80001000
Press CTRL-C for special boot menu
```

Note

If the messages are not appearing on your system console, verify that you are using the DB-9 to RJ-45 adapter.

Boot messages

After the boot is successfully completed, your V-Series system loads the operating system. The following message is an example of the boot messages and questions that appear on the system console of a GF270 at first boot. The exact boot messages that appear on your system console depend on your system configuration.

Boot messages

```
NetApp Release x.x.x: Mon Oct 20 04:06:00: PDT 2003
System ID: 0084170726 ();partner ID: 0084170777 (f5a-v-series)
System Serial Number: 999999
slot 0:    System Board
           Processors:      1
           Processor revision: B2
           Processor type: 1250
           Memory Size:   1022 MB
slot 0:    FC Host Adapter 0b
           14 Disks:  952.0 GB
           1 shelf with EFH
slot 0:    FC Host Adapter 0c
slot 0:    SB1250 Gigabit Dual Ethernet Controller
           e0a MAC Address: 00:a0:98:00:e9:b3 (auto-unknow
           e0a MAC Address: 00:a0:98:00:e9:b4 (auto-unknow
slot 0:    NetApp ATA/IDE Adapter 0a (0x00000000000001f0)
           0a.0    245MB
Please enter the new hostname []: hw-166
Do you want to configure virtual network interfaces? [n]:
Please enter the IP address for Network Interface e0a [172.22.6.33]: 172.22.6.166
Please enter the netmask for Network Interface e0a [255.255.255.0]:
Should interface e0a take over a partner IP address during failover? [n]: y
Please enter the IP address or interface name to be taken over by e0a []: 172.22.6.167
Please enter media type for e0a {100tx-fd, tp-fd, 100tx, tp, auto (10/100/1000)}
[auto]:
Please enter flow control for e0a {none, receive, send, full} [full]:
Do you want e0a to support jumbo frames? [n]:
Please enter the IP address for Network Interface e0b []:
Should interface e0b take over a partner IP address during failover? [n]:
```

Boot messages

```
Would you like to continue setup through the web interface? [n]:
Please enter the name or IP address of the default V-Series system [172.22.6.1]:
          The administration host is given root access to the filer's
          /etc files for system administration.  To allow /etc root access
          to all NFS clients enter RETURN below.
Please enter the name or IP address of the administration host:
Please enter timezone [GMT]:
Where is the filer located? []: orlab
Do you want to run DNS resolver? [n]: y
Please enter DNS domain name [lab.netapp.com]:
You may enter up to 3 nameservers
Please enter the IP address for first nameserver [172.19.2.30]:
Do you want another nameserver? [y]: n
Do you want to run NIS client? [n]:
```

For detailed information

For a detailed list of the startup error messages, see “POST messages” on page 47.

List of POST error messages

The following table describes the extended POST error messages that might appear on the system console if your V-Series system encounters CPU-level system errors during the POST process.

Note

Always power-cycle your V-Series system when you receive any of the following errors. If the system repeats the error message, follow the corrective action for that error message.

Error message or code	Description	Corrective action
[RAMX]	No physical memory was found by the system.	This indicates that the system doesn’t see any memory. Try reseating the DIMM. See “Replacing the SDRAM DIMM on the CPU module” on page 172.

Error message or code	Description	Corrective action
[Cerr]	Cache error.	These are cache errors. These errors indicate a bad CPU. If a power-cycle doesn't fix the problem, replace the CPU module. See "Replacing the CPU module" on page 162.
[Cer2]	Cache error.	
[EXC!]	Exception.	This indicates that the system took an exception while in firmware. If it is repeatable, this is likely a software bug in the firmware. Contact NetApp and provide a log of the error. If you can't get past this error, boot the system using the backup firmware image.
[RUN!]	CFE (common firmware environment) is jumping to executable code.	This is not an error but rather a progress state indicator used to help troubleshoot the problem.
[HELO]	Very early Init code.	If the system stops on one of these error codes, there is likely a hardware problem. First, try Step 1 below. If this doesn't fix the problem, proceed to the subsequent steps until the problem is fixed. **1.** Power off the system, then power it on. **2.** Try booting with the backup firmware image. See "Booting your GF270c V-Series system from a backup firmware image" on page 55. **3.** Replace the CPU module. See "Replacing the CPU module" on page 162.
[L1CI]	L1 cache INIT.	
[L2CI]	L2 Cache INIT.	
[TST1]	Simple POST test: cache of both levels and tags.	
[CPU1]	CPU1 INIT.	
[cpu1]	CPU1 entering IDLE loop.	

Error message or code	Description	Corrective action
[DRAM]	Running on CPU0, on memory segment 0 (that is, program is now running in RAM rather than flash memory).	If the system stops on one of these error codes, the memory is bad or the NVLOG subsystem malfunctioned. To test this, reseat the DIMM and disconnect the battery. See Chapter 5, "Maintaining and Servicing the GF270c," on page 161. If that fails to clear the problem, replace the DIMM. See "Replacing the SDRAM DIMM on the CPU module" on page 172.
[Zero]	Zero memory…no nvmem.	
[Keep]	Keep memory…preserve nvmem.	
[ZBSS]	Zero the BSS segment.	
[CODE]	Zero and copy the code segment from flash to memory.	
[DATA]	Zero and copy the data segment from flash to memory.	
[RELO]	Jump to the new code segment.	
[L12F]	Flush and enable caches.	
[MAIN]	Jump to the main CFE memory.	
[KMEM]	Initialize CRDs heap.	
[NVCL]	Clear memory that isn't owned by NVMEM or CFE.	
[CONS]	Attach console device.	Check the connection between your V-Series system and the console device. Replace the cable if it is defective.

Error message or code	Description	Corrective action
[CIOK]	Copyright etc.	A message of this type doesn't indicate a specific failure, but a general failure of some system component. **1.** Try booting with the backup firmware image. See "Booting your GF270c V-Series system from a backup firmware image" on page 55. **2.** Otherwise, replace the CPU module. See "Replacing the CPU module" on page 162.
[AREN]	Physical memory map INIT.	
[DEVI]	Misc devices INIT.	
[ENVI]	Environmental variable subsystem INIT.	
[PCIH]	PCI host bridge INIT.	If the system stops with one of these error codes, there is likely a problem with either the SB1250 chip or the ISP2312 FC-AL chip. **1.** Try booting with the backup firmware image. See "Booting your GF270c V-Series system from a backup firmware image" on page 55. **2.** Otherwise, replace the CPU module. See "Monitoring the CPU module" on page 44.
[PCIB]	PCI try to init P2P bridges.	
[PCIS]	PCI device scan.	
[CFE]	This message is written when CFE jumps to the exception handler, for whatever reason. This is caused by either bad hardware or a bad flash memory.	**1.** Power-cycle the system. **2.** Try booting with the backup firmware image. See "Booting your GF270c V-Series system from a backup firmware image" on page 55. **3.** Replace the CPU module. See "Replacing the CPU module" on page 162.

Netboot process for the GF270c

Reason to perform the netboot process

The netboot process enables you to boot your GF270c V-Series system from a remote server if your CompactFlash media becomes damaged or unusable.

Configuration requirements for netboot servers

You can configure a system to serve boot images to NetApp devices that support the netboot process. To do so, you must configure the following items:

- HTTP and/or TFTP services on your system
- The rest of your netbooting environment to use the system as the netboot source

For example, you might configure BOOTP, DHCP, bootparamd, and/or rarpd, depending on the specific procedure you are using.

Note

For more information about the netbooting process, see the *Storage Management Guide*.

Performing the netboot process from a remote image

To perform the netboot process on a GF270c from a remote image, complete the following steps.

Step	Action
1	Place a Data ONTAP boot image on a local HTTP server. You can copy the boot image from the GF270c boot directory, /etc/boot/netapp-mips, or download it from http://now.netapp.com.
2	At the V-Series system CFE prompt, enter one of the following commands: Using DHCP: **`ifconfig e0a -auto`** Using manual configuration: **`ifconfig e0a -addr=`*`filer_addr`* `-mask=`*`netmask`* `-gw=`*`V-Series system`* `-dns=`*`dns_addr`* `-domain=`*`dns_domain`*

Step	Action
3	At the CFE prompt, enter the following command: **`netboot`** ***`URL`*** **Example:** `netboot http://myserver/bootimages/netapp/netapp-mips` **Result:** You should then see normal boot messages during the netboot process.

Note

If you performed the netboot process because your CompactFlash card is blank or corrupted, be sure to execute the Data ONTAP **`download`** command to copy the correct files from the disks to the CompactFlash card. See the Data ONTAP *Storage Management Guide* for more details.

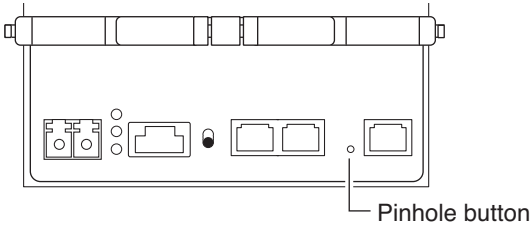
Booting your GF270c V-Series system from a backup firmware image

Caution about this procedure

This procedure boots your V-Series system using a stored backup firmware image and should only be used as a last resort.

Booting with a backup firmware image

To boot using a backup firmware image, complete the following steps.

Step	Action
1	With the system powered off, insert a paper clip into the tiny, unmarked hole between the console and Ethernet ports. Make sure that you can feel the button pushing in. 
2	While the button is pressed with the paper clip, turn on power to the V-Series system.
3	Remove the paper clip from the hole.
4	The V-Series system begins booting, showing its progress on the console screen.

Troubleshooting hardware problems

Troubleshooting the GF270c

Use this table to troubleshoot specific problems with your V-Series system.

Problem	Possible cause	Solution
CFE (common firmware environment) won't boot. Last console status code might be [ZBSS], [L12F], or [CERR].	This indicates that something is wrong with the memory DIMM.	To fix this problem, begin with the first procedure in the following list. If that doesn't solve the problem, continue down to the next troubleshooting tip on the list until the problem is solved. ◆ Unplug the battery in the CPU module for 5 seconds, plug the battery back in, and try booting the V-Series system. **Note** Unplugging the battery might reset the clock. ◆ Reseat the DIMM on the CPU module. ◆ Replace the DIMM. ◆ Replace the CPU module.
CFE comes up but [CERR] is printed out when booting the kernel	This is a problem with NVMEM. NVMEM is mainly for power outages. Handling the CPU module outside the shelf while NVMEM is valid might corrupt memory.	◆ If the CPU module was not handled, contact NetApp technical support. ◆ Otherwise, unplug the battery in the CPU module for 5 seconds, plug the battery back in, and try booting the V-Series system. **Note** Unplugging the battery might reset the clock.

Problem	Possible cause	Solution
CFE comes up but can't boot anything from the CompactFlash card.	Contents of the CompactFlash card are not correct.	Try entering this command at the CFE prompt, which is equivalent to 'dir c:' from a PC: **`test fatfs ide0.0`** If no errors occur and nothing is shown on the console, the contents of the CompactFlash card are not valid. If there is an error, replace the CompactFlash card.
Real-Time Clock (RTC) loses its time.	The rechargeable battery for NVMEM also powers the real-time clock. If this battery is disconnected for more than a few seconds or the battery is discharged, the real-time clock might be reset.	Plug the battery back in to the motherboard and reset the clock to the correct time.
I replaced a CPU module and now the new module can't see the disks (LUNs)	The disk ownership mechanism ties disks to CPU module system IDs. If you replace a CPU module with a new one, the LUNs are still stamped with the system ID of the old module.	Perform a `disk reassign` command. Use the **`help`** command to get the exact syntax.

Problem	Possible cause	Solution
The battery is discharged and Data ONTAP won't boot.	The battery voltage is too low to hold data for three days during a power-out condition. If you turn on the machine and let it sit at the firmware (CFE) prompt, it does not turn on the charger. You need to boot Data ONTAP to get the software to turn on the battery charger.	You have two main options at this point: **1.** Leave the V-Series system alone for a few hours to let the battery charge. **2.** Press Ctrl-C to override this check. Executing a `priv set advanced` and an `nv` command shows you the current status of the battery (if you pressed Ctrl-C to override the stall condition). You can also try out the `environ chassis Battery` command (note that "Battery" is case-sensitive). In either case, the battery charger is turned on and recharges the battery over the next few hours.
CFE failed, creating a POST code.	CFE firmware runs a series of POST before trying to load Data ONTAP. If any of the POSTs fail, a code is printed out.	See "List of POST error messages" on page 49 for a description of the error.

Problem	Possible cause	Solution
Fibre Channel adapter 0b appears to be unattached or disconnected.	You have an open loop. Fibre Channel needs a closed/completed loop to communicate.	◆ Check the terminate switch on the CPU module. If an expansion shelf is attached to your system, the terminate switch should be OFF. If there's no expansion shelf, you must have the terminate switch set to ON. ◆ If that doesn't fix it, you might have a faulty shelf, drive, or cable. Try removing items until the loop closes and then add them back until you see the failure. While removing/adding, be sure to set the terminate switches appropriately. ◆ If that still doesn't fix it, you might have a bad adapter on the CPU module (rare case). You'll have to do a CPU module replacement.
The V-Series system won't stop beeping.	It is the responsibility of the kernel to "ping" the ops panel occasionally so the ops panel's watchdog timer doesn't start beeping.	Push the MUTE button on the back of the shelf to stop the beeping. If beeping continues, contact NetApp technical support.

Maintaining and Servicing GF900 Systems 3

About this chapter

This chapter lists field-replaceable units (FRUs) that are available for your GF900 systems, and describes the tasks you must complete to replace each type of FRU.

Topics in this chapter

This chapter discusses the following topics:

Field-replaceable unit overview

About FRUs

A FRU is a component in your V-Series system that you can replace if it fails. FRUs must be purchased through your authorized reseller.

Units you can replace

You can replace the following units in the field:

- Cable management bracket
- Motherboard tray, including PCB carrier
- Motherboard lithium system battery
- Memory card assembly
- SDRAM DIMMs on the memory card assembly
- Expansion adapters
  - NVRAM4 (nonvolatile random access memory) adapter for GF920, GF940, and GF960 stand-alone systems
  - NVRAM5 adapter for all GF980 systems and for GF920, GF940, GF960 cluster systems (not including MetroCluster configurations)
  - Single-port fiber Gigabit Ethernet (GbE) network adapter
  - Single-port 10Base-T/100Base-TX/1000Base-T GbE network adapter
  - Dual-port fiber GbE network adapter
  - Dual-port 10Base-T/100Base-TX/1000Base-T GbE network adapter
  - Remote management card
  - FC-AL adapters
  - Single-port Fibre Channel tape back up adapter
  - Dual-port Fibre Channel tape back up adapter
  - SCSI tape backup adapter
  - IB cluster adapter
- Fan subassembly
- Power supplies
- Bezel
- Control panel subassembly
- CompactFlash unit

What to do if the failed item isn't on the FRU list

If you need to replace a component that is not in the FRU list, call your authorized reseller for instructions.

Required tools and equipment

To replace components, you need the following tools and equipment:

- Phillips screwdrivers (#0, #1, and #2)
- 3/16-inch socket wrench
- Torque screwdriver
- Antistatic wrist strap and grounding leash
- Antistatic bag

Attention

Your V-Series system uses electronic components that are sensitive to static electricity. Static discharge from your clothing or other fixtures around you can damage these components. Wear an antistatic wrist strap and grounding leash to free yourself of static electricity before touching any electronic components.

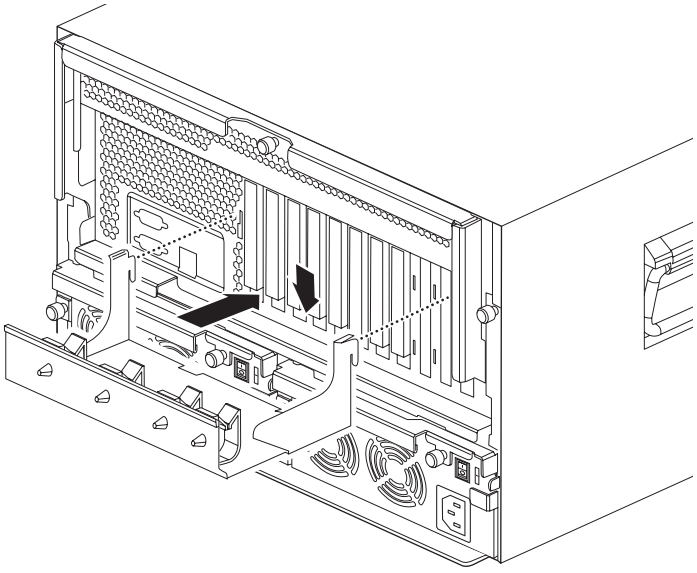
Replacing the cable management tray

About replacing the cable management tray

The cable management tray functions to direct all network cables away from the back of your V-Series system. You must remove it to replace FRUs inside the PCB carrier.

Removing the cable management tray

To remove the cable management tray, complete the following steps, using the figure for reference.



Step	Action
1	Remove all cables from the cable management tray.
2	Unhinge the cable management tray from the back of your V-Series system by lifting the tray, and then pulling out the tabs from the slots on the PCB carrier.

Installing the cable management tray

To install your cable management tray, complete the following steps.

Step	Action
1	Align the tabs on the tray with the slots on the back of your V-Series system.
2	Insert the tabs on the tray into the slots and secure it by gently lowering the hinges and locking the tabs into place.
3	After you connect all the cables to your V-Series system, secure them to your V-Series system through the tray cable holders.

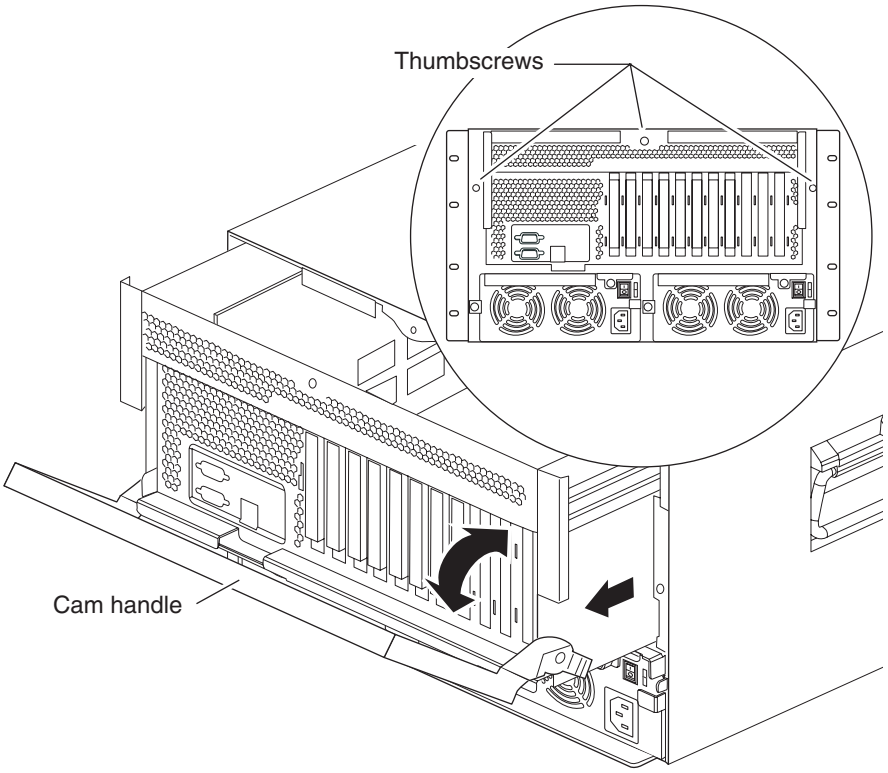
Opening the PCB carrier

Reasons to open the PCB carrier

You open the PCB carrier to access the motherboard tray, memory card assembly, expansion adapters, and other FRUs.

Opening the PCB carrier

To open the PCB carrier for access to the internal FRUs, complete the following steps, using the figure for reference.



Step	Actions
1	Shut down your V-Series system by entering the following command at the console: `halt` **Attention** Always use the `halt` command to perform a clean shutdown. **Note** You must perform a clean shutdown to replace components inside the PCB carrier of your V-Series system.
2	Turn off and disconnect the power to your V-Series system.
3	Put on the antistatic wrist strap and attach the grounding leash to the chassis.
4	Remove the cable management tray.
5	Loosen the three thumbscrews on the back panel of the PCB carrier.
6	Carefully pull the cam handle so that the PCB carrier slides out from the chassis until the carrier tabs click to lock the slide rails in place. The PCB carrier has a travel distance of approximately 19 inches (48.26 centimeters).

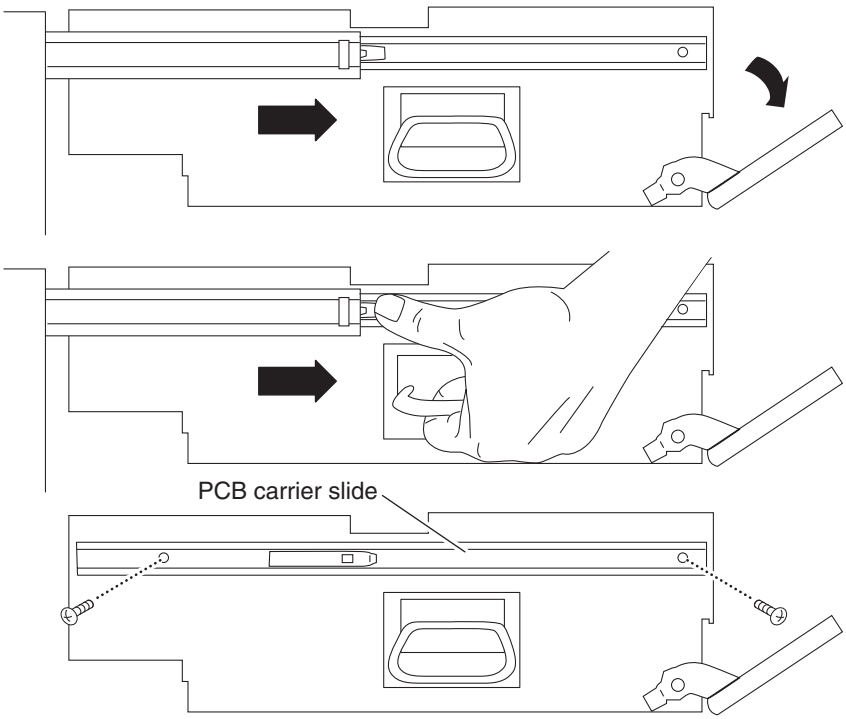
Removing the PCB carrier

Reasons for removing the PCB carrier

You must remove the PCB carrier from your V-Series system if you are replacing the motherboard tray. You can also remove the PCB carrier to replace components, such as the memory card assembly and expansion adapters.

Removing the PCB carrier

To remove the PCB carrier from your V-Series system, complete the following steps, using the figure for reference.



Step	Action
1	Open the PCB carrier by following the procedure described in “Opening the PCB carrier” on page 66.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>2</td><td colspan="2">With the PCB carrier completely extended, press inward on the carrier tabs on each slide rail and pull and lift the PCB carrier out of the chassis. Make sure that you remove the slide rails on the PCB carrier before sending it for replacement.</td></tr>
<tr><td>3</td><td colspan="2">Support the PCB carrier with both hands, and set it aside.</td></tr>
<tr><td rowspan="3">4</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Replacing the motherboard tray</td><td>Go to “Replacing the motherboard tray” on page 70.</td></tr>
<tr><td>Not replacing the motherboard tray, but you are replacing units on it</td><td>Go to the appropriate procedure for the unit you are replacing:
“Replacing the motherboard lithium battery” on page 72
“Replacing the memory card assembly” on page 75
“Installing or replacing expansion adapters” on page 83</td></tr>
</table>

Replacing the motherboard tray

About replacing the motherboard tray

Replacing the motherboard tray consists of the following procedures:

- "Removing the motherboard tray" on page 70
- "Installing the motherboard tray" on page 71

Removing the motherboard tray

To remove the motherboard tray, complete the following steps.

Attention

To prevent shorting the NVRAM4 or NVRAM5 battery, you must perform this procedure on a nonconductive surface. Shorting the NVRAM4 or NVRAM5 battery causes data loss.

Step	Action
1	Shut down your V-Series system by entering the following command at the console: `halt`
2	Open the PCB carrier by following the procedure described in "Opening the PCB carrier" on page 66. **Note** When the motherboard fails, your V-Series system performs a "dirty shutdown." This prevents you from performing the recommended clean shutdown. However, the data from the last transaction is still buffered in the battery-backed memory on the NVRAM4 or NVRAM5 adapter.
3	Remove all adapters by following Steps 2 through 6 of the procedure described in "Removing an existing expansion adapter" on page 84. If your PCI expansion adapters are secured by screws, set the screws and adapters aside for later use.
4	Remove the memory card assembly by following the procedure described in "Replacing the memory card assembly" on page 75.

Step	Action
5	Remove the PCB carrier from the chassis by following Steps 2 through 4 in “Removing the PCB carrier” on page 68.
6	Unscrew the slides from the PCB carrier and set them aside for your replacement motherboard tray, which includes the PCB carrier, empty of all other FRUs.

Installing the motherboard tray

To install the motherboard tray, complete the following steps.

Step	Action
1	Using a #2 Phillips screwdriver, secure the rails on the side of the PCB carrier.
2	Install the memory card assembly by following the procedure described in “Replacing the memory card assembly” on page 75.
3	Reinstall all other adapters into the expansion slots on the motherboard by following Steps 3 through 6 of the procedure described in “Installing an expansion adapter” on page 86.
4	Pull the inner slides from your V-Series system’s chassis to full extension, then carefully align the PCB carrier rails with the inner slides.
5	Slide the PCB carrier into your V-Series system chassis. **Note** If the PCB carrier gets stuck while the inner slides are extended, reach inside your V-Series system chassis and hold the locking mechanism straight so that the slides are not obstructed.
6	Reconnect your V-Series system to your network.
7	Reconnect your V-Series system to AC power and power it on.
8	Download the latest firmware version for your V-Series system.
9	Run diagnostics for your system. See the *Diagnostics Guide* for more information.

Replacing the motherboard lithium battery

About replacing the motherboard lithium battery

Replacing the 3.3V lithium battery on the motherboard consists of the following procedures:

- "Removing the motherboard lithium battery" on page 72
- "Installing the motherboard lithium battery" on page 73

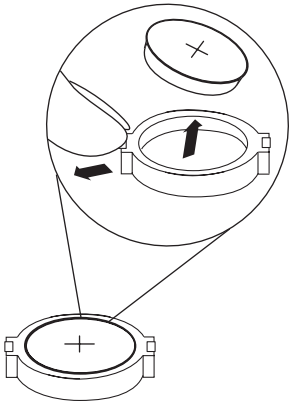
Removing the motherboard lithium battery

To remove the motherboard lithium battery, complete the following steps.

Attention

You must perform a clean shutdown before you replace your motherboard battery.

Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 66. **Attention** Put on an antistatic wrist strap and attach the grounding leash to your V-Series system chassis.

Step	Action
2	Carefully lift up the battery toward the open side of the battery holder, as shown. 

Installing the motherboard lithium battery

To install the motherboard lithium battery, complete the following steps.

WARNING

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instructions.

AVERTISSEMENT

Il y a danger d'explosion s'il y a remplacement incorrect de la pile. Remplacer la pile seulement avec une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettre au rebut les piles usagées selon les instructions du fabricant.

ACHTUNG

Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Die Batterien nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ ersetzen. Gebrauchter Batterien nach Angaben des Herstellers loswerden.

Step	Action
1	Turn the battery so that the positive side is up (marked with a “+”).
2	Push the battery through the open side of the battery holder so that it sits flush inside the battery holder.
3	Go to “Closing the PCB carrier” on page 96.

Replacing the memory card assembly

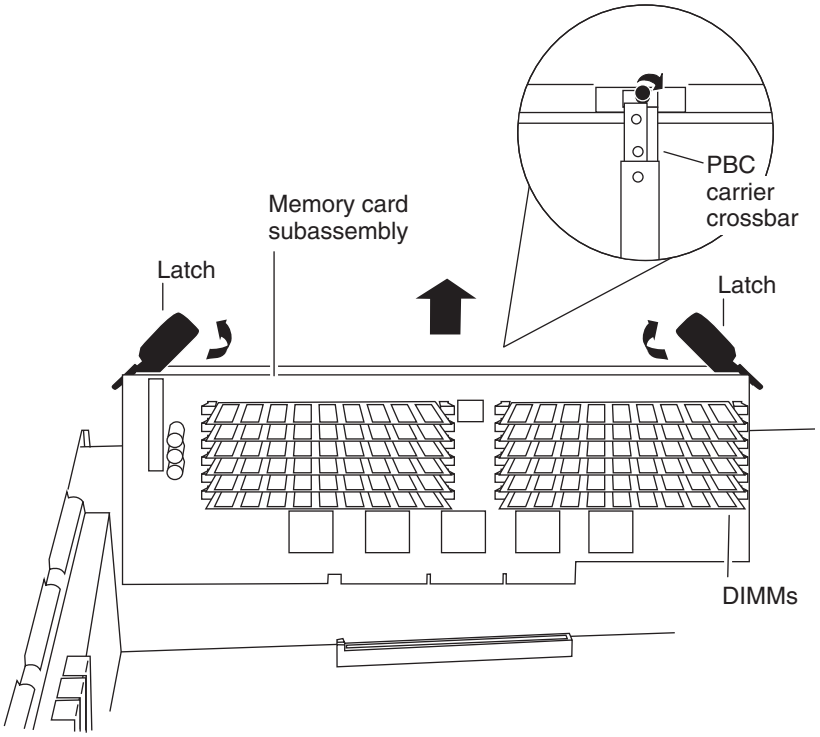
About replacing the memory card assembly

The memory card assembly contains the SDRAM DIMMs of your system and is connected to the motherboard. Replacing the memory card assembly consists of the following procedures:

- "Removing the memory card assembly" on page 75
- "Installing the memory card assembly" on page 76

Removing the memory card assembly

To remove the memory card assembly, complete the following steps, using the figure for reference.



Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 66.
2	Lift the PCB carrier crossbar from the top of the inside of the PCB carrier by loosening the thumbscrew above the memory card assembly.
3	Pull apart the latches on both sides of the memory card assembly to release it from the PCB carrier.
4	Carefully pull the memory card assembly from its riser slot.
5	Set the memory card assembly aside in an antistatic bag.

Installing the memory card assembly

To install the memory card assembly, complete the following steps.

Step	Action
1	Hold the memory card assembly by the sides to avoid damaging the components.
2	Carefully insert the memory card assembly straight into its riser slot. The memory card assembly fits tightly in the slot, but should go in easily. If not, realign the memory card assembly with its riser slot and try again. **Attention** Visually inspect the memory card assembly to verify that it is evenly aligned and fully inserted into the slot; otherwise, the edge connector on the memory card assembly does not make complete contact with the slot.
3	Push carefully, but firmly on the top edge of the memory card assembly until the latches snap into place.
4	Lower the PCB carrier crossbar and secure it on top of the memory card assembly by tightening the thumbscrew.

Step	Action
5	Go to “Closing the PCB carrier” on page 96.
6	After turning on your V-Series system, run diagnostics on your new memory card assembly. See the *Diagnostics Guide* for more information.

Replacing SDRAM DIMMs on the memory card assembly

About replacing SDRAM DIMMs

This section provides the supported memory configurations for your V-Series system and describes the procedures for replacing the SDRAM DIMMs on the memory card assembly.

Replacing the SDRAM DIMMs on the memory card consists of the following procedures:

- "Removing an SDRAM DIMM" on page 80
- "Installing an SDRAM DIMM" on page 81

Supported memory configurations

The following table lists the supported memory configurations for your V-Series system.

V-Series system model	DIMM slots	DIMM group numbers	Required memory configuration
GF920	1–4	Group 1	3.3V, registered, 4 x 512 MB SDRAM DIMMs
GF940	1–4	Group 1	3.3V, registered, 8 x 512 MB SDRAM DIMMs
	5–8	Group 2	
GF960	1–4	Group 1	3.3V, registered, 12 x 512 MB SDRAM DIMMs
	5–8	Group 2	
	9–12	Group 3	
GF980	1–4	Group 1	3.3V registered, 8 x 1 GB SDRAM DIMMs
	4–8	Group 2	

Note

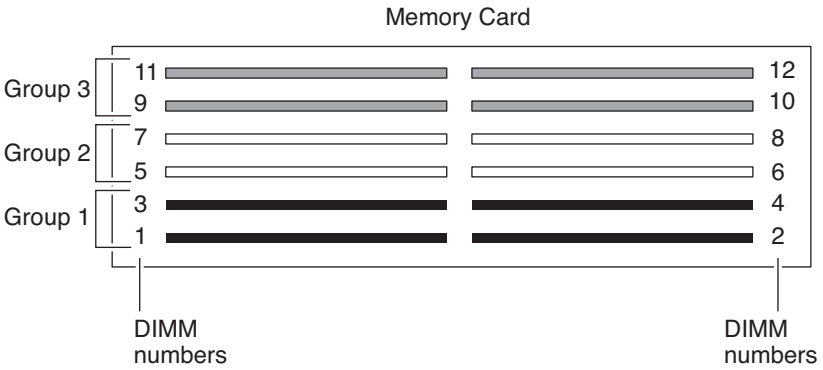
SDRAM DIMMs are numbered to the right and the left of the DIMM slots on the memory card. The DIMM group numbers appear in smaller print perpendicular to the DIMM slots.

Attention

All DIMMs must be listed on the Approved Parts List. Contact your authorized reseller to obtain this list. Unapproved DIMMs have not been tested for reliability and might cause system downtime.

DIMM locations

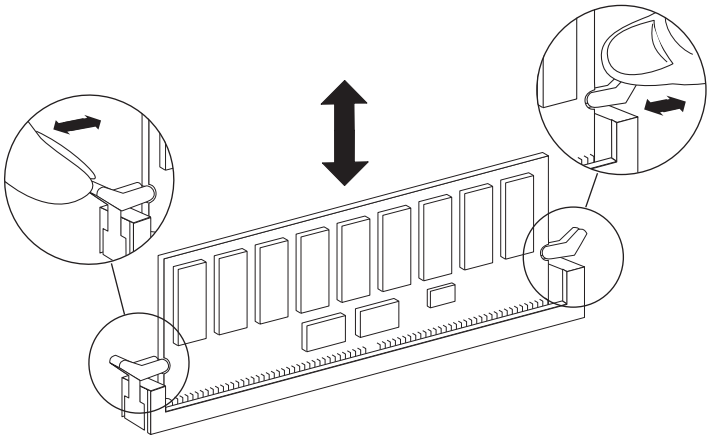
Use the following illustration to determine the location of DIMM slot and DIMM group numbers.



Removing an SDRAM DIMM

To remove an SDRAM DIMM, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 66.
2	Remove the memory card assembly, as described in "Removing the memory card assembly" on page 75.
3	Locate the DIMM that you want to remove.

Step	Action
4	Push apart the latches on either side of the DIMM to release the DIMM from its slot, as shown. 
5	Pull the DIMM out of the slot.
6	Set the DIMM aside in an antistatic bag.

Installing an SDRAM DIMM

To install an SDRAM DIMM, complete the following steps.

Step	Action
1	Locate the DIMM slot for the DIMM you are installing.
2	Hold the DIMM by its top corners to avoid damaging the components.

Step	Action
3	Insert the DIMM straight into the slot. The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and try again. **Attention** Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the edge connector on the DIMM does not make complete contact with the slot.
4	Push carefully, but firmly on the top edge of the DIMM until the latches snap into place.
5	Install the memory card assembly, as described in “Installing the memory card assembly” on page 76.
6	Go to “Closing the PCB carrier” on page 96.
7	After turning on your system, run diagnostics on the SDRAM DIMMs. See the *Diagnostics Guide* for more information.

Installing or replacing expansion adapters

About installing or replacing expansion adapters

Replacing an expansion adapter or installing a new expansion adapter consists of one or both of the following procedures:

- "Removing an existing expansion adapter" on page 84
- "Installing an expansion adapter" on page 86

Expansion adapters used

Your V-Series system uses the following expansion adapters:

- NVRAM4
- NVRAM5 adapter

Note

If your appliance uses NVRAM5, go to "Replacing the NVRAM5 adapter" on page 89.

- Fibre Channel HBAs
- GbE NICs
- Tape
  - SCSI
  - FC-AL
- IB cluster

Slot assignments for expansion adapters

If you are adding expansion adapters to your V-Series system, see your configuration chart for current configuration information for the following:

- Expansion slots that are available on your V-Series system
- Supported adapters
- Expansion slot assignments

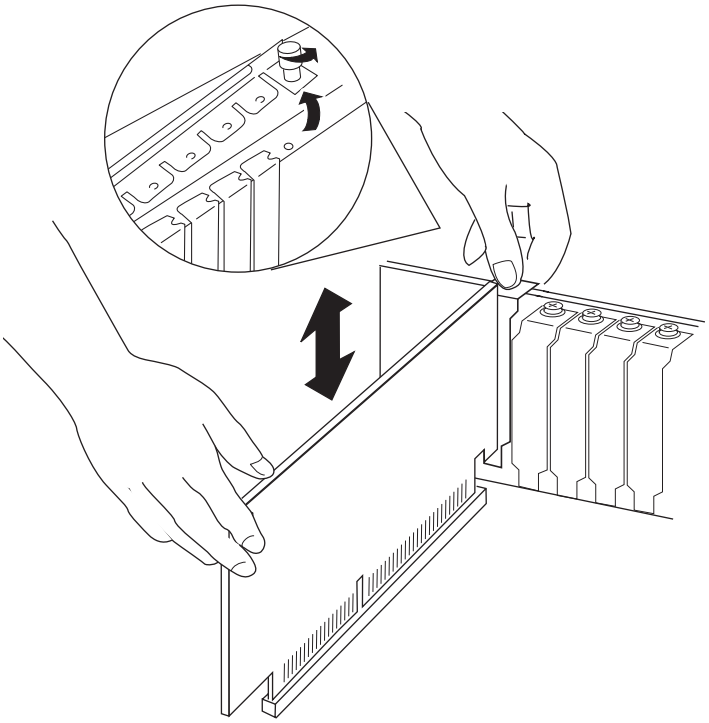
Attention

Install only supported expansion adapters in the assigned expansion slots.

Removing an existing expansion adapter

To remove existing expansion adapters, complete the following steps.

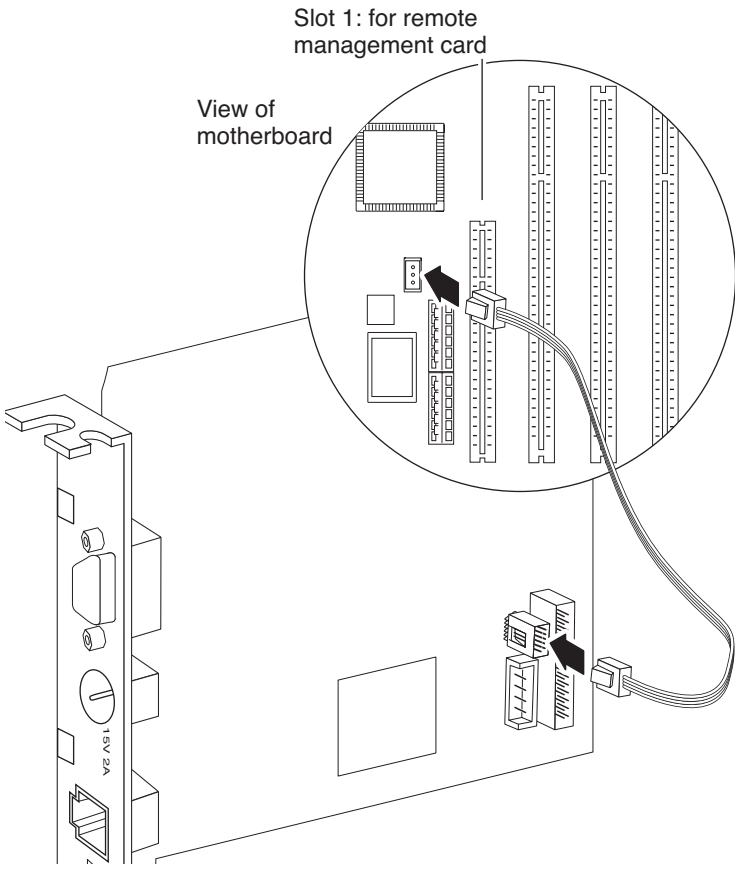
Step	Action	
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 66.	
2	Unlatch the PCI clamp arm and pull it aside. **Note** Your system might require that you screw down PCI expansion adapters. If so, remove and set aside any screws for PCI expansion adapters.	
3	Note which cables (if any) are connected to the connectors on the faceplate of the expansion adapter before disconnecting the cables. **Attention** Do not disconnect or connect SCSI cables while your V-Series system is on. You could cause permanent damage to the hardware.	
4	**If you are replacing the...**	**Then...**
	NVRAM4 adapter	Remove the PCB carrier crossbar by loosening the thumbscrew and lifting the crossbar away from the top of the PCB carrier. **Attention** If you did not perform a clean shutdown using the `halt` command, disconnecting the NVRAM battery from the NVRAM4 adapter results in data loss.
	NVRAM5	Go to"Replacing the NVRAM5 adapter" on page 89.
	Remote administration card	Carefully unplug the internal cable that connects to the motherboard.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>5</td><td colspan="2">Remove the PCI clamp-down bracket holding the expansion adapter faceplate to the back panel bracket and save it for reinstalling the adapter.</td></tr>
<tr><td>6</td><td colspan="2">Pull upward on the top edge of the expansion adapter and lift it out of the chassis, as shown.
  </td></tr>
<tr><td rowspan="3">7</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Not installing a replacement expansion adapter</td><td>Install a slot cover for the empty PCI slot.</td></tr>
<tr><td>Installing a replacement expansion adapter</td><td>Go to “Installing an expansion adapter” on page 86.</td></tr>
</table>

Installing an expansion adapter

To install an expansion adapter, complete the following steps.

Step	Action	
1	**If you are...**	**Then...**
	Installing a new adapter	Take the adapter out of the antistatic bag and discard the bag.
	Installing a replacement adapter	Take the replacement adapter out of the antistatic bag and place the used adapter into that bag.
	Reinstalling all other adapters	Go to Step 2. You reinstall adapters when you replace the motherboard.
2	Holding the adapter by its top edge, with the faceplate near the back of the machine, lower the adapter into the slot until its connector edge meets the grooves in the expansion slot. The faceplate of the adapter should be in position against the back panel, and should cover the endplate slot on the back panel.	
3	Press carefully on the top edge of the adapter until the edge connector is seated in the expansion slot.	
4	If applicable, replace the faceplate screw to secure the adapter to the back panel.	
5	Reconnect the cables to the external connectors on the replacement expansion adapter.	

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="4">6</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Replacing the NVRAM4</td><td>Lock down the PCB carrier crossbar over the NVRAM4, then secure the crossbar to the side of the PCB carrier by tightening the thumbscrew.</td></tr>
<tr><td>Removing the NVRAM5</td><td>Go to “<a>Replacing the NVRAM5 adapter” on page 89.</td></tr>
<tr><td>Replacing the remote management card</td><td>Remove the connector from the motherboard, as shown in the following illustration.
 
</td></tr>
</table>

Step	Action
7	Go to “Closing the PCB carrier” on page 96.
8	After turning on your V-Series system, run diagnostics on the expansion adapter you replaced. See the *Diagnostics Guide* for more information.

Replacing the NVRAM5 adapter

About replacing the NVRAM5 adapter

Replacing the NVRAM5 adapter consists of the following procedures:

- "Removing the NVRAM5 adapter" on page 90
- "Installing an NVRAM5 adapter" on page 93

Note

You use your NVRAM5 adapter in cluster mode when your appliance is in a cluster configuration. See the *Cluster Guide* for more information.

Attention

You must perform a clean shutdown before you replace your NVRAM5 adapter.

About NVRAM5 cabling

When your GF900 system is in a clustered configuration, you cable the NVRAM5 adapter on each appliance to each other.

There are two types of cables for the NVRAM5 cluster interconnect adapter:

- Copper
- Fiber optic

Note

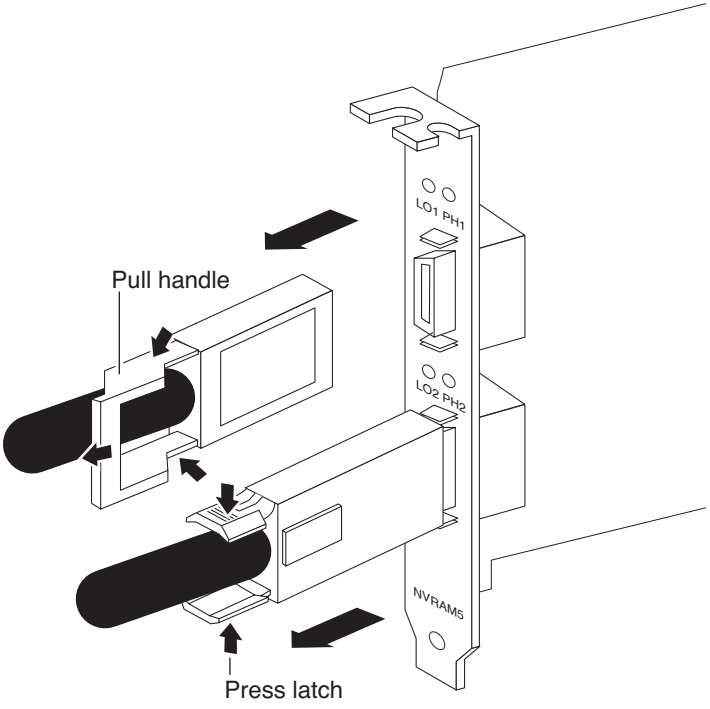
If you plan on using a cable with a distance greater than 10 meters, you must use fiber cabling.

Removing the NVRAM5 adapter

To remove your NVRAM5 adapter, complete the following steps, using the figure for reference.

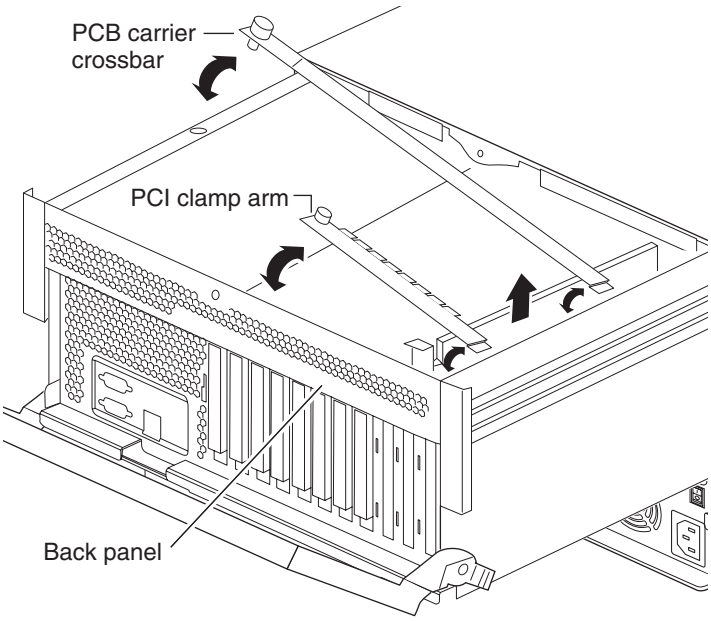
Note

There are two varieties of copper cables, both of which are shown in the following illustration.



Step	Action
1	Make sure that you are properly grounded before proceeding.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="4">2</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Disconnecting copper cables with a pull-back handle</td><td>Complete these steps, using the illustration for reference.
1. Hold the copper IB connector with one hand, and then carefully pull back the latch of the top cable and slowly pull the IB connector from the NVRAM5 adapter port.
2. Repeat this step for the cable connecting to the bottom port.
3. Go to Step 2.</td></tr>
<tr><td>Disconnecting copper cables with press-latches</td><td>Complete these steps, using the illustration for reference.
1. Press the latches of the top cable and slowly pull the IB connector from the NVRAM5 adapter port.
2. Repeat this step for the cable connecting to the bottom port.
3. Go to Step 2.</td></tr>
<tr><td>Using fiber cables with a media converter</td><td>Go to “Replacing the NVRAM5 media converter” on page 109 to remove your media converter.</td></tr>
<tr><td>3</td><td colspan="2">Open your PCB carrier, as described in “Opening the PCB carrier” on page 66.</td></tr>
</table>

Step	Action
4	By completing the following substeps, disengage your NVRAM5 adapter from the motherboard, using the figure for reference.  **1.** Remove the PCB carrier crossbar by loosening the thumbscrew and lifting the crossbar away from the top of the PCB carrier. **2.** Remove the PCI clamp arm by loosening the thumbscrew and lifting the arm away from the back panel.
5	Pull upward on the top edge of the expansion adapter and lift it out of the chassis, as shown in Step 6 of “Installing or replacing expansion adapters” on page 83.
6	If you are installing a replacement adapter, go to “Installing an NVRAM5 adapter” on page 93.

Step	Action	
7	**If you are...**	**Then...**
	Converting your appliance from cluster mode to stand-alone mode	**1.** Install your NVRAM5 adapter in slot 10, as described in "Installing an NVRAM5 adapter" on page 93. **2.** Install a slot cover for PCI slot 11, if unused. **3.** Close the PCB carrier, as described in "Closing the PCB carrier" on page 96.
	Installing a replacement NVRAM5 adapter for cluster mode	Go to "Installing an NVRAM5 adapter" on page 93.

Installing an NVRAM5 adapter

To install an NVRAM5 adapter, complete the following steps.

Step	Action
1	Open your PCB carrier, as described in "Opening the PCB carrier" on page 66. Make sure that you are properly grounded.
2	Unlatch the PCI clamp arm by loosening the thumbscrew, and then remove it from the back panel.
3	Remove the PCB carrier crossbar arm by loosening the thumbscrew and lifting it from the PCB carrier.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">4</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Installing a new NVRAM5 adapter in a stand-alone system or converting your appliance from a clustered to stand-alone system</td><td>1. Take the adapter out of the antistatic bag and remove the port protectors from the adapter.
2. Install the NVRAM5 adapter in slot 10, as described in Step 5.</td></tr>
<tr><td>Installing a new NVRAM5 adapter in a clustered system or converting your appliance from stand-alone to clustered system</td><td>1. Take the adapter out of the antistatic bag and remove the port protectors from the adapter.
2. Install the NVRAM5 adapter in slot 11, as described in Step 5.
Note
For fabric-attached clusters, the NVRAM5 adapter is installed in slot 10.</td></tr>
<tr><td>5</td><td colspan="2">Holding the NVRAM5 adapter by its top edge, with the faceplate near the back of the machine, lower the adapter into the slot until its connector edge meets the grooves in the appropriate expansion slot.
The faceplate of the adapter should be in position against the back panel, and should cover the endplate slot on the back panel.</td></tr>
<tr><td>6</td><td colspan="2">Press carefully on the top edge of the adapter until the edge connector is seated in the expansion slot.</td></tr>
<tr><td>7</td><td colspan="2">Bring the PCB carrier crossbar over the top of the NVRAM5 adapter and secure it by tightening the thumbscrew.</td></tr>
<tr><td>8</td><td colspan="2">Push the PCI clamp arm back into place and tighten the thumbscrew to secure it to the back panel.</td></tr>
<tr><td>9</td><td colspan="2">Close your PCB carrier, as described in “Closing the PCB carrier” on page 96.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">10</td><td>If you have...</td><td>Then...</td></tr>
<tr><td>Installed an NVRAM5 adapter in a stand-alone system</td><td>Go to Step 11.</td></tr>
<tr><td>Installed an NVRAM5 adapter in a clustered system</td><td>1. Reconnect the clustered nodes by cabling the NVRAM5 cluster interconnect adapters, as described in the Cluster Guide.

Note
If you are using fiber optic cables, go to “Installing a media converter” on page 110.

2. Go to Step 11.</td></tr>
<tr><td>11</td><td colspan="2">Power on your V-Series system.</td></tr>
<tr><td>12</td><td colspan="2">Run diagnostics on your entire system.</td></tr>
</table>

Closing the PCB carrier

Closing the PCB carrier

To close the PCB carrier, complete the following steps.

Step	Action
1	If you removed the PCB carrier, screw in the carrier rails on each side of the PCB carrier, and then carefully place it on the extended slides of your V-Series system chassis so that the tabs on the rails fit into the slots on the slides.
2	Using the cam handle, slide the PCB carrier into your V-Series system chassis. If the PCB carrier is locked in position, press inward on the carrier tabs on each carrier slide rail while pushing the PCB carrier into the chassis.
3	Tighten the three thumbscrews on the back of the chassis.
4	Reinstall the cable management tray by following the procedure described in “Replacing the cable management tray” on page 64.
5	Reconnect any cables you removed from the back panel of your V-Series system.
6	Reconnect the power to your V-Series system.
7	Turn on your disk subsystem, your tape backup, and Fibre Channel switches, if applicable, and then your V-Series system.
8	Interrupt the boot process by pressing the Delete key during the memory test.
9	Run diagnostics by entering the following command at the `ok>` prompt: **`sys-diag`** See the *Diagnostics Guide* for more information.
10	Run the specific diagnostics that apply to the unit you installed or replaced.

Replacing fan subassemblies

About replacing fan subassemblies

Replacing a fan subassembly consists of the following procedures:

- "Removing a fan subassembly" on page 98
- "Installing a fan subassembly" on page 100

Identifying the subassembly to replace

Each of the three fan subassemblies secured to the front of the chassis contains two fans. If a problem occurs in a fan, the system console displays an error message identifying the specific fan that has the problem, rather than the subassembly it belongs to.

Note

You cannot replace the individual fan; you must replace the subassembly.

The following table lists the individual fan numbers that the console might display and their corresponding subassemblies.

Fan number (as indicated on your console)	**Subassembly (as indicated on your chassis)**
Baseboard fan 1	Subassembly 1
Baseboard fan 2	
Baseboard fan 3	Subassembly 2
Baseboard fan 4	
Baseboard fan 5	Subassembly 3
Baseboard fan 6	

Note

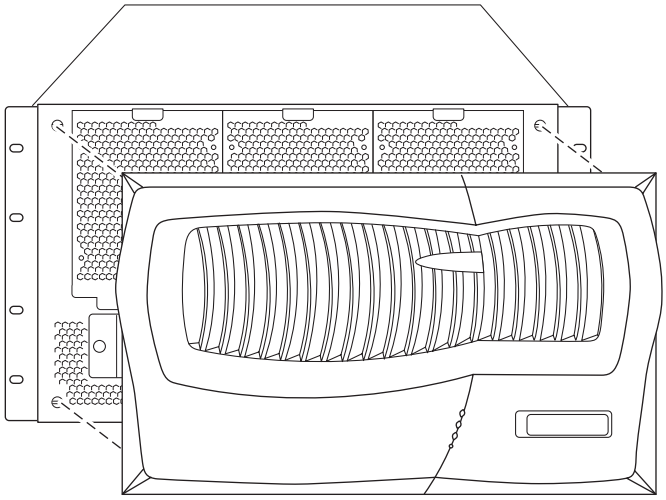
To maintain UL, CSA, and TUV safety certifications, you must obtain replacement fan subassemblies from your authorized reseller. Using unapproved replacement fan subassemblies voids the safety certifications.

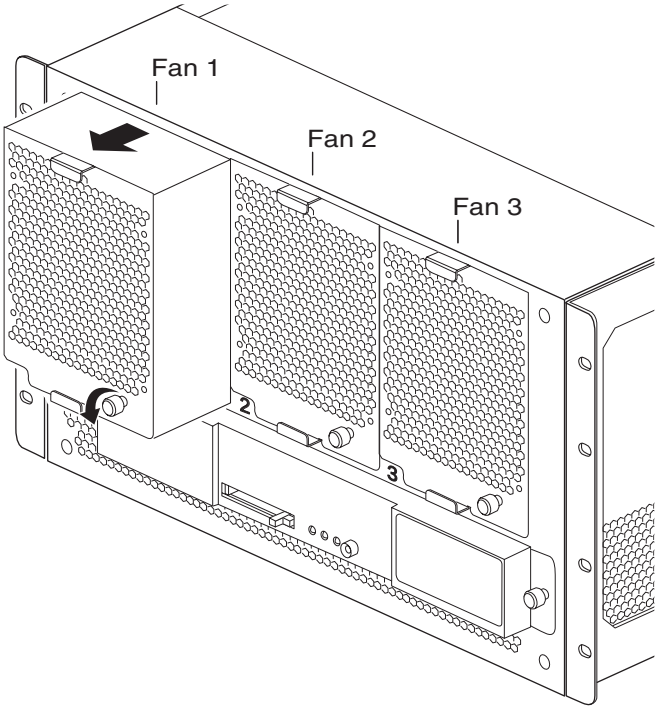
Removing a fan subassembly

To remove a fan subassembly, complete the following steps.

Note

Because the three subassemblies are hot-swappable, there is no need to shut down your V-Series system. There is a two-minute window for replacing fans.

Step	Action
1	From the console, note the identification of the fan that failed and identify the subassembly that it belongs to.
2	Pull the bezel straight off the front panel of your V-Series system by using the grooves on the left and right edges of the bezel. 
3	Using a #1 Phillips screwdriver, loosen the thumbscrews on the chassis fan subassembly that failed.

Step	Action
4	Using both the upper and lower lips, pull the subassembly out of your V-Series system chassis. The sheet metal below the subassemblies is silk-screened with the labels Fan 1, Fan 2, and Fan 3, as indicated in the illustration below. **Note** If your V-Series system is running Data ONTAP software, it reports a failure for the removed fan subassembly. 
5	Set the subassembly aside.

Installing a fan subassembly

To install a fan subassembly, complete the following steps.

Step	Action
1	Slide the subassembly straight into your V-Series system chassis.
2	Tighten the subassembly thumbscrews.
3	Align the pins on the bezel with the holes on the front panel of your V-Series system, then push the bezel straight onto the front panel.
4	Run diagnostics by entering the following command at the `ok>` prompt: **`sys-diag`** See the *Diagnostics Guide* for more information.
5	Run the diagnostics that apply to the unit you installed or replaced.

Replacing the power supplies

About replacing a power supply

Your V-Series system has two power supplies in two separate power supply bays at the back.

Replacing a power supply consists of the following procedures:

- "Removing a power supply" on page 101
- "Installing a power supply" on page 103

Power supply compatibility

Be aware of the following caution regarding the compatibility between the two power supplies in your V-Series system.

Attention

When replacing a power supply, be sure not to mix power supplies from different systems. The two power supplies in your V-Series system must have the same part number.

Removing a power supply

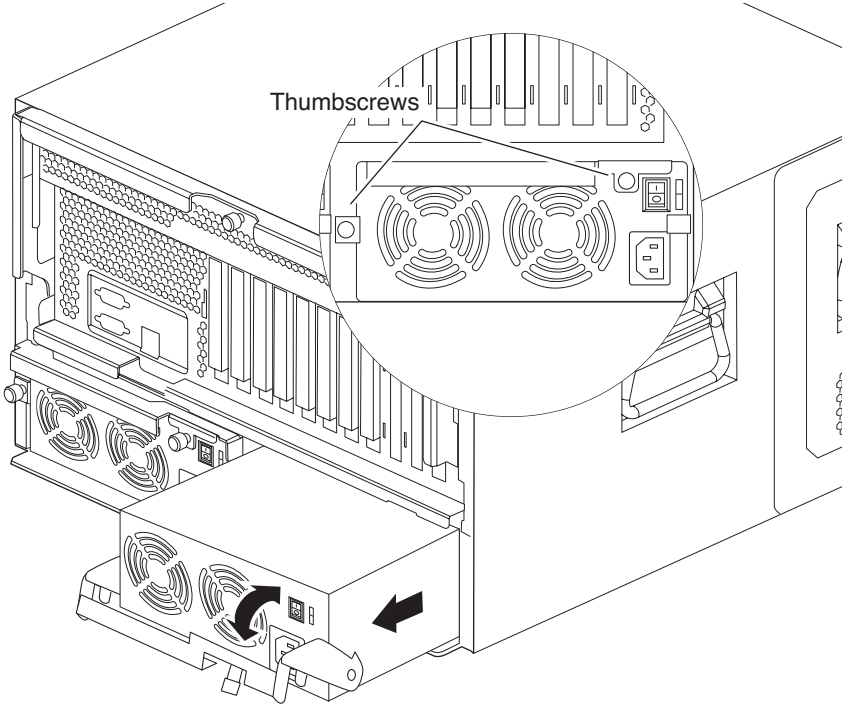
To remove a power supply, complete the following steps, using the figure for reference.

WARNING

To avoid an electric shock hazard, you must disconnect the power supply before removing it from your V-Series system.

Note

Because you have two power supplies that are hot-swappable, you do not have to shut down your V-Series system when you are replacing one of them.



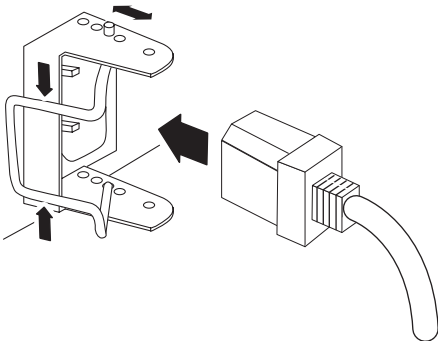
Step	Action
1	From the console or LCD screen, identify the failed power supply. **Note** The power supply identifiers, PS1 and PS2, are silk-screened onto your V-Series system chassis.
2	Put on the antistatic wrist strap and grounding leash.
3	Turn off the switch on the power supply that you are replacing.
4	Lift up the clip lock and unplug the power cord from your V-Series system power supply.
5	Loosen the power supply thumbscrews by turning each thumbscrew counterclockwise.

Step	Action
6	Use the cam handle to slide the power supply out of the power supply bay. **WARNING** **The power supply is heavy. Support the bottom of the unit while removing the unit from its bay.**
7	Set the power supply aside. **Note** If your V-Series system is running Data ONTAP, it reports a failure for the removed power supply.

Installing a power supply

To install a power supply, complete the following steps.

Step	Action
1	Verify that the switch on the power supply is turned off.
2	Slowly and firmly push the power supply into the bay until the power supply is firmly seated in the bay.
3	Secure the power supply by turning the thumbscrew clockwise until it stops.

Step	Action
4	Plug the power cord into the power cord receptacle on the power supply and secure it with the adjustable clip lock, shown below. 
5	Turn on the power to the new power supply.

Replacing the control panel subassembly

About replacing the control panel subassembly

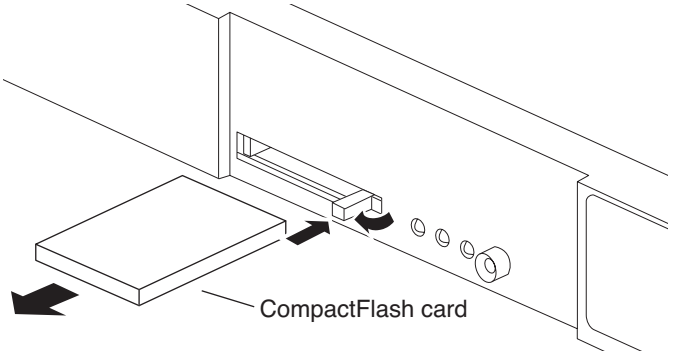
The control panel assembly includes your CompactFlash unit. Replacing the control panel subassembly consists of the following procedures:

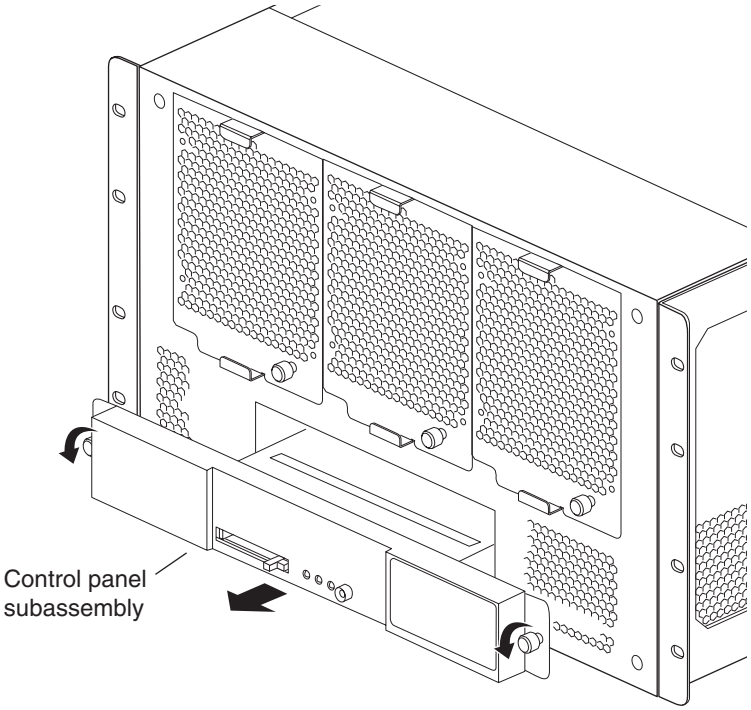
- "Removing the control panel subassembly" on page 105
- "Installing the control panel subassembly" on page 107

Removing the control panel subassembly

To remove the control panel subassembly, complete the following steps.

Step	Action
1	Shut down your V-Series system by entering the following command at the console: `halt` **Attention** Always use the `halt` command to perform a clean shutdown of your V-Series system. If you do not perform a clean shutdown before removing the CompactFlash unit, your system panics.
2	Turn off and disconnect the power to your V-Series system.
3	Put on the antistatic wrist strap and attach the grounding leash to your V-Series system chassis.
4	Pull the bezel straight off the front panel of your V-Series system by using the grooves on the left and right edges of the bezel. See the illustration in Step 2 of "Removing a fan subassembly" on page 98.

Step	Action
5	Remove the CompactFlash card by pulling the lever on the side of the CompactFlash bay and pushing to release the unit, as shown in the following illustration. 
6	Loosen the two thumbscrews on each side of your control panel subassembly.

Step	Action
7	Pull the control panel subassembly out of the drive bay. 

Installing the control panel subassembly

To install the control panel subassembly, complete the following steps.

Step	Action
1	Slide the control panel subassembly into the drive bay.
2	Tighten the two thumbscrews to secure the control panel subassembly to the chassis.
3	Slide the CompactFlash unit into the slot on the front of the CompactFlash reader.

Step	Action
4	Reinstall the front bezel by aligning the pins on the bezel with the holes on the front panel of your V-Series system, and then pushing the bezel straight onto the front panel.
5	Reconnect and turn on the power to your V-Series system.
6	Interrupt the boot process by pressing the Delete key during the memory test.
7	Insert the CompactFlash unit and run diagnostics by entering the following command at the `ok>` prompt: **`sys-diag`** See the *Diagnostics Guide* for more information.

Replacing the NVRAM5 media converter

About replacing the NVRAM5 media converter

Your NVRAM5 media converter attaches to an MPO connector and plugs into the IB port on the NVRAM5 adapter when your appliance is in a clustered configuration. Replacing the NVRAM5 media converter consists of the following procedures:

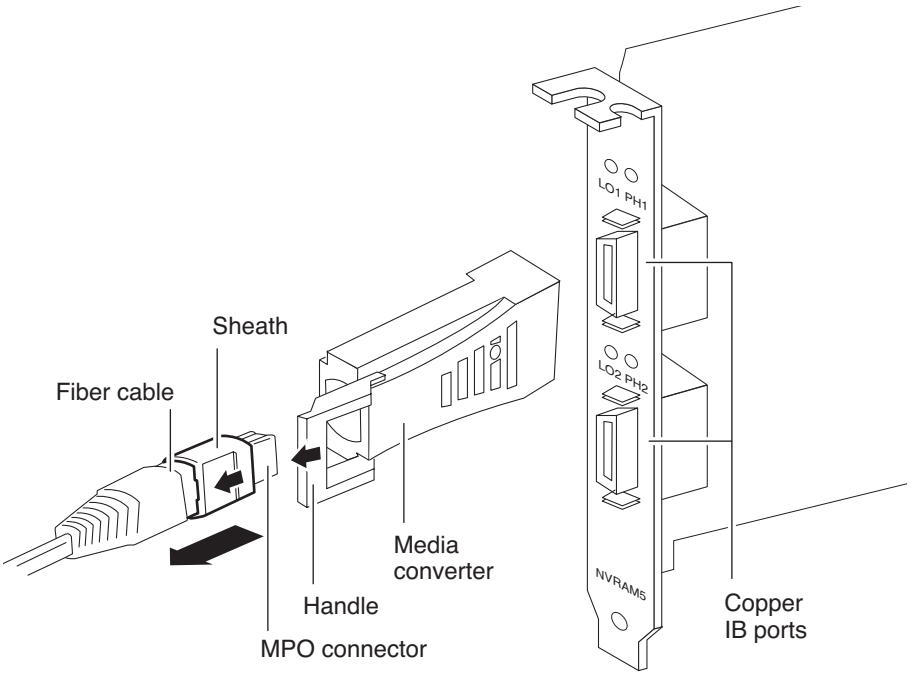
- "Removing the media converter" on page 109
- "Installing a media converter" on page 110

Removing the media converter

To remove your media converter, complete the following steps, using the figure for reference.

Attention

You must perform a clean shutdown before you replace your media converter.



Step	Action	
1	Starting with the top port, grasp the media converter firmly with one hand. With your other hand, pull the handle so that the latches open, and then gently remove the media converter IB connector from your NVRAM5 adapter port.	
2	To disconnect the cable, grip the connector sheath by the top and bottom between your finger and thumb, hold the sides of the media converter firmly with your other hand, and then gently remove the cable MPO connector from the media converter.	
3	Repeat steps 1 through 2 for the bottom cable, if applicable.	
4	**If...**	**Then...**
	You are replacing the media converter	Go to "Installing a media converter" on page 110.
	You are switching from fiber to copper cabling	**1.** Gently plug the IB connector on the copper cable into the NVRAM5 adapter top port. **2.** Repeat Step 1 for the bottom port on your NVRAM5 adapter.

Installing a media converter

To install a media converter, complete the following steps.

Step	Action
1	For each media converter, plug the MPO connector on the fiber cable into your media converter.
2	Plug the media converter IB connector into the bottom port on your NVRAM5. Repeat this step for the top port on your NVRAM5.
3	Check LED status to ensure that you have physical connectivity. ◆ For media converter LEDs, go to "NVRAM5 media converter LEDs" on page 29. ◆ For NVRAM5 LED descriptions, go to "NVRAM5 adapter LEDs" on page 27.

Maintaining and Servicing the GF825 4

About this chapter

This chapter lists field-replaceable units (FRUs) that are available for your GF825, and describes the tasks you must complete to replace each type of FRU.

Topics in this chapter

This chapter discusses the following topics:

Field-replaceable unit overview

About FRUs

A FRU is a component in your V-Series system that you can replace if it fails. You must obtain FRUs through your authorized reseller.

Data ONTAP Versions

Data ONTAP versions up to 7.1.x are supported on GF825 and GF825c models. Version 7.2 is not supported.

Units you can replace

You can replace the following units in the field:

- Motherboard with lithium battery and with or without DIMMs
- DIMMs
  - NVRAM III DIMM
  - Motherboard DIMMs
- Expansion adapters
  - NVRAM III (nonvolatile random access memory) adapter
  - FC-AL or SCSI adapter for tape drive backup
  - Dual-port Fibre Channel HBAs
  - Network interface cards (NICs)
  - IB Cluster adapter
- Batteries
  - NVRAM lead-acid battery
  - Motherboard lithium battery
- CPU fan and heat-sink
- Chassis fan subassemblies
- Power supplies
- GF825 V-Series system bezel
- LED/LCD subassembly
- CompactFlash and CompactFlash reader subassembly

Units that cannot be individually replaced

Replacement of the onboard 10Base-T/100Base-TX Ethernet interface on the motherboard requires replacement of the motherboard.

What to do if the failed item isn't on the FRU list

If you need to replace a component that is not in the FRU list, call your authorized reseller for instructions.

Required tools and equipment

To replace components, you need the following tools and equipment:

- Phillips screwdrivers (#0, #1, and #2)
- 3/16-inch socket wrench
- Torque screwdriver
- Antistatic wrist strap and grounding leash
- Antistatic bag

Attention

Your V-Series system uses electronic components that are sensitive to static electricity. Static discharge from your clothing or other fixtures around you can damage these components. Wear an antistatic wrist strap and grounding leash to free yourself of static electricity before touching any electronic components.

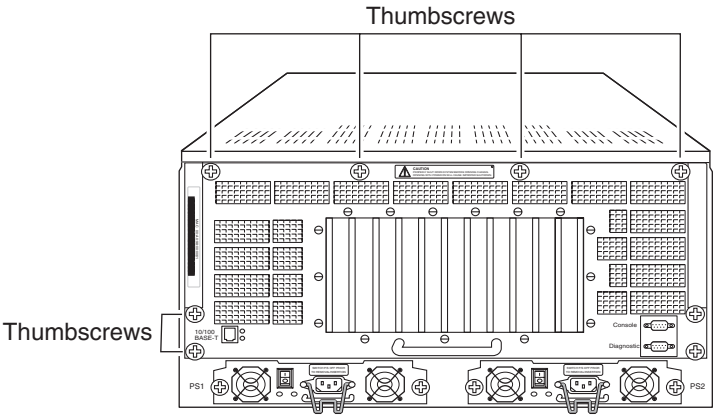
Opening the PCB carrier

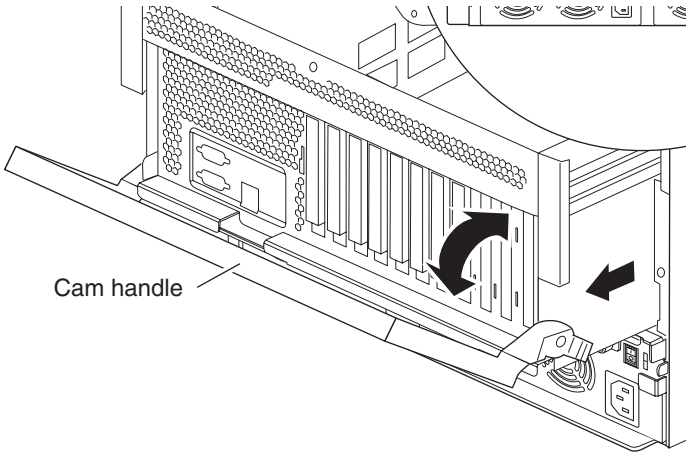
Reasons to open the PCB carrier

You open the PCB carrier to access the motherboard, expansion adapters, and other FRUs in your V-Series system.

Opening the PCB carrier

To open the PCB carrier, complete the following steps.

Step	Actions
1	Shut down your V-Series system by entering the following command at the console: `halt` **Attention** Always use the `halt` command to perform a clean shutdown.
2	Turn off and disconnect the power to your V-Series system.
3	Put on an antistatic wrist strap and attach the grounding leash to the V-Series system chassis.
4	Using a #1 or #2 Phillips screwdriver, loosen the eight thumbscrews on the back panel of the PCB carrier. 

Step	Actions
5	Carefully pull the PCB carrier out of the chassis until the carrier tabs click to lock the slide rails in place. The PCB carrier has a travel distance of approximately 19 inches (48.26 centimeters). **WARNING** **Use caution when servicing components in the chassis. There is danger of electric shock from hazardous energy on the backplane.** 

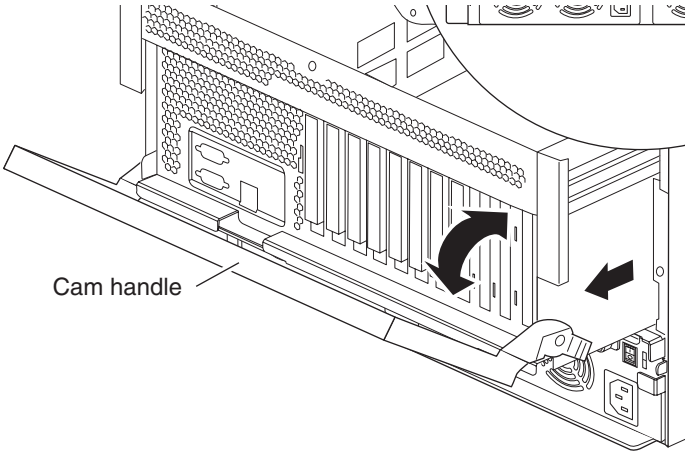
Removing the PCB carrier

Reasons to remove the PCB carrier

You can remove the PCB carrier from your V-Series system to make maneuvering easier when replacing units.

Removing the PCB carrier

To remove the PCB carrier from the V-Series system, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 114.
2	Press inward on the carrier tabs on each slide rail while pulling the PCB carrier out of the chassis. 
3	Support the PCB carrier with both hands, and set it aside.

Step	Action	
4	**If you are...**	**Then...**
	Replacing the motherboard	Disconnect all cables connected to the ports on the back of the PCB carrier and go to "Replacing the motherboard" on page 118.
	Not replacing the motherboard, but you are replacing units on it	Go to the appropriate procedure for the unit you are replacing: ◆ "Replacing SDRAM DIMMs on the motherboard" on page 122 ◆ "Installing or replacing expansion adapters" on page 125 ◆ "Replacing the NVRAM III battery" on page 133 ◆ "Replacing the CPU fan and heat-sink unit" on page 138 ◆ "Replacing the motherboard lithium battery" on page 140

Replacing the motherboard

About replacing the motherboard

Replacing the motherboard consists of the following procedures:

- "Removing the motherboard" on page 118
- "Installing the motherboard" on page 120

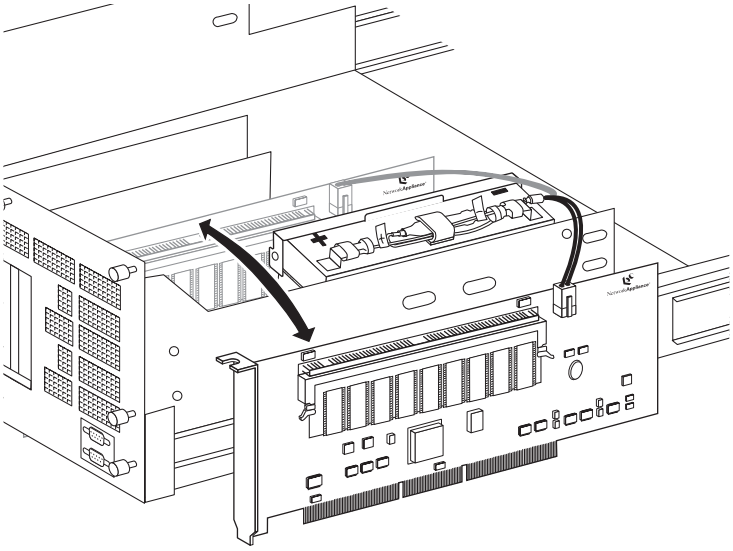
Removing the motherboard

To remove the motherboard, complete the following steps.

Attention

To prevent shorting the NVRAM III battery, you must perform this procedure on a nonconductive surface. Shorting the NVRAM III battery causes data loss.

Step	Action
1	Open the PCB carrier by following Step 2 through Step 5 of the procedure described in "Opening the PCB carrier" on page 114. **Note** When the motherboard fails, your V-Series system performs a "dirty shutdown." This prevents you from performing the recommended clean shutdown. However, the data from the last transaction is still buffered in the battery-backed memory on the NVRAM III adapter.
2	Remove the PCB carrier by following Step 2 through Step 4 of the procedure described in "Removing the PCB carrier" on page 116.
3	Using the #0 or #1 Phillips screwdriver, remove all adapters except the NVRAM III adapter from the expansion slots on the motherboard by following the procedure described in "Removing an existing expansion adapter" on page 126. Set the screws and adapters aside for later use.
4	Using a #0 or #1 Phillips screwdriver, remove the screw securing the NVRAM III adapter to the PCB carrier. Set the screw aside for later use.

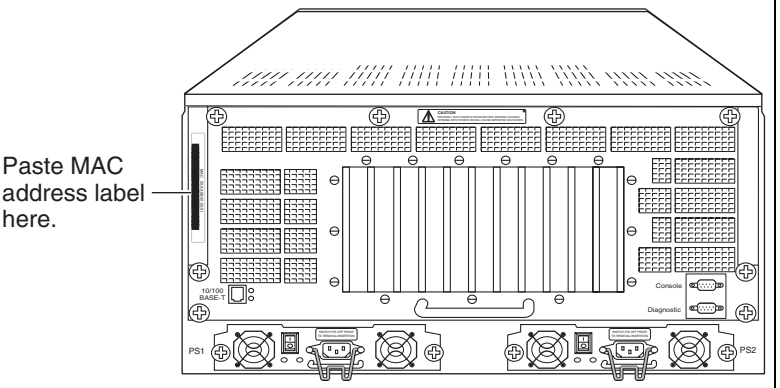
Step	Action
5	Lift the NVRAM III adapter out of the expansion slot and carefully lay it over the side of your V-Series system. This allows easy access for the removal of the NVRAM III battery. **Attention** If a dirty shutdown occurred, do not disconnect the NVRAM III battery wire from the NVRAM III adapter. This disconnection causes data loss. 
6	Using a #1 or #2 Phillips screwdriver, loosen the two thumbscrews securing the NVRAM III battery carrier to the V-Series system chassis.
7	Lift the NVRAM III battery out of the PCB carrier and place the battery and the still-connected NVRAM III adapter on the nonconductive surface.
8	Remove all SDRAM DIMMs from the motherboard by following Step 3 through Step 5 of the procedure described in "Removing an SDRAM DIMM" on page 122. Set the SDRAM DIMMs aside for later use.

Step	Action
9	Using a 3/16-inch socket wrench, remove the four screws on the back of the chassis that secure the Console and Diagnostic ports to the chassis.
10	Using a #2 Phillips screwdriver, remove the 11 screws securing the motherboard to the PCB carrier.
11	Lift the motherboard and slide it out of the PCB carrier.

Installing the motherboard

To install the motherboard, complete the following steps.

Step	Action
1	Slide the replacement motherboard into the PCB carrier and, using a #2 Phillips screwdriver, secure the motherboard to the PCB carrier with the 11 screws.
2	Reinstall all SDRAM DIMMs into the motherboard by following Step 2 through Step 4 of the procedure described in "Installing an SDRAM DIMM" on page 123.
3	Without disconnecting the wire from the NVRAM III adapter, reinstall the NVRAM III battery into its place on the PCB carrier. **Note** Maintaining the connection between the NVRAM III adapter and the NVRAM III battery is necessary only if a dirty shutdown occurred.
4	Tighten the two thumbscrews securing the NVRAM III battery carrier to the PCB carrier.
5	Carefully turn over the still-connected NVRAM III adapter that is outside the V-Series system and reinstall it in the expansion slot.
6	Using the #0 or #1 Phillips screwdriver, secure the NVRAM III adapter to the PCB carrier.

Step	Action
7	Reinstall all other adapters into the expansion slots on the motherboard by following the procedure described in "Installing an expansion adapter" on page 128.
8	Using a 3/16 socket wrench, connect all the screwlocks to the PCB carrier.
9	Paste the MAC (Media Access Control) address label provided with the replacement motherboard on the PCB carrier, as shown. 
10	Go to "Closing the PCB carrier" on page 142.
11	Reconnect your V-Series system to your network.
12	Reconnect your V-Series system to AC power and power it on.
13	Download the latest firmware version for your V-Series system if your replacement motherboard does not have firmware compatible with your version of Data ONTAP software.
14	Run diagnostics for your system. See the *Diagnostics Guide* for more information.

Replacing SDRAM DIMMs on the motherboard

About replacing SDRAM DIMMs

This section provides the supported memory configurations for your V-Series system and the procedures for replacing the SDRAM DIMMs on the motherboard. Replacing the SDRAM DIMMs on the motherboard consists of the following procedures:

- "Removing an SDRAM DIMM" on page 122
- "Installing an SDRAM DIMM" on page 123

Supported memory configurations

The following table lists the supported memory configurations for your V-Series system.

V-Series system	DIMM slots	Required memory configuration
GF825	J40, J43	3.3V, registered, 2 x 512 MB SDRAM DIMMs

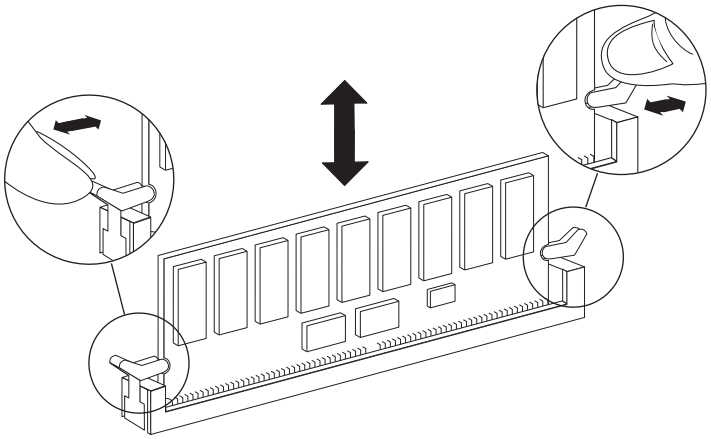
Attention

All DIMMs must be listed on the NetApp Approved Parts List. Contact your authorized reseller to obtain this list. Unapproved DIMMs have not been tested for reliability and might cause system downtime.

Removing an SDRAM DIMM

To remove an SDRAM DIMM, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 114.
2	Locate the DIMM that you want to remove.

Step	Action
3	Push apart the latches on either side of the DIMM to release the DIMM from its slot, as shown. 
4	Pull the DIMM out of the slot.
5	Set the DIMM aside in an antistatic bag.

Installing an SDRAM DIMM

To install the SDRAM DIMM, complete the following steps.

Step	Action
1	Locate the DIMM slot for the DIMM you are installing.
2	Hold the DIMM by its top corners to avoid damaging the components.

Step	Action
3	Insert the DIMM straight into the slot. The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and try again. **Attention** Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the edge connector on the DIMM does not make complete contact with the slot.
4	Push carefully, but firmly on the top edge of the DIMM until the latches snap into place.
5	Go to “Closing the PCB carrier” on page 142.

Installing or replacing expansion adapters

About installing or replacing expansion adapters

This section describes the steps involved in replacing an expansion adapter or installing a new expansion adapter. Replacing an expansion adapter consists of the following procedures:

- "Removing an existing expansion adapter" on page 126
- "Installing an expansion adapter" on page 128

Additional procedures: The NVRAM adapter might also require the following additional procedures:

- "Removing the NVRAM III DIMM" on page 131
- "Installing the NVRAM III DIMM" on page 131

Expansion adapters used

The GF825 V-Series system uses the following expansion adapters:

- NVRAM III adapter
- Dual-port Fibre Channel HBA
- Tape adapters
  - SCSI
  - FC-AL
- IB cluster adapter
- NICs

Slot assignments for expansion adapters

If you are adding expansion adapters to your V-Series system, check current system configuration information for the following:

- Expansion slots that are available on your V-Series system
- Supported adapters
- Expansion slot assignments

Attention

Install only supported expansion adapters in the assigned expansion slots.

Removing an existing expansion adapter

To remove existing expansion adapters, complete the following steps.

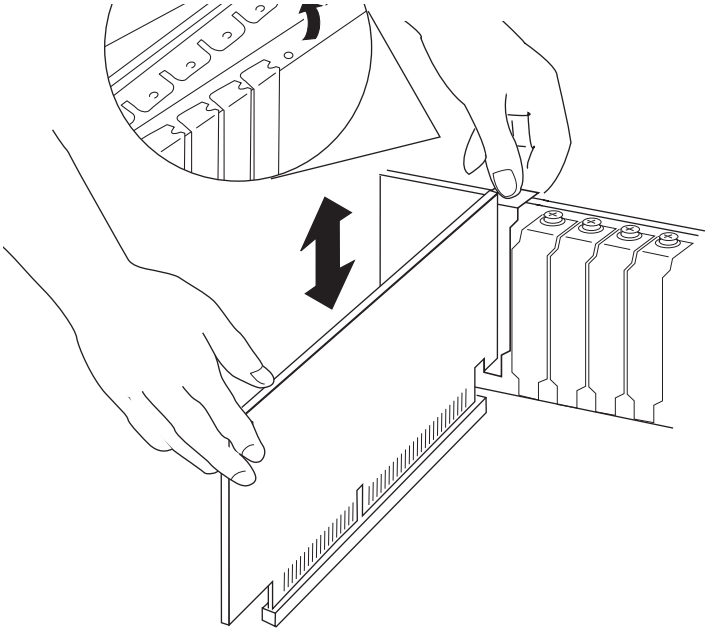
<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>1</td><td colspan="2">Open the PCB carrier.

Follow the procedure in “Opening the PCB carrier” on page 114.</td></tr>
<tr><td>2</td><td colspan="2">Note which cables (if any) are connected to the connectors on the faceplate of the expansion adapter before disconnecting the cables.

Attention
Do not disconnect or connect SCSI cables while your V-Series system is powered up. You could cause permanent damage to the hardware.</td></tr>
<tr><td rowspan="3">3</td><td>If you are replacing the...</td><td>Then...</td></tr>
<tr><td>NVRAM III adapter or replacing the DIMM on the NVRAM III adapter</td><td>Unplug the electrical wires from the J1 connector on the NVRAM III adapter. See the figure in “Replacing the NVRAM III battery” on page 133.

Attention
If you did not perform a clean shutdown using the <code>halt</code> command, disconnecting the NVRAM battery from the NVRAM III adapter results in data loss.</td></tr>
<tr><td>Fibre Channel adapter for tape library</td><td>Some versions of this adapter might have a GBIC module. Press the latches on both sides of the HSSDC port of the GBIC module and remove the module.

This enables you to remove the adapter without difficulty.</td></tr>
<tr><td>4</td><td colspan="2">Remove the screw holding the expansion adapter faceplate to the back panel bracket and save both for reinstalling the adapter.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>5</td><td colspan="2">Pull upward on the top edge of the expansion adapter and lift it out of the chassis, as shown.
  </td></tr>
<tr><td rowspan="4">6</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Not installing a replacement expansion adapter</td><td>Install a faceplate over the empty slot.</td></tr>
<tr><td>Installing a replacement expansion adapter</td><td>Go to “Installing an expansion adapter” on page 128.</td></tr>
<tr><td>Replacing the DIMM on the NVRAM adapter</td><td>Go to “Replacing the NVRAM III battery” on page 133.</td></tr>
</table>

Installing an expansion adapter

To install an expansion adapter, complete the following steps.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">1</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Installing a new adapter</td><td>Take the adapter out of the antistatic bag and discard the bag.</td></tr>
<tr><td>Installing a replacement adapter</td><td>Take the replacement adapter out of the antistatic bag and place the used adapter into that bag.</td></tr>
<tr><td rowspan="4">2</td><td>If you are...</td><td>Then...</td></tr>
<tr><td>Replacing or reinstalling an NVRAM III adapter</td><td>Plug the electrical wires from the NVRAM battery to the connector on the NVRAM III adapter. See the figure in “Replacing the NVRAM III battery” on page 133.</td></tr>
<tr><td>Replacing an FC-AL adapter</td><td>1. If your adapter has a GBIC, press the latches on both sides of the HSSDC port of the GBIC module and remove the module.
Note
The dual channel adapter does not have a GBIC module. Skip this step and go to Step 3.
2. Go to Step 3.</td></tr>
<tr><td>Reinstalling all other adapters</td><td>Go to Step 3.
You reinstall adapters when you replace the motherboard.</td></tr>
<tr><td>3</td><td colspan="2">Holding the adapter by its top edge, with the faceplate near the back of the machine, lower the adapter into the slot until its connector edge meets the grooves in the expansion slot.
The faceplate of the adapter should be in position against the back panel, and should cover the endplate slot on the back panel.</td></tr>
</table>

Step	Action
4	Press carefully on the top edge of the adapter until the edge connector is seated in the expansion slot.
5	Replace the faceplate screw to secure the adapter to the back panel.
6	Reconnect the cables to the external connectors on the replacement expansion adapter. If your replacement adapter requires a GBIC module, plug it into the socket of adapter.
7	Go to “Closing the PCB carrier” on page 142.

Replacing the NVRAM III DIMM

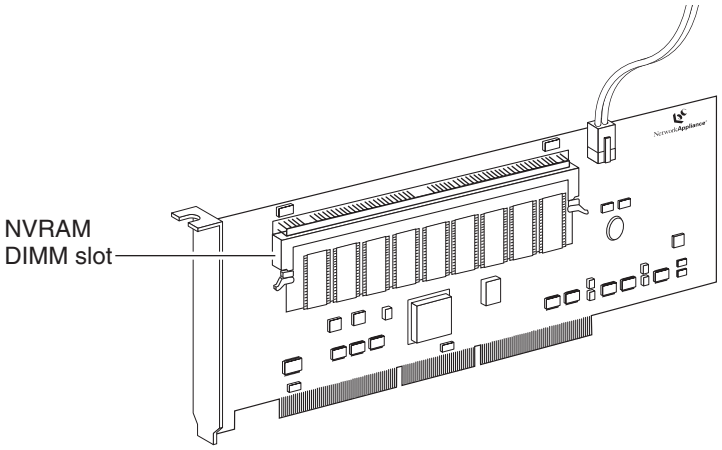
About replacing the NVRAM III DIMM

Replacing the NVRAM III DIMM consists of the following procedures:

- "Removing the NVRAM III DIMM" on page 131
- "Installing the NVRAM III DIMM" on page 131

Location of the NVRAM III DIMM slot

The following figure shows the location of the NVRAM III DIMM slot on the NVRAM III adapter.

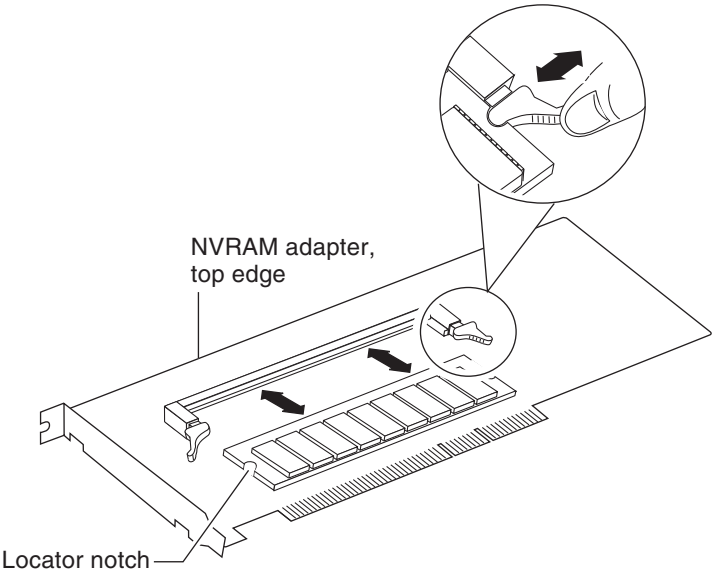


Removing the NVRAM III DIMM

To remove the NVRAM III DIMM, complete the following steps.

Note

This procedure assumes that you already removed the NVRAM III adapter, as described in “Removing an existing expansion adapter” on page 126.

Step	Action
1	Push apart the latches on both sides of the DIMM with your index fingers. 
2	Place the DIMM in an antistatic bag.

Installing the NVRAM III DIMM

To install the NVRAM III DIMM, complete the following steps.

Step	Action
1	Hold the DIMM at the top corners to avoid damaging the components or the edge connector.

Step	Action
2	Align the DIMM over the slot and then tilt the top edge of the DIMM at a slight angle away from the top edge of the NVRAM adapter.
3	Insert the DIMM into the slot. The DIMM should slide into the slot easily if you wiggle the DIMM into position. If not, realign the DIMM with the slot and try again.
4	Push the DIMM into the slot until the mounting tabs close over the DIMM to lock it in place. **Attention** Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the DIMM could bend or break when pushed to the locked position.
5	Return to “Installing an expansion adapter” on page 128 to complete the installation.

Replacing the NVRAM III battery

About replacing the NVRAM III battery

The NVRAM adapter has one detached, sealed, lead-acid battery that is recharged whenever the system is turned on and operating normally. If the battery continues to read low after 24 hours of normal system operation, you must replace the battery or the NVRAM III adapter.

Note

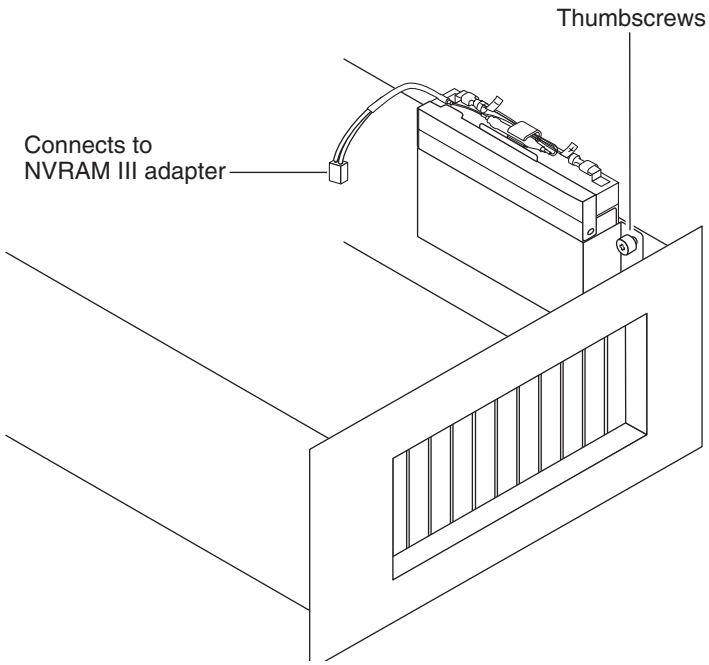
The NVRAM III adapter for the GF825 V-Series system is different from the NVRAM adapter in other models of V-Series systems. It is not interchangeable with NVRAM adapters from other models of V-Series systems.

Replacing the NVRAM battery consists of the following procedures:

- "Removing the NVRAM III battery" on page 134
- "Installing the NVRAM III battery" on page 137

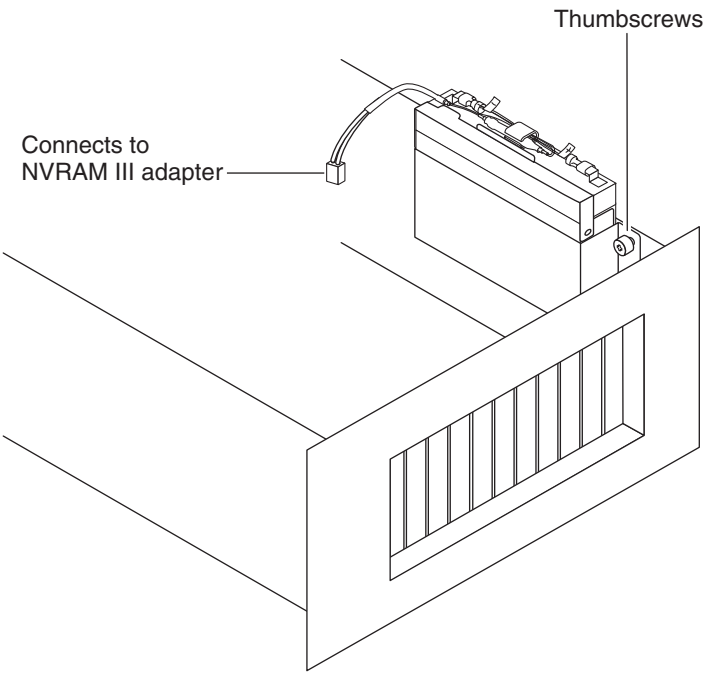
Location of the NVRAM III battery

The following figure shows the battery location.



Removing the NVRAM III battery

To remove the NVRAM III battery, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 114. **Attention** Wear an antistatic wrist strap and attach the grounding leash to the V-Series system chassis.
2	Unplug the electrical cable from the connector on the NVRAM III adapter. **Attention** If you did not perform a clean shutdown using the `halt` command, disconnecting the NVRAM III battery from the NVRAM III adapter results in data loss. 

Step	Action
3	Flip down the retaining clip on the battery carrier. **WARNING** **If the battery is leaking, follow the procedure in "Handling a leaking NVRAM III battery" on page 135.**
4	Remove the battery from the battery carrier in the chassis and set it aside.

Handling a leaking NVRAM III battery

The hazardous components of the NVRAM III battery are lead, sulfuric acid, fiberglass, and polystyrene.

To handle a leaking NVRAM III battery, complete the following steps.

Attention
Perform this procedure after you remove the battery from your V-Series system.

Step	Action
1	Neutralize the leaking substance with bicarbonate (baking soda), sodium carbon (soda ash), or calcium oxide (lime). **WARNING** **Dispose of the neutralized hazardous battery substance in accordance with local, state, and federal laws. Do not flush or pour into the sewage system.**

Step	Action	
2	**If the unneutralized substance...**	**Then...**
	Has made contact with your skin and the contact area is large, or if blisters form	Flush the affected area with water and see a physician.
	Has made contact with your eye	Call a physician immediately and flush your eye with water until the physician arrives.
	Is ingested	Call a physician. If the patient is still conscious, also flush the patient’s mouth with water and have the patient drink milk or sodium bicarbonate solution.

Installing the NVRAM III battery

To install the NVRAM III battery, complete the following steps.

WARNING

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instructions.

AVERTISSEMENT

Il y a danger d'explosion s'il y a remplacement incorrect de la pile. Remplacer la pile seulement avec une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettre au rebut les piles usagées selon les instructions du fabricant.

ACHTUNG

Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Die Batterien nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ ersetzen. Gebrauchter Batterien nach Angaben des Herstellers loswerden.

Step	Action
1	Insert the NVRAM III battery into the battery carrier in the chassis, and flip up the retaining clip to secure the battery in place.
2	Plug the electrical cable into the J1 connector on the NVRAM III adapter.
3	Go to "Closing the PCB carrier" on page 142.

Replacing the CPU fan and heat-sink unit

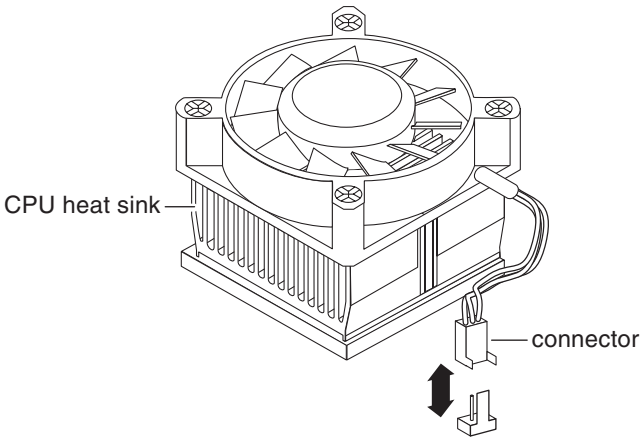
About replacing the CPU fan and heat-sink unit

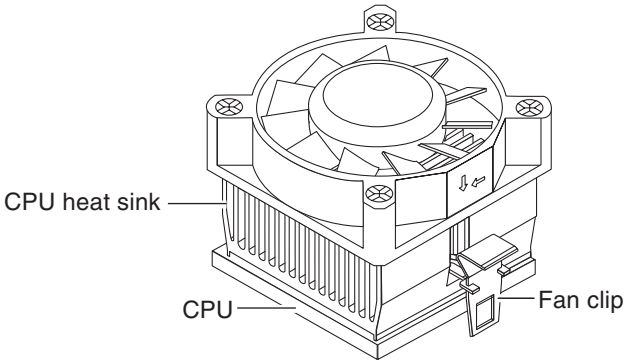
Replacing the CPU fan and heat-sink unit consists of the following procedures:

- "Removing the CPU fan and heat-sink unit" on page 138
- "Installing a CPU fan and heat-sink unit" on page 139

Removing the CPU fan and heat-sink unit

To remove the CPU fan and heat-sink unit, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 114.
2	Unplug the fan power connector from the three-pin header on the motherboard, as shown. 

Step	Action
3	Release the clip that secures the CPU fan and heat-sink unit to the motherboard. 
4	Lift the CPU fan and heat-sink unit and set it aside.

Installing a CPU fan and heat-sink unit

To install a replacement CPU fan and heat-sink unit, complete the following steps.

Step	Action
1	Flip down the clip securing the CPU fan and heat-sink unit to the motherboard.
2	Plug the CPU fan cable connector into the three-pin header on the motherboard. The connectors are keyed so that they can fit together only one way.
3	Go to “Closing the PCB carrier” on page 142.

Replacing the motherboard lithium battery

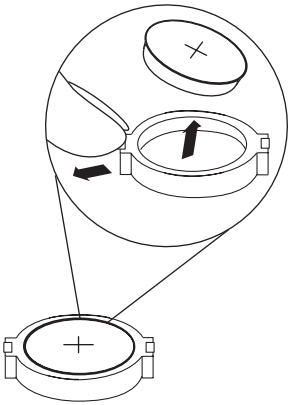
About replacing the motherboard lithium battery

Replacing the 3.3V lithium battery on the motherboard consists of the following procedures:

- "Removing the motherboard lithium battery" on page 140
- "Installing the motherboard lithium battery" on page 141

Removing the motherboard lithium battery

To remove the motherboard lithium battery, complete the following steps.

Step	Action
1	Open the PCB carrier. Follow the procedure in "Opening the PCB carrier" on page 114. **Attention** Wear an antistatic wrist strap and attach the grounding leash to the V-Series system chassis.
2	Lift up the battery toward the open side of the battery holder, as shown. 

Installing the motherboard lithium battery

To install the motherboard lithium battery, complete the following steps.

WARNING

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instructions.

AVERTISSEMENT

Il y a danger d'explosion s'il y a remplacement incorrect de la pile. Remplacer la pile seulement avec une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettre au rebut les piles usagées selon les instructions du fabricant.

ACHTUNG

Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Die Batterien nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ ersetzen. Gebrauchter Batterien nach Angaben des Herstellers loswerden.

Step	Action
1	Turn the battery so that the positive side is up (marked with a "+").
2	Push the battery through the open side of the battery holder so that it sits flush inside the battery holder.
3	Go to "Closing the PCB carrier" on page 142.

Closing the PCB carrier

Closing the PCB carrier

To close the PCB carrier, complete the following steps.

Step	Action
1	If you removed the PCB carrier, insert the carrier slide rails evenly and slowly into the slide rails using both hands to support the PCB carrier. There should be no resistance. **Attention** The carrier slide rails must align with the ball bearings along the chassis slide rails; otherwise, the PCB carrier does not go in and the slide rails could be bent permanently.
2	Carefully push the PCB carrier into the chassis: if the PCB carrier is locked in position, press inward on the carrier tabs on each carrier slide rail while pushing the PCB carrier into the chassis.
3	Tighten and then torque the eight thumbscrews on the back panel of the PCB carrier 8 to 10 in.-lbs to prevent access without a tool.
4	Reconnect any cables you removed from the back panel of your V-Series system.
5	Reconnect the power to your V-Series system, and if applicable, your disk shelves.
6	Turn on your disk shelves, if applicable, and then your V-Series system.
7	Interrupt the boot process by pressing the Delete key during the memory test.
8	Run diagnostics by entering the following command at the ok> prompt: `sys-diag` See the *Diagnostics Guide* for more information.

Step	Action
9	Run the specific diagnostics that apply to the unit you installed or replaced.

Replacing the chassis fan subassembly

About replacing chassis fan subassemblies

Replacing a chassis fan subassembly consists of the following procedures:

- “Removing a chassis fan subassembly” on page 145
- “Installing a chassis fan subassembly” on page 147

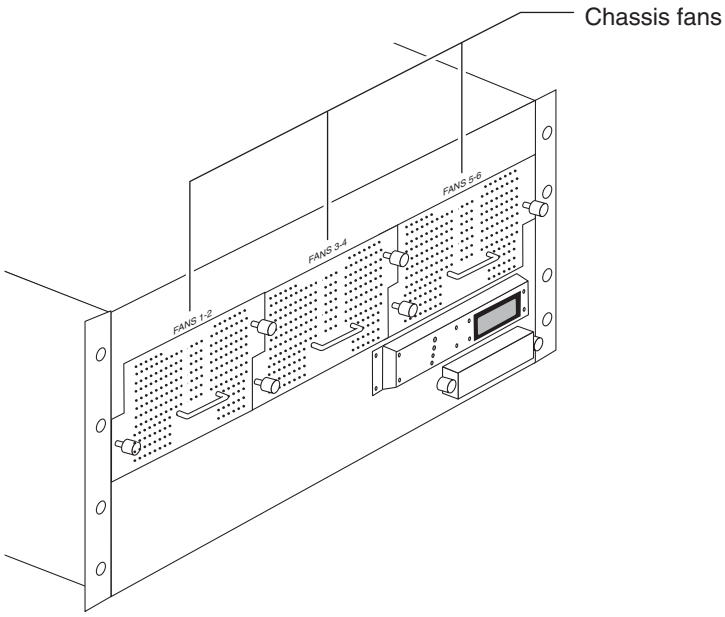
There are three chassis fan subassemblies on your V-Series system. Each chassis fan subassembly has two fans. The chassis fans are secured to the front of the chassis.

Note

To maintain UL, CSA, and TUV safety certifications, you must obtain replacement chassis fan subassemblies from your authorized reseller. Using unapproved replacement chassis fans voids the safety certifications.

Location of chassis fan subassemblies

The chassis fan subassemblies are behind the front bezel. The following figure shows the chassis fan subassembly locations with the front bezel removed. The sheet metal above the chassis fan subassemblies is silk-screened with the labels Fans 1-2, Fans 3-4, and Fans 5-6.



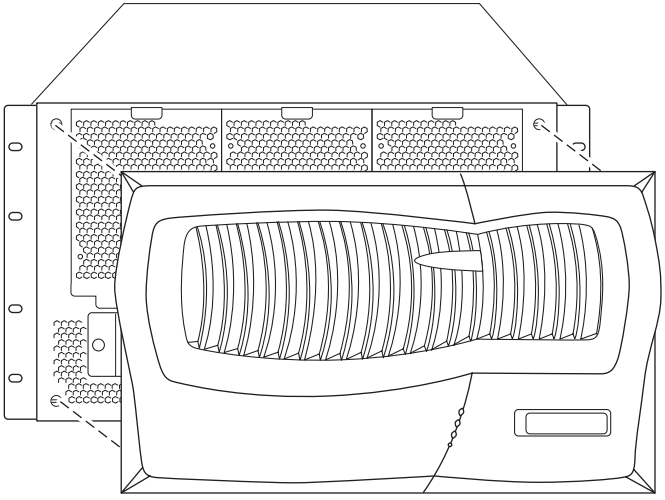
Removing a chassis fan subassembly

To remove a chassis fan subassembly, complete the following steps.

Note

Because the three fan subassemblies are hot-swappable, there is no need to shut down your V-Series system.

Step	Action
1	From the console, note the identification of the fan subassembly that failed.

Step	Action
2	Pull the bezel straight off the front panel of your V-Series system by using the grooves on the left and right edges of the bezel. 
3	Using a #1 Phillips screwdriver, loosen the thumbscrews on the chassis fan subassembly that failed.
4	Using the handle, pull the chassis fan subassembly straight out of the V-Series system chassis. **WARNING** **Use caution when servicing components in the chassis. There is danger of electric shock from hazardous energy on the backplane.** **Note** If your V-Series system is running Data ONTAP software, it reports a failure for the removed fan assembly.
5	Set the chassis fan subassembly aside.

Installing a chassis fan subassembly

To install a chassis fan subassembly, complete the following steps.

Step	Action
1	Using the handle, slide the chassis fan subassembly straight into the V-Series system chassis.
2	Tighten and then torque the chassis fan thumbscrews 8 to 10 in.-lbs.
3	Align the pins on the bezel with the holes on the front panel of the V-Series system, then push the bezel straight onto the front panel.
4	Reconnect and turn on the power to the V-Series system.
5	Interrupt the boot process by pressing the Delete key during the memory test.
6	Run diagnostics by entering the following command at the ok> prompt: **`sys-diag`** See the *Diagnostics Guide* for more information.
7	Run the diagnostics that apply to the unit you installed or replaced.

Replacing power supplies

About replacing power supplies

Replacing a power supply consists of the following procedures:

- “Removing a power supply” on page 149
- “Installing a power supply” on page 150

Attention

The power supplies in your GF825 V-Series system are different from the power supplies in other V-Series systems. The power supplies are not interchangeable.

Power supply compatibility

Be aware of the following caution regarding the compatibility between the two power supplies in the V-Series system.

Attention

When replacing a power supply, be sure not to mix power supplies from different systems. The two power supplies in your V-Series system must have the same part number.

Removing a power supply

To remove a power supply, complete the following steps.

WARNING

To avoid an electric shock hazard, you must disconnect the power supply before removing it from the V-Series system.

Note

Because you have two power supplies that are hot-swappable, you do not have to shut down your V-Series system.

Step	Action
1	From the console or LCD screen, identify the failed power supply. **Note** The power supply identifiers, PS1 and PS2, are silk-screened onto your V-Series system chassis.
2	Put on an antistatic wrist strap and grounding leash.
3	Turn off the switch on the power supply that you are replacing. Lift up the clip lock and unplug the power cord from the V-Series system power supply.
4	Loosen the power supply thumbscrews by turning each thumbscrew counterclockwise.
5	Pull the power supply out of the power supply bay in your V-Series system. **WARNING** **The power supply is heavy. Support the bottom of the unit while removing the unit from its bay.**
6	Set the power supply aside. **Note** If the V-Series system is running Data ONTAP, it reports a failure for the removed power supply.

Installing a power supply

To install a power supply, complete the following steps.

Step	Action
1	Verify that the switch on the power supply is turned off.
2	Slowly and firmly push the power supply into the bay until the power supply is firmly seated in the bay.
3	Secure the power supply by turning the thumbscrew clockwise until it stops.
4	Plug the power cord into the power cord receptacle on the power supply and secure it with the clip lock.
5	Turn on the power to the new power supply in your V-Series system.

Replacing the LED/LCD subassembly

About replacing the LED/LCD subassembly

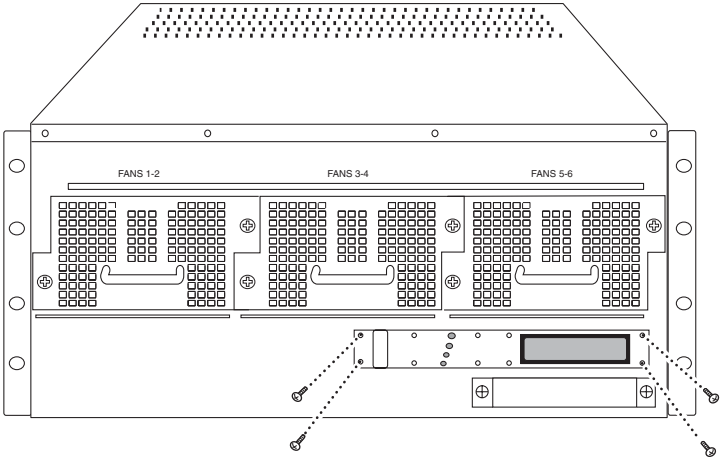
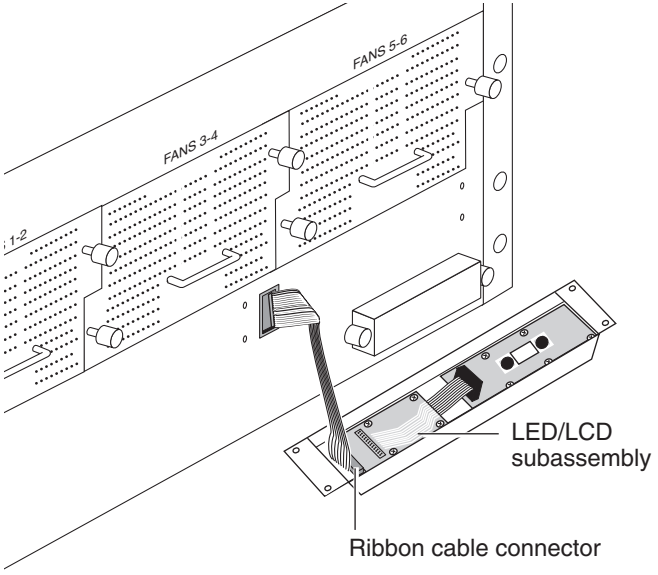
Replacing the LED/LCD subassembly consists of the following procedures:

- "Removing the LED/LCD subassembly" on page 151
- "Installing the LED/LCD subassembly" on page 153

Removing the LED/LCD subassembly

To remove the LED/LCD subassembly, complete the following steps.

Step	Action
1	Shut down your V-Series system by entering the following command at the console: `halt` **Attention** Always use the `halt` command to perform a clean shutdown.
2	Turn off and disconnect the power to your V-Series system.
3	Pull the bezel straight off the front panel of your V-Series system by using the grooves on the left and right edges of the bezel.
4	Put on an antistatic wrist strap and attach the grounding leash to the V-Series system chassis.

Step	Action
5	Use a #1 Phillips screwdriver to remove the four panhead screws that fasten the LED/LCD subassembly to the front panel. Save the screws. 
6	Carefully pull the LED/LCD subassembly and the attached cable from the hole in the chassis front panel. 

Step	Action
7	Unplug the LED ribbon cable from the JP1 connector.
8	Set the LED/LCD subassembly aside.

Installing the LED/LCD subassembly

To install the LED/LCD subassembly, complete the following steps.

Step	Action
1	Plug the LED ribbon cable into the JP1 connector of the LED/LCD subassembly.
2	Feed the cable back into the chassis as you push the LED/LCD subassembly against the chassis front panel.
3	Insert and tighten the four panhead screws to secure the LED/LCD subassembly to the chassis front panel.
4	Align the pins on the bezel with the holes on the front panel of your V-Series system, and then push the bezel straight onto the front panel.
5	Reconnect and turn on the power to your V-Series system.
6	Interrupt the boot process by pressing the Delete key during the memory test.
7	Run diagnostics by entering the following command at the ok> prompt: `sys-diag` See the *Diagnostics Guide* for more information.
8	Run the diagnostics that apply to the unit you replaced.

Replacing the CompactFlash card

About replacing the CompactFlash unit

Replacing the CompactFlash unit consists of the following procedures:

- "Removing the CompactFlash unit" on page 154
- "Installing a replacement CompactFlash unit" on page 155

Attention

The CompactFlash unit is required for normal V-Series system operation. Remove the CompactFlash unit only when you suspect a failed CompactFlash unit or CompactFlash reader.

Removing the CompactFlash unit

To remove the CompactFlash unit, complete the following steps.

Step	Action
1	Shut down your V-Series system by entering the following command at the console: `halt` **Attention** Always use the `halt` command to perform a clean shutdown of the V-Series system. If you do not perform a clean shutdown before removing the CompactFlash unit, your system panics.
2	Turn off the power to your V-Series system.
3	Pull the bezel straight off the front panel of your V-Series system by using the grooves on the left and right edges of the bezel.
4	Push the eject button on the right front of the CompactFlash reader.
5	Pull the CompactFlash unit out of the reader.

Installing a replacement CompactFlash unit

To install and restore the image on a replacement CompactFlash unit, complete the following steps.

Attention

You must obtain preformatted replacement CompactFlash units from an authorized reseller. Using non-preformatted CompactFlash units can cause your system to hang at boot.

Step	Action
1	Fully engage the CompactFlash unit by pushing it all the way into the slot on the front of the CompactFlash reader.
2	Reinstall the front bezel by aligning the pins on the bezel with the holes on the front panel of your V-Series system, then pushing the bezel straight onto the front panel.
3	Turn on the power switch to your V-Series system.
4	Interrupt the boot process by pressing the Delete key during the memory test.
5	Run CompactFlash unit diagnostics by entering the following command at the ok> prompt: `sys-diag` See the *Diagnostics Guide* for more information.
6	Exit the diagnostics to return to the ok> prompt.
7	Boot from hard disk by entering the following command at the ok> prompt: `boot fcal` **Result:** This causes the system to boot from the hard disk instead of the CompactFlash unit.
8	Update the image on the CompactFlash unit by entering the following command at the V-Series system prompt: `download` **Result:** The CompactFlash image is restored using information from the hard disk.

Step	Action
9	Boot from the CompactFlash unit by entering the following command at the V-Series system prompt: **`reboot`**

Replacing the CompactFlash reader subassembly

About replacing the CompactFlash reader subassembly

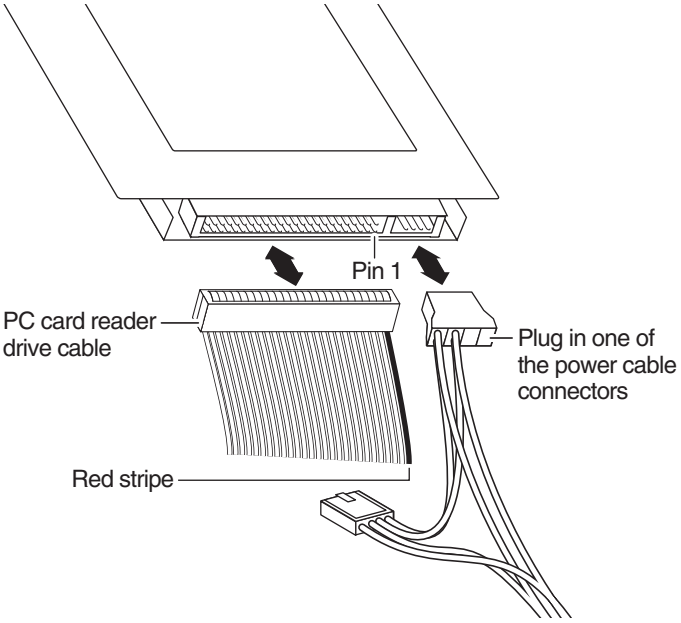
Replacing the CompactFlash reader subassembly consists of the following procedures:

- "Removing the CompactFlash reader subassembly" on page 157
- "Installing the CompactFlash reader subassembly" on page 159

Removing the CompactFlash reader subassembly

To remove the CompactFlash reader subassembly, complete the following steps.

Step	Action
1	Shut down the V-Series system by entering the following command at the console: `halt` **Attention** Always use the `halt` command to perform a clean shutdown of the V-Series system. If you do not perform a clean shutdown before removing the CompactFlash unit, your system panics.
2	Turn off and disconnect the power to your V-Series system.
3	Put on an antistatic wrist strap and attach the grounding leash to the V-Series system chassis.
4	Remove chassis fans 5-6 to access the CompactFlash reader subassembly cables by following Steps 3 through 5 of the procedure described in "Removing a chassis fan subassembly" on page 145.
5	Using a #2 Philips screwdriver, loosen the two thumbscrews on the CompactFlash reader subassembly.

Step	Action
6	Unplug the CompactFlash reader from the chassis backplane as follows: **1.** Reach into the space previously occupied by chassis fans 5-6. **2.** Partially pull the CompactFlash reader subassembly out of the chassis to access the cables. **3.** Press the latches on either side of the data cable connector to release it from the backplane. **4.** Unplug the power cable from the chassis backplane. **5.** Pull out the cables.
7	Pull the CompactFlash reader subassembly out of the drive bay.
8	Disconnect the data cable and power cable from the back of the CompactFlash reader subassembly and set them aside. 

Installing the CompactFlash reader subassembly

To install the CompactFlash reader subassembly, complete the following steps.

Step	Action
1	Connect the data cable that you set aside to the back of the CompactFlash reader subassembly. The data cable is keyed on both ends; either end of the data cable can connect to the back of the CompactFlash reader subassembly.
2	Connect the power cable that you set aside to the back of the CompactFlash reader subassembly. The power cable has two different connectors for connection to the CompactFlash reader. Plug the proper-sized power cable connector into the connector on the back of the CompactFlash reader subassembly.
3	Align the rails of the replacement CompactFlash reader subassembly with the grooves in the drive bay.
4	Partially slide the CompactFlash reader subassembly into the drive bay.
5	Plug the power cable into the chassis backplane power connector.
6	Plug the CompactFlash reader data cable into the chassis backplane 40-pin data connector. The 30-pin data connector is used for diskette drives, which are not used on V-Series systems with a CompactFlash reader.
7	Neatly fold the excess slack of the CompactFlash reader data and power cables so that you can install chassis fans 5-6 in the next step without any obstruction.
8	Use the handle on the chassis fan subassembly to slide chassis fans 5-6 into the V-Series system chassis.
9	Tighten and then torque the chassis fan thumbscrews 8 to 10 in.-lbs.
10	Tighten the two thumbscrews to secure the CompactFlash reader subassembly to the chassis.
11	Slide the CompactFlash unit into the slot on the front of the CompactFlash reader.

Step	Action
12	Reinstall the front bezel by aligning the pins on the bezel with the holes on the front panel of your V-Series system, and then pushing the bezel straight onto the front panel.
13	Reconnect and turn on the power to your V-Series system.
14	Verify that the chassis fans are operating.
15	Interrupt the boot process by pressing the Delete key during the memory test.
16	Run CompactFlash card diagnostics by entering the following command at the ok> prompt: `sys-diag` See the *Diagnostics Guide* for more information.

Maintaining and Servicing the GF270c 5

About this chapter

This chapter describes how to replace the CPU module and other devices in your GF270c V-Series system.

Topics in this chapter

This chapter discusses the following topics:

Replacing the CPU module

About replacing the CPU module

Replacing the CPU module consists of the following procedures:

- "Removing the CPU module" on page 163
- "Moving the Data ONTAP software" on page 165

Location of the CPU module and blank filler module

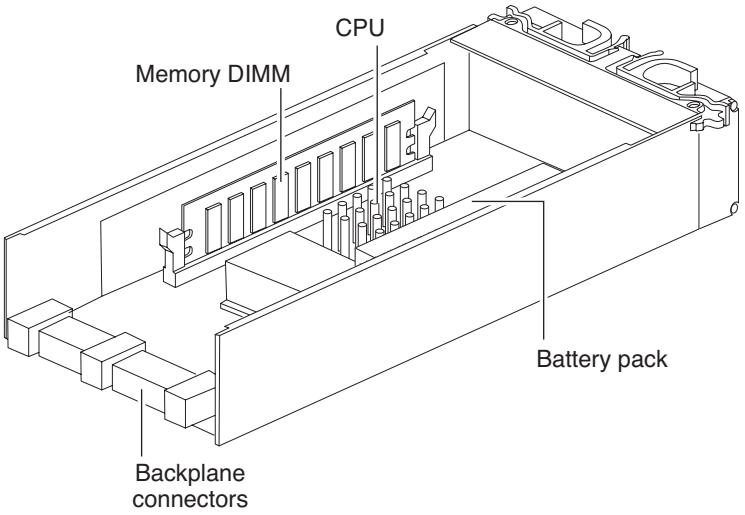
The CPU module is at the center position on the back of your V-Series system. A clustered GF270c has two CPU modules (or nodes) with Node A above Node B. Both modules use the same cam mechanism levers to remove and install the module.

Attention

Both modules must be in place during operation to ensure proper airflow through the V-Series system.

CPU module contents

The CPU module contains the system motherboard, CPU, memory DIMM, CompactFlash card (underside), battery pack, and other system components.



Removing the CPU module

Reasons for removing the CPU module

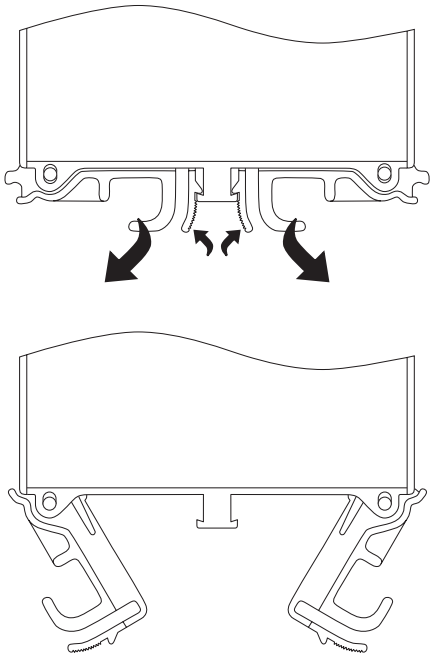
There are several reasons for removing the CPU module:

- Replacement of a defective CPU module
- Replacement of the SDRAM DIMM
- Accessing the CompactFlash card
- Accessing the system battery and connection to the motherboard
- V-Series system upgrade and conversion options

Removing the CPU module

To remove the CPU module, complete the following steps.

Step	Actions	
1	**If you are performing…**	**Then…**
	A planned CPU module replacement on a clustered GF270c	Determine which module is to be replaced. From the partner CPU module, perform a takeover operation by entering the following command: `cf takeover`
	An unplanned CPU module replacement on a clustered GF270c, where the partner node performed a takeover	Proceed to Step 2.
	An unplanned CPU module replacement on a clustered GF270c, where the partner node did not perform a takeover	Proceed to Step 2.
2	Put on the antistatic wrist strap and attach the grounding leash to the V-Series system chassis.	

Step	Actions
3	Disconnect all cables to the CPU module that you are replacing.
4	At the rear-center of your V-Series system, using your thumb and index finger of both hands, press the cam mechanism levers in the middle of the CPU module to release it. The following figure shows how to release the cam mechanism. 
5	Carefully pull the cam handle so that the CPU module slides out from the chassis. The CPU module has a travel distance of approximately 10 inches (25.4 centimeters).

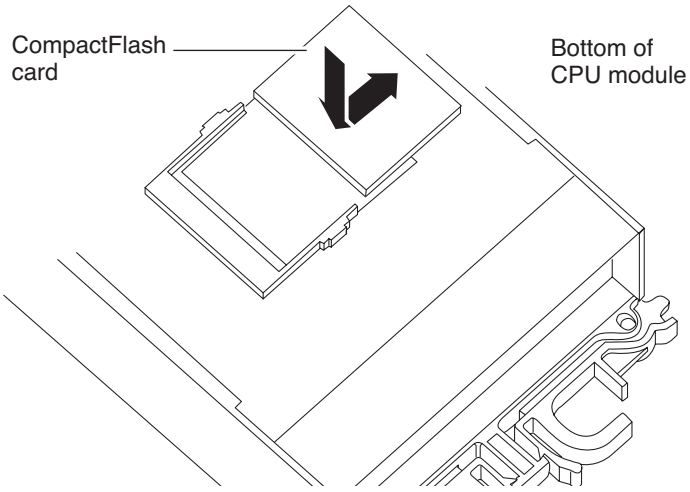
Step	Actions	
6	**If you are…**	**Then…**
	Replacing a defective CPU module with a new one	Proceed to "Moving the Data ONTAP software" on page 165.
	Servicing a component on the CPU module	See the appropriate procedure in this chapter. Then proceed to "Replacing the CPU module" on page 162.

Moving the Data ONTAP software

The Data ONTAP software is installed on the CompactFlash card of the old CPU module. The CompactFlash card on the replacement CPU module is blank. To get the correct version of Data ONTAP onto the replacement CPU module, you need to move the CompactFlash card from the old CPU module to the replacement CPU module.

To install the correct version of Data ONTAP onto the replacement CPU module, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.

Step	Action
2	On the bottom side of the old CPU module, remove the CompactFlash card. Use your thumb to apply pressure to the exposed surface of the card, while gently sliding the card out of the socket. 
3	Repeat the same procedure by removing the CompactFlash card from the replacement CPU module.
4	Install the old CompactFlash card into the replacement CPU module by orienting the card so that the pin slots on the card engage properly with the pins inside the socket, and then gently sliding the card into place until it is firmly seated in the socket. **Attention** Damage to the card socket and card can result if you do not orient the card properly during insertion.
5	Install the blank CompactFlash card from the replacement CPU module into the old CPU module and return the old CPU module to NetApp.
6	Proceed to “Replacing the CPU module” on page 162 to install your replacement CPU module.

Installing the CPU module

Choosing the proper installation procedure

There are three separate cases to consider when installing a CPU module. Choose one of the following three procedures, based on your system criteria:

- "Installing the module in a clustered system with cf disabled" on page 168
- "Hot-swapping a module in a clustered system while in takeover mode" on page 170

Installing the module in a clustered system with cf disabled

To install the CPU module in a clustered system where the partner node has not performed a takeover, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Connect all cables to the CPU module before inserting the module into its CPU module bay.
3	From the back of your V-Series system, slide the module into the CPU module bay and push the cam mechanism levers into place.
4	Set the terminate switch on the CPU module to the proper position.
5	If power was removed, reconnect the power to your V-Series system and turn on the power switch on both power supplies.
6	If you installed a new CPU module with a new CompactFlash card, the card might not contain any data, in which case you need to boot your V-Series system from a remote image. See “Performing the netboot process from a remote image” on page 53.
7	Press **Ctrl-c** to stop rebooting.
8	Run diagnostics on the new CPU module by entering the following command: **boot_diags**
9	At the diagnostics prompt, run all tests by entering the following command: **all**
10	Exit diagnostics by entering the following command: **exit** See the *Diagnostics Guide* at http://now.netapp.com for more information.
11	Boot Data ONTAP by entering the following command: **boot_ontap**
12	Press **Ctrl-c** to enter the Maintenance menu.
13	Select option 5 to enter Maintenance mode.

Step	Action
14	Fix disk ownership. To see all disks and the old CPU module name, enter the following command: **`disk show -v`**
15	Reassign disk ownership by entering the following command: **`disk reassign -o systemname`**
16	Shut down the V-Series system by entering the following command at the console: **`halt`**
17	Boot Data ONTAP by entering the following command: **`boot_ontap`**

Hot-swapping a module in a clustered system while in takeover mode

To install the CPU module in a clustered system where the partner node has performed a takeover, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Connect all cables to the CPU module before inserting it into the module bay.
3	Set the terminate switch on the CPU module to the proper position.
4	From the back of your V-Series system, slide the module into the module bay and push the cam mechanism levers into place.
5	If you installed a new CPU module with a new CompactFlash card, the card might not contain any data, in which case you need to boot your V-Series system from a remote image. See “Performing the netboot process from a remote image” on page 53.

6	Capture the output from the console. Be sure to write down the system ID number, as shown in boldface in the following example. The output should look something like this:
	`Loading: 0xffffffff80001000/8500653 Entry at 0xffffffff80001000`
	`Closing network.`
	`Starting program at 0xffffffff80001000`
	`Press CTRL-C for special boot menu`
	`.`
	`.`
	`WARNING: there do not appear to be any disks attached to the system.`
	`Check that disks have been assigned ownership to this system (ID` **`84166052`**`) using the 'disk show' and 'disk assign' commands from maintenance mode.`
	`No root volume found.`
	`Rebooting...`

7	Press **`Ctrl-c`** to stop rebooting.
8	Reassign disk ownership for the new CPU module *from the partner node* with the new SYSID, by entering the following commands at the takeover prompt: **`priv set advanced`**

Step	Action

9	Enter the following command using the recorded System ID from Step 6, for example:
	`disk reassign -d 84166083`
	The console screen should display something resembling the following:
	`node x(takeover)> priv set advanced`
	`node x(takeover)*> disk reassign -d 84166083`
	
	`Disk ownership will be updated on all disks previously belonging to Filer with serial number 123456.`
	`Would you like to continue (y/n)?`

10	Select **`y`**.
11	Verify disk ownership. Make sure that all disks that were supposed to be reassigned, were reassigned. To see all disks, enter the following command: **`disk show -v`**
12	The new CPU module should see the disk on the next reboot, accompanied by the following message: `Waiting for cluster giveback` From the *partner node*, enter the following command: **`cf giveback`** **Note** If the giveback doesn't succeed, see the Data ONTAP *Storage Management Guide* for additional information.

Replacing the SDRAM DIMM on the CPU module

About replacing SDRAM DIMMs

The SDRAM DIMM is on the CPU module motherboard. To replace the DIMM, you must remove the CPU module from the chassis.

Required memory configuration

The GF270c supports 1 x 1 GB, 2.5V 184P DDR SDRAM DIMM. The DIMM slot is inside the CPU module.

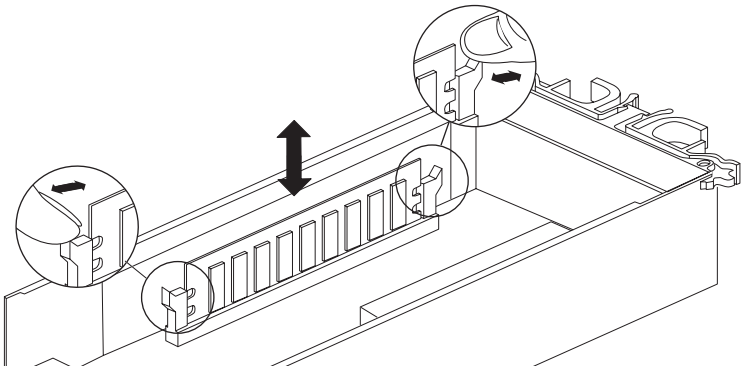
Attention

All DIMMs must be listed on the NetApp Approved Parts List. Contact Network Appliance Sales to obtain this list. Unapproved DIMMs have not been tested for reliability and might cause system downtime.

Removing the SDRAM DIMM

To remove the SDRAM DIMM, complete the following steps.

Step	Action
1	Perform a clean system shutdown before removing the DIMM. **Attention** Removing the DIMM without first performing a clean system shutdown can result in data loss.
2	Remove the CPU module containing the DIMM to be replaced. Follow the procedure in “Removing the CPU module” on page 163.
3	Put on the antistatic wrist strap and grounding leash.
4	Unplug the battery pack from the motherboard before removing the DIMM. For the location of the battery pack and cable connection, see the illustration in Step 4 of “Replacing the battery” on page 178.

Step	Action
5	Push apart the latches on either side of the DIMM to release the DIMM from its slot, as shown. 
6	Pull the DIMM out of the slot.
7	Set the old DIMM aside in an antistatic bag.

Installing a DIMM

To install the SDRAM DIMM, complete the following steps.

Step	Action
1	Pick up the new DIMM by its top corners to avoid damaging the components.
2	Insert the DIMM straight into the slot. The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and try again. **Attention** Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the edge connector on the DIMM does not make complete contact with the slot.
3	Push carefully but firmly on the top edge of the DIMM until the latches snap into place.

4	Plug the battery cable back into the motherboard.
5	Reinstall the CPU module. See “Replacing the CPU module” on page 162.
6	After turning on your system, run diagnostics on the DIMM. See the *Diagnostics Guide* for more information.

Replacing the CompactFlash card on the CPU module

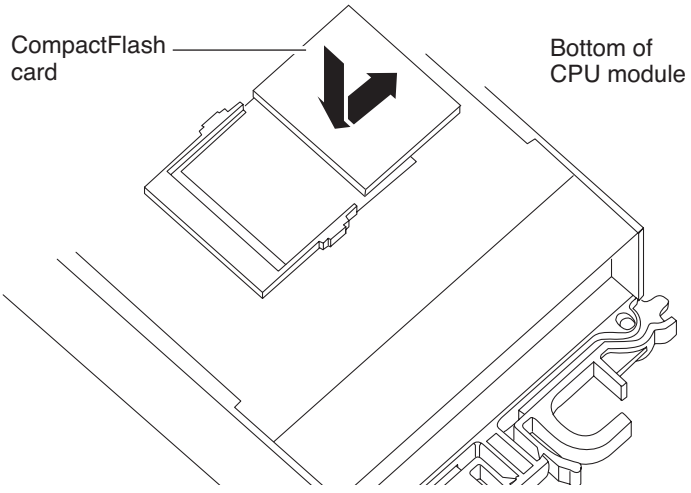
About replacing the CompactFlash card

The CompactFlash card is on the back side of the CPU module. Replacing the CompactFlash card consists of the following tasks:

- Removing the CPU module
- Replacing the CompactFlash card
- Reinstalling the CPU module

Replacing the CompactFlash card

To replace the CompactFlash card, complete the following steps.

Step	Action
1	Remove the CPU module by following the procedure in “Removing the CPU module” on page 163.
2	Put on the antistatic wrist strap and grounding leash.
3	On the bottom side of the CPU module, remove the CompactFlash card. Use your thumb to apply pressure to the exposed surface of the card, while gently sliding the card out of the socket, as shown in the following illustration. 

Step	Action
4	Install the CompactFlash card by orienting the card correctly so that the pin-slots on the card engage properly with the pins inside the socket, and gently sliding the card into place until it is firmly seated in the socket. **Attention** Damage to the card socket and card can result if you do not orient the card properly during insertion.
5	Reinstall the CPU module. See “Replacing the CPU module” on page 162.
6	Boot your V-Series system from a remote image. See “Performing the netboot process from a remote image” on page 53. Otherwise, proceed to Step 8.
7	Copy the correct Data ONTAP boot files to the CompactFlash card by entering the following command: `download`

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>8</td><td colspan="2">Test the CompactFlash card by using one of the following two options.</td></tr>
<tr><td></td><td>Option 1</td><td>Option 2</td></tr>
<tr><td></td><td>1. Reboot the V-Series system and let it autoboot by entering the following command:
<code>reboot</code>
2. After Data ONTAP boots, copy the boot files to the secondary backup area of the CompactFlash card by entering the following command:
<code>download</code></td><td>1. Shut down the V-Series system by entering the following command at the console:
<code>halt</code>
2. Run diagnostics by entering the following command:
<code>boot_diags</code>
See the Diagnostics Guide for more information.
3. When finished, exit from diagnostics by entering the following command:
<code>exit</code>
4. Boot Data ONTAP by entering the following command:
<code>boot_ontap</code></td></tr>
</table>

Replacing the battery on the CPU module

About replacing the battery

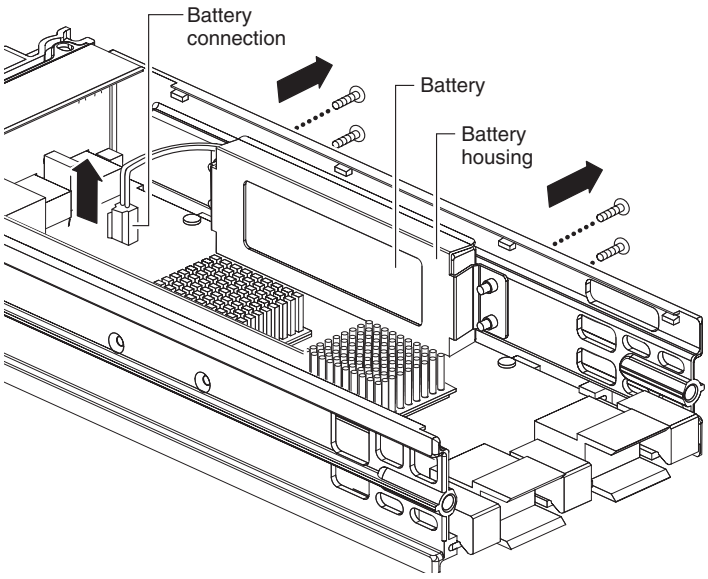
If the battery inside your GF270c CPU module fails, you need to replace it. Replacing the battery consists of the following tasks:

- Removing the CPU module
- Replacing the battery
- Reinstalling the CPU module

Replacing the battery

To replace the battery, complete the following steps.

Step	Action
1	Remove the CPU module by following the procedure in “Removing the CPU module” on page 163.
2	Put on the antistatic wrist strap and grounding leash.
3	Disconnect the battery wire from the CPU module motherboard.

Step	Action
4	At the side of the CPU module, remove the four screws holding the battery housing, as shown in the following illustration, and remove the battery.  **WARNING** **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's instructions.** **AVERTISSEMENT** **Il y a danger d'explosion s'il y a remplacement incorrect de la pile. Remplacer la pile seulement avec une pile du même type ou d'un type équivalent recommandé par le fabricant. Mettre au rebut les piles usagées selon les instructions du fabricant.** **ACHTUNG** **Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Die Batterien nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ ersetzen. Gebrauchter Batterien nach Angaben des Herstellers loswerden.**

Step	Action
5	Install the new battery by placing it into the battery housing, and secure the battery housing to the CPU module using the four screws.
6	Reconnect the battery wire to the CPU module.
7	Reinstall the CPU module. See “Replacing the CPU module” on page 162.
8	After turning on your system, run diagnostics on the new battery. See the *Diagnostics Guide* for more information. **Note** The battery is rechargeable, and diagnostics might indicate a low charge after installation. This is normal. The battery begins charging automatically after you boot Data ONTAP.
9	Check and set the date and time values on your V-Series system. Replacing the battery likely causes these values to get reset.

Replacing a power supply

About replacing a power supply

Replacing a power supply in a GF270c consists of the following procedures:

- "Removing a power supply" on page 182
- "Installing a power supply" on page 182

Rules for replacing power supplies

When replacing the power supply in your V-Series system, observe the following rules:

- You do not need to turn off the power to the V-Series system when you replace one power supply at a time.
- If you are replacing both power supplies, replace them one at a time to avoid powering down your V-Series system.
- Although a single fan failure in one of the power supplies is not a critical event, it is recommended that you install a new power supply when one of the two fans in either power supply stops working.
- When hot-swapping power supplies, replace and install the power supplies within two minutes of each other.

Attention

Your V-Series system can run with one power supply for a maximum of two minutes. The airflow through your V-Series system is degraded when only one power supply is present and operating. Therefore, if the power supplies are not replaced within two minutes of each other, the system halts and no data is accessible.

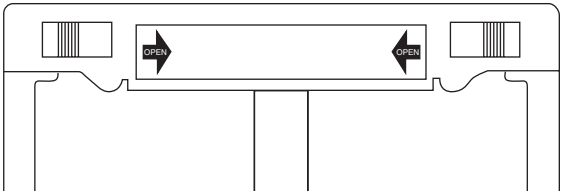
- Have the replacement power supply close by and ready to install before removing the old one.

Attention

A power load board is installed in the front of your GF270c to stabilize the power supplies. Do not remove the power load board from your V-Series system.

Removing a power supply

To remove a power supply, complete the following steps.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.
2	Turn off the switch on the power supply that you are replacing.
3	Lift up the clip lock and unplug the power cord from your V-Series system's power supply.
4	At the top of the rear of the unit, using your thumb and index finger, press the cam mechanism levers toward each other to release the power supply handle. The following figure shows how to press the levers on the cam mechanism and release the power supply handle. 
5	Use the handle to pull the power supply out of the V-Series system. **WARNING** **When removing a power supply, always use two hands to support its weight.**

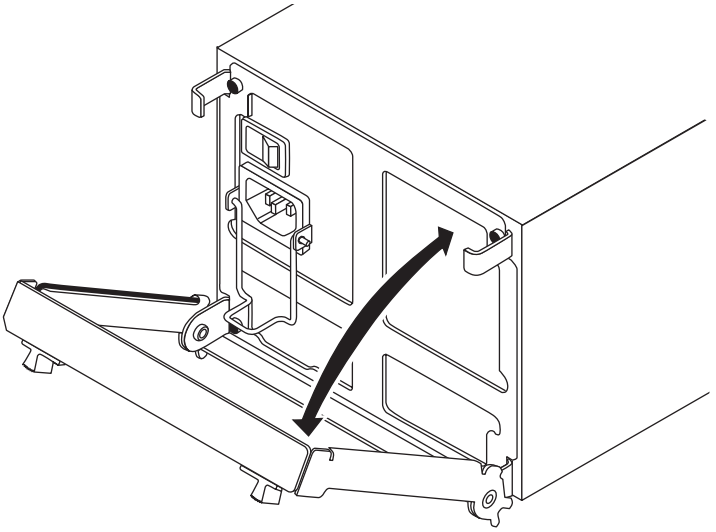
Installing a power supply

To install a power supply, complete the following steps.

Attention

Do not use excessive force when sliding the power supply into your V-Series system. You can damage the connector.

Step	Action
1	Put on the antistatic wrist strap and grounding leash.

Step	Action
2	Slide the power supply into the power supply bay until you hear the power supply connect with the connector inside your V-Series system chassis.
3	Raise the handle while pressing the cam mechanism levers toward each other, and push the power supply handle into place. The following figure shows how to raise the handle into place. 
4	Plug the power cord into the power receptacle and fasten it with the clamp.
5	Plug the other end of the power cord into a grounded AC power source.
6	Turn on the power switch and confirm proper operation by checking the power supply LEDs. See “Monitoring the power supply” on page 42.
7	After turning on your system, run diagnostics. See the *Diagnostics Guide* for more information.

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