IBM System Storage

IBM

N3300 and N3600 Hardware and Service Guide

IBM System Storage

N3300 and N3600 Hardware and Service Guide

> **Note:**
> Before using this information and the product it supports, be sure to read the general information in "Notices" on page 79.

The following paragraph does not apply to any country (or region) where such provisions are inconsistent with local law.

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Safety and environmental notices

This section contains information about:
- "Safety notices and labels"
- "Laser safety" on page vi
- "Rack safety" on page vii
- "Product recycling and disposal" on page x
- "Battery return program" on page xi
- "Fire suppression systems " on page xii

Safety notices and labels

When using this product, observe the danger, caution, and attention notices contained in this guide. The notices are accompanied by symbols that represent the severity of the safety condition.

The following sections define each type of safety notice and provide examples.

The following notices and statements are used in IBM® documents. They are listed below in order of increasing severity of potential hazards. Follow the links for more detailed descriptions and examples of the danger, caution, and attention notices in the sections that follow.
- **Note:** These notices provide important tips, guidance, or advice.
- **"Attention notices" on page v:** These notices indicate potential damage to programs, devices, or data.
- **"Caution notices" on page v:** These statements indicate situations that can be potentially hazardous to you.
- **"Danger notices":** These statements indicate situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these situations.
- In addition to these notices, "Labels" on page iv may be attached to the product to warn of potential hazards.

Danger notices

A danger notice calls attention to a situation that is potentially lethal or extremely hazardous to people. A lightning bolt symbol accompanies a danger notice to represent a dangerous electrical condition. A sample danger notice follows.

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (D004)**

A comprehensive danger notice provides instructions on how to avoid shock hazards when servicing equipment. Unless instructed otherwise, follow the procedures in the following danger notice.

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DANGER

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

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

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

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

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

(D005)

Labels

As an added precaution, safety labels are often installed directly on products or product components to warn of potential hazards.
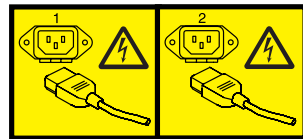
The actual product safety labels may differ from these sample safety labels:

DANGER

Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label.

(L001)

DANGER

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

(L003)

Caution notices

A caution notice calls attention to a situation that is potentially hazardous to people because of some existing condition. A caution notice can be accompanied by different symbols, as in the examples below:

If the symbol is...	It means....
	A hazardous electrical condition with less severity than electrical danger.
	A generally hazardous condition not represented by other safety symbols.
Class I	A hazardous condition due to the use of a laser in the product. Laser symbols are always accompanied by the classification of the laser as defined by the U. S. Department of Health and Human Services (for example, Class I, Class II, and so forth).

Attention notices

An attention notice indicates the possibility of damage to a program, device, or system, or to data. An exclamation point symbol may accompany an attention notice, but is not required. A sample attention notice follows:

Attention: Do not bend a fibre cable to a radius less than 5 cm (2 in.); you can damage the cable. Tie wraps are not recommended for optical cables because they can be easily overtightened, causing damage to the cable.

Laser safety

When using an NVRAM5 or NVRAM6 cluster (active-active) copper-fiber converter, the storage system must be installed in a restricted access location.

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

This equipment contains Class 1 laser products, and complies with FDA radiation Performance Standards, 21 CFR Subchapter J and the international laser safety standard IEC 825-2.

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

Attention: In the United States, use only SFP or GBIC optical transceivers that comply with the FDA radiation performance standards, 21 CFR Subchapter J. Internationally, use only SFP or GBIC optical transceivers that comply with IEC standard 825–1. Optical products that do not comply with these standards may produce light that is hazardous to the eyes.

Usage restrictions

The optical ports of the modules must be terminated with an optical connector or with a dust plug.

Rack safety

Rack installation

DANGER

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

- **Heavy equipment - personal injury or equipment damage might result if mishandled.**
- **Always lower the leveling pads on the rack cabinet.**
- **Always install stabilizer brackets on the rack cabinet.**
- **To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.**
- **Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.**
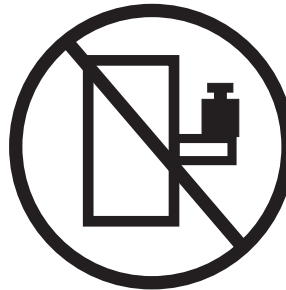
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**
- **An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.**

(R001 part 1 of 2

CAUTION:

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

(R001 part 2 of 2)

Rack relocation (19″ rack)

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

- **Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:**
  - **Remove all devices in the 32U position and above.**
  - **Ensure that the heaviest devices are installed in the bottom of the rack cabinet.**
  - **Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.**
  - **If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.**
  - **Inspect the route that you plan to take when moving the rack to eliminate potential hazards.**
  - **Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that came with your rack cabinet for the weight of a loaded rack cabinet.**
  - **Verify that all door openings are at least 760 x 2030 mm (30 x 80 in.).**
  - **Ensure that all devices, shelves, drawers, doors, and cables are secure.**
  - **Ensure that the four leveling pads are raised to their highest position.**
  - **Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.**
  - **Do not use a ramp inclined at more than ten degrees.**
  - **Once the rack cabinet is in the new location, do the following:**
    - **Lower the four leveling pads.**
    - **Install stabilizer brackets on the rack cabinet.**
    - **If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.**
  - **If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.**

(R002)

Product recycling and disposal

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

www.ibm.com/ibm/environment/products/prp.shtml

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la informacion (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean utiles. IBM dispone de una serie de programas y servicios de devolucion de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar informacion sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM www.ibm.com/ibm/environment/products/prp.shtml.
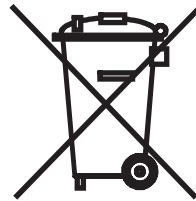
Notice: This mark applies only to countries within the European Union (EU) and Norway.

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

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

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

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

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

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the

WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

Battery return program

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

www.ibm.com/ibm/environment/products/batteryrecycle.shtml

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

For California:

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

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

For Taiwan:

廢電池請回收

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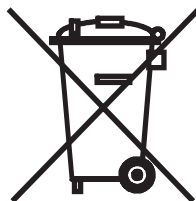
Note: This mark applies only to countries within the European Union (EU).

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

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

Fire suppression systems

A fire suppression system is the responsibility of the customer. The customer's own insurance underwriter, local fire marshal, or a local building inspector, or both, should be consulted in selecting a fire suppression system that provides the correct level of coverage and protection. IBM designs and manufactures equipment to internal and external standards that require certain environments for reliable operation. Because IBM does not test any equipment for compatibility with fire suppression systems, IBM does not make compatibility claims of any kind nor does IBM provide recommendations on fire suppression systems.

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About this document

This guide describes how to connect and manage the IBM System Storage™ N3300 (model numbers 2859-A10 and 2859-A20) and N3600 (model numbers 2862-A10 and 2862-A20) systems.

For information about installation and setup, see the *Installation and Setup Instructions* that came with your system.

For information about error messages and troubleshooting, see the *IBM System Storage N series Platform Monitoring Guide*.

Compliance ID 2859-NAS covers MT/models 2859-A10 and 2859-A20. Compliance ID 2862-NAS covers MT/models 2862-A10 and 2862-A20.

Who should read this document

This guide is for qualified system administrators and service personnel who are familiar with IBM storage systems. This document is for customer use. It addresses setup, operation, and servicing of the 2859 and 2862 models A10/A20. This document is intended to provide information to customers, operators, administrators, installers, and service personnel.

Supported features

IBM System Storage N series storage systems and expansion boxes are driven by NetApp® Data ONTAP® software. Some features described in the product software documentation are neither offered nor supported by IBM. Please contact your local IBM representative or reseller for further details.

Information about supported features can also be found at the following Web site:

www.ibm.com/storage/support/nas/

A listing of currently available N series products and features can be found at the following Web site:

www.ibm.com/storage/nas/

How this document is organized

This document contains the following chapters:
- Chapter 1, "Preparing for the installation," on page 1 provides an overview of the entire system installation process, hardware specifications, and the appropriate documentation references for the procedures.
- Chapter 2, "Connecting your system," on page 13 describes how to connect your system.
- Chapter 3, "Configuring the system," on page 23 describes how to configure your system.
- Chapter 4, "Monitoring your system," on page 27 describes how to monitor your system based on the LEDs for your system.
- Chapter 5, "Replacing N3300 and N3600 system devices," on page 33 describes how to replace devices in your system.

- Appendix A, "Recommended power line sizes," on page 65 discusses how to determine the power line lengths running from your system to the power source.
- Appendix B, "FRU/CRU and power cord list for N series products," on page 67 lists the feature codes for the power cords for your system.
- Appendix C, "Optional adapter cards (N3600 only)," on page 71 describes the optional adapter cards supported for the N3600 system.
- Appendix D, "IBM System Storage N series documentation," on page 75 lists the documents in the IBM System Storage N series hardware and Data ONTAP product libraries, as well as other related documents.

Getting information, help, and service

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your IBM System Storage N series product, and whom to call for service, if it is necessary.

The following applies in Taiwan:

IBM Taiwan Product Service Contact Info:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd., Taipei Taiwan
Tel: 0800-016-888

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:
- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation and use the diagnostic tools that come with your system.
- Check the IBM support Web site for known problems and limitations.

Using the documentation

Information about the N series product and Data ONTAP software is available in printed documents and a documentation CD that comes with your system. The same documentation is available as PDF files on the IBM NAS support Web site:

www.ibm.com/storage/support/nas/

Web sites

IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates.
- For NAS product information, go to the following Web site:

www.ibm.com/storage/nas/

- For NAS support information, go to the following Web site:

  www.ibm.com/storage/support/nas/

- For AutoSupport information, go to the following Web site:

  www.ibm.com/storage/support/nas/

- You can order publications through the IBM Publications Ordering System at the following Web site:

  www.elink.ibmlink.ibm.com/public/applications/publications/

  cgibin/pbi.cgi/

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services. Visit the following Web site for support telephone numbers:

www.ibm.com/planetwide/

Supported servers and operating systems

IBM N series products attach to many servers and many operating systems. To determine the latest supported attachments, visit the following Web site and access the IBM System Storage N series interoperability matrix:

www.ibm.com/systems/storage/network/interophome.html

Firmware updates

As with all devices, it is recommended that you run the latest level of firmware, which is embedded in Data ONTAP. If there are changes, they will be posted to the following Web site:

www.ibm.com/storage/support/nas/

Note: If you do not see new changes on the Web site, you are running the latest level of firmware.

Verify that the latest level of firmware is installed on your machine before contacting IBM for technical support.

Conventions and terminology used in this document

This guide uses the following terminology, command conventions, format conventions and keyboard conventions:

Terminology

In this and other IBM N series documents, the term *filer* describes IBM N series systems (such as the N3300 and N3600 A10 and A20) that either contain internal disk storage or attach to the disk storage expansion units specifically designed for the IBM N series systems. There are three disk storage expansion units specifically designed for the IBM N series filers:

- IBM EXN4000 Fibre Channel disk storage expansion unit
- IBM EXN2000 Fibre Channel disk storage expansion unit
- IBM EXN1000 serial advanced technology attachment (SATA) storage expansion unit

Note: None of these expansion units is intended to attach to a gateway.

The term *gateway* describes IBM N series models that *do not* contain internal disk storage or attach to disk storage expansion units. IBM N series gateways attach to external storage devices on a Storage Area Network (SAN).

The terms *system* or *storage system* refer to either a gateway by itself or a filer, either by itself or with additional disk drives.

In addition, this guide uses the following terms:

- *AT-FCX* refers to the controller module of the serial advanced technology attachment (SATA) storage expansion unit (EXN1000).
- *Active-Active configuration* (sometimes referred to as *clustered configuration*) refers to a High Availability system with at least two nodes that share resources to provide redundancy.
- *Device carrier* refers to the container that encases a fan/power supply unit or a disk.
- *Disk* applies to any hard disk drive.
- *ESH2* refers to the controller module of the EXN2000 Fibre Channel disk storage expansion unit.
- *ESH4* refers to the controller module of the EXN4000 Fibre Channel disk storage expansion unit.
- *Loop* refers to one or more daisy-chained expansion units connected to a filer.
- *Node* refers to a chassis. There is one node in the A10 models; there are two nodes in the A20 models.

Command conventions

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

Formatting conventions

The following table lists different character formats used in this guide to set off special information.

Formatting convention	Type of information
Italic type	• Words or characters that require special attention. • Placeholders for information you must supply. For example, if the guide requires you to enter the `fctest` *adaptername* command, you enter the characters "fctest" followed by the actual name of the adapter. • 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.

Formatting convention	Type of information
`Bold monospaced font`	Words or characters you type. What you type is always shown in lowercase letters, unless your program is case-sensitive and uppercase letters are necessary for it to work properly.

Keyboard conventions

This guide uses capitalization and some abbreviations to refer to the keys on the keyboard. The keys on your keyboard might not be labeled exactly as they are in this guide.

What is in this guide...	What it means...
hyphen (-)	Used to separate individual keys. For example, Ctrl-D means holding down the Ctrl key while pressing the D key.
Enter	Used to refer to the key that generates a carriage return, although the key is named Return on some keyboards.
type	Used to mean pressing one or more keys on the keyboard.
enter	Used to mean pressing one or more keys and then pressing the Enter key.

How to send your comments

Your feedback is important in helping us provide the most accurate and high-quality information. If you have comments or suggestions for improving this document, send us your comments by e-mail to starpubs@us.ibm.com or use the Readers' Comments form at the back of this publication. Be sure to include the following:

- Exact publication title
- Form number (for example, GC26-1234-02)
- Page numbers to which you are referring

If the Reader Comment Form in the back of this manual is missing, you can direct your mail to:

International Business Machines Corporation
Information Development
Department GZW
9000 South Rita Road
Tucson, Arizona 85744-0001 U.S.A.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

Chapter 1. Preparing for the installation

This chapter provides an overview of the entire IBM System Storage N3300 and N3600 system installation process, hardware specifications, and the appropriate documentation references for the procedures. Refer to the *Installation and Setup Instructions* that came with your system for further information about installing your equipment.

This chapter discusses the following topics:
- "Required manuals, tools and equipment"
- "Handling static-sensitive devices"
- "Planning and organizing the installation" on page 2

Required manuals, tools and equipment

You need the following manuals in addition to this manual:
- *Installation and Setup Instructions* for your N3300 and N3600 system and expansion units
- *IBM System Storage N series Data ONTAP Software Setup Guide* for your version of Data ONTAP, if applicable
- *IBM System Storage N series Data ONTAP Active-Active Configuration Guide* for your version of Data ONTAP, if applicable

You need to supply the following tools and equipment:
- Ethernet LAN cables
- Fibre Channel cables
- Console (for example, a PC or laptop) and a serial null modem cable
- #2 Phillips screwdriver and slotted screwdriver
- Grounding leash and ESD strap

Handling static-sensitive devices

Attention: This system uses electronic components that are sensitive to static electricity. Static discharge from your clothing or other fixtures around you can damage these components. Put on an antistatic ESD strap and grounding leash to free yourself of static electricity before touching any electronic components.

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

To reduce the possibility of electrostatic discharge (ESD), observe the following precautions:
- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.

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- While the device is still in its static-protective package, touch it to an unpainted metal part of the system unit for at least two seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it in its static-protective package. Do not place the device on your system unit cover or on a metal table. Take additional care when handling devices during cold weather because heating reduces indoor humidity and increases static electricity.

Planning and organizing the installation

This section identifies the shipment contents and the rules and regulations you need to observe for the proper installation of your N3300 and N3600 system. It also provides an overview of the entire system installation process and the appropriate documentation references for the procedures.

For detailed information, see the following topics:
- "Hardware specifications"
- "Checking shipment package contents" on page 9
- "Rules for installing the system in a rack" on page 10
- "Guide to the installation process " on page 11

Hardware specifications

The following table lists the characteristics and requirements for your hardware.

CAUTION:
Two people are required to lift the N3300 system during installation. Three people are required to lift the N3600 system during installation.

Table 1. N3300 and N3600 system hardware specifications

Physical characteristics		
Weight	2859-A10, 2859-A20	Active/active: 66 lbs (30 kg) full Single controller: 64 lbs (28 kg) empty
	2862-A10, 2862-A20	Active/active: 112 lbs (51 kg) full Single controller: 110 lbs (50 kg) empty
Rack units	2859-A10, 2859-A20	2U
	2862-A10, 2862-A20	4U
Height	2859-A10, 2859-A20	3.45 in. (8.75 cm)
	2862-A10, 2862-A20	6.95 in. (17.75 cm)
Width		17.7 in. (44.9 cm)
Depth	2859-A10, 2859-A20	56 cm (22 in)
	2862-A10, 2862-A20	58.5 cm (23 in)
Clearance dimensions		
Front-cooling	All versions	10 in. (25.4 cm)
Rear-cooling	All versions	12 in. (30.5 cm)
Front-maintenance	All versions	30 in. (76.2 cm)

Table 1. N3300 and N3600 system hardware specifications (continued)

Rear-maintenance	All versions	30 in. (76.2 cm)

Table 2. N3300 and N3600 system environmental requirements

Environmental requirements **Note:** Operating at the extremes of the following environmental requirements might increase the risk of device failure.		
Operating temperature maximum range		50° F to 104° F (10° C to 40° C)
Operating temperature recommended range		68° F to 77° F (20° C to 25° C)
Nonoperating temperature range		-40° F to 140° F (-40° C to 60° C)
Relative humidity		20 to 80% noncondensing
Recommended operating temperature relative humidity range		40 to 55%
Maximum wet bulb temperature		28° C (82° F)
Maximum altitude		3050 m (10,000 ft.)
Acoustic level	N3300	54 dBA @ 23° C 7.2 bels @ 23° C
	N3600	49 dBA @ 23° C 6.7 bels @ 23° C

The following tables list the maximum electrical power for the N3300 and N3600 and the electrical requirements for different configurations of the N3300 and N3600 systems.

Table 3. N3300 and N3600 maximum electrical power

System	**Maximum electrical power**
N3300	100-240 V ac, 10-4 A per node, 50-60 Hz
N3600	100-240 V ac, 12-5 A per node, 50-60 Hz

Note: In the following tables, *Worst-case* indicates a system running with one PSU and high fan speed, with power distributed over one power cord. *Per PSU* indicates typical power needs, per PSU, for a system operating under normal condition. *System* indicates typical power needs for two PSUs in a system operating under normal condition and power distributed over two power cords.

Table 4. N3300 electrical requirements - one controller module

Input voltage	**100 to 120V**			**200 to 240V**		
	Worst-case	Per PSU	System	Worst-case	Per PSU	System

Table 4. N3300 electrical requirements - one controller module (continued)

Input voltage		100 to 120V			200 to 240V		
Input current measured, A	144G SAS drives	3.83	1.7	3.39	1.94	0.94	1.87
	300G SAS drives	4.44	1.95	3.89	2.23	1.08	2.16
	250G SATA drives	3.07	1.47	2.94	1.60	0.79	1.57
	500G SATA drives	3.22	1.55	3.09	1.68	0.81	1.61
	750G SATA drives	3.37	1.61	3.22	1.69	0.83	1.66
Input power measured, W	144G SAS drives	377	165	330	371	174	348
	300G SAS drives	439	191	381	431	204	407
	250G SATA drives	300	144	287	304	145	289
	500G SATA drives	319	151	301	322	147	294
	750G SATA drives	332	158	316	327	152.5	305
Thermal dissipation, BTU/hr	144G SAS drives	1287	563	1125	1264	593	1185
	300G SAS drives	1497	649	1298	1470	669	1338
	250G SATA drives	1024	490	979	1035	494	987
	500G SATA drives	1088	514	1028	1099	501	1002
	750G SATA drives	1133	539	1077	1114	520	1039
Inrush peak, A	All drives	16	16	16	34	34	34
Input power frequency, Hz	50 to 60						

Table 5. N3300 electrical requirements - two controller modules

Input voltage		100 to 120V			200 to 240V		
		Worst-case	Per PSU	System	Worst-case	Per PSU	System
Input current measured, A	144G SAS drives	4.69	2.05	4.09	2.34	1.11	2.22
	300G SAS drives	4.94	2.38	4.75	2.45	1.19	2.37
	250G SATA drives	3.82	1.86	3.72	1.91	0.93	1.86
	500G SATA drives	3.94	1.90	3.80	1.97	0.97	1.93
	750G SATA drives	4.13	1.95	3.89	2.09	0.99	1.98
Input power measured, W	144G SAS drives	464	200	400	452	210	419
	300G SAS drives	488	233	465	476	224	448
	250G SATA drives	377	183	365	367	173	345
	500G SATA drives	389	186	372	381	180	360
	750G SATA drives	409	191	382	404	186	372
Thermal dissipation, BTU/hr	144G SAS drives	1583	683	1365	1542	714.5	1429
	300G SAS drives	1665	794	1587	1624	715	1527
	250G SATA drives	1287	623	1245	1253	589	1178
	500G SATA drives	1328	634	1268	1298	614	1227
	750G SATA drives	1395	651	1302	1377	634	1268
Inrush peak, A	All drives	16	16	16	34	34	34
Input power frequency, Hz	50 to 60						

Table 6. N3300 electrical requirements - one controller module, no disks

Input voltage	100 to 120V			200 to 240V		
	Worst-case	Per PSU	System	Worst-case	Per PSU	System
Input current measured, A	1.67	0.8	1.60	0.9	0.45	0.89
Input power measured, W	165	77	153	160	75	149
Thermal dissipation, BTU/hr	563	261	521	544	253	506
Inrush peak, A	16	16	16	34	34	34
Input power frequency, Hz	50 to 60					

Table 7. N3300 electrical requirements - two controller modules, no disks

Input voltage	100 to 120V			200 to 240V		
	Worst-case	Per PSU	System	Worst-case	Per PSU	System
Input current measured, A	2.63	1.12	2.23	1.34	0.59	1.18
Input power measured, W	254	108	215	240	104	208
Thermal dissipation, BTU/hr	866	366	731	818	355	709
Inrush peak, A	16	16	16	34	34	34
Input power frequency, Hz	50 to 60					

Table 8. N3600 electrical requirements - one controller module

Input voltage		100 to 120V			200 to 240V		
		Worst-case	Per PSU	System	Worst-case	Per PSU	System
Input current measured, A	144G SAS drives	5.64	2.38	4.76	2.82	1.33	2.65
	300G SAS drives	6.62	2.96	5.92	3.27	2.76	5.52
	250G SATA drives	4.40	2.02	4.04	2.30	1.04	2.07
	500G SATA drives	4.64	2.18	4.36	2.33	1.09	2.17
	750G SATA drives	5.07	2.26	4.51	2.46	1.20	2.40

Table 8. N3600 electrical requirements - one controller module (continued)

Input voltage		100 to 120V			200 to 240V		
Input power measured, W	144G SAS drives	560	233	465	547	251	502
	300G SAS drives	658	292	583	636	262	523
	250G SATA drives	435	197	393	439	193	386
	500G SATA drives	459	213	425	447	204	408
	750G SATA drives	504	220	439	474	224	447
Thermal dissipation, BTU/hr	144G SAS drives	1909	794	1587	1864	855	1710
	300G SAS drives	2243	994	1988	2165	891	1782
	250G SATA drives	1482	670	1339	1497	659	1317
	500G SATA drives	1564	724	1448	1523	696	1392
	750G SATA drives	1718	749	1497	1617	762	1523
Inrush peak, A	All drives	20	19	19	40	36	36
Input power frequency, Hz	50 to 60						

Table 9. N3600 electrical requirements - two controller modules

Input voltage		100 to 120V			200 to 240V		
		Worst-case	Per PSU	System	Worst-case	Per PSU	System

Table 9. N3600 electrical requirements - two controller modules (continued)

Input voltage		100 to 120V			200 to 240V		
Input current measured, A	144G SAS drives	6.31	2.84	5.68	3.09	1.45	2.89
	300G SAS drives	7.51	3.34	6.68	3.73	1.71	3.41
	250G SATA drives	5.54	2.49	4.98	2.7	1.26	2.52
	500G SATA drives	5.74	2.84	5.67	2.89	1.33	2.65
	750G SATA drives	5.91	2.74	5.74	2.97	1.39	2.77
Input power measured, W	144G SAS drives	628	279	558	600	275	550
	300G SAS drives	747	330	659	728	328	655
	250G SATA drives	549	244	487	518	237	474
	500G SATA drives	567	277	554	561	252	503
	750G SATA drives	585	268	536	575	262	524
Thermal dissipation, BTU/hr	144G SAS drives	2142	951	1902	2044	938	1876
	300G SAS drives	2547	1124	2247	2483	1116	2232
	250G SATA drives	1872	831	1662	1767	809	1617
	500G SATA drives	1932	946	1891	1913	857	1714
	750G SATA drives	1996	914	1827	1962	893	1785
Inrush peak, A	All drives	20	19	19	40	36	36
Input power frequency, Hz	50 to 60						

Table 10. N3600 electrical requirements - one controller module, no disks

Input voltage	100 to 120V			200 to 240V		
	Worst-case	Per PSU	System	Worst-case	Per PSU	System
Input current measured, A	2.10	0.90	1.80	1.10	0.50	0.99
Input power measured, W	205	86.5	173	198	84	168
Thermal dissipation, BTU/hr	698	295	589	675	287	574
Inrush peak, A	20	19	19	40	36	36
Input power frequency, Hz	50 to 60					

Table 11. N3600 electrical requirements - two controller modules, no disks

Input voltage	100 to 120V			200 to 240V		
	Worst-case	Per PSU	System	Worst-case	Per PSU	System
Input current measured, A	2.62	1.19	2.37	1.35	0.62	1.24
Input power measured, W	256	114	227	250	111	222
Thermal dissipation, BTU/hr	874	387	773	851	379	758
Inrush peak, A	20	19	19	40	36	36
Input power frequency, Hz	50 to 60					

Checking shipment package contents

Make sure that your shipment package includes the following items, in addition to the *IBM System Storage N3300 and N3600 Hardware and Service Guide*.

- Single-controller system (2859/2862 A10)
  - 1 single-controller system containing the power supplies and any options you ordered
  - 1 console adapter cable, RJ-45 to DB-9
  - 1 system bezel
  - 1 ESD wrist strap
  - 1 serial null modem cable
  - 1 set of IBM publications
  - 2 power cords
  - SFPs

  There will also be envelopes with the software EULA and license keys.

  A rail kit for mounting the single-controller system in a standard IBM 19–inch rack may also be present.

- Dual-controller system (2859/2862 A20)

- 1 dual-controller system containing the power supplies and any options you ordered
- 2 console adapter cables, RJ-45 to DB-9
- 1 system bezel
- 2 wrist ESD straps
- 1 serial null modem cable
- 1 set of IBM publications
- 4 power cords
- SFPs

There will also be envelopes with the software EULA and license keys.

A rail kit for mounting the dual-controller system in a standard IBM 19–inch rack may also be present.

Rules for installing the system in a rack

Attention: The rack installation instructions provided in this document and in the Installation and Setup Instructions for your N series product apply specifically to the installation of the N series product in an IBM 19-inch rack. IBM service personnel cannot install the N series product in a non-IBM rack.

If the N series product is being installed in a non-IBM rack, the rails shipped with the N series product may or may not work with the non-IBM rack. Physical installation of the N series product in a non-IBM rack is the customer's responsibility.

You need to observe the following rules and restrictions when installing an N3300 and N3600 system in a standard IBM 19-inch (48.26 cm) equipment rack with mounting rails:

CAUTION:
Use safe practices when lifting.

- **For the N3600:** You must work with two other people.

32-55 kg (70.5-121.2 lbs) svc00168

DANGER

> **The weight of this part or unit is between 32 and 55 kg (70.5 and 121.2 lb). It takes three persons to safely lift this part or unit. (C010)**

Attention: Remove the power supplies and fan units from the chassis before attempting to lift the system.

- **For the N3300:** You must work with one other person.

18-32 kg (39.7-70.5 lbs) svc00167
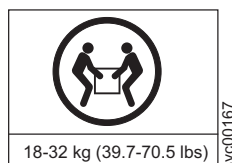
DANGER

> **The weight of this part or unit is between 18 and 32 kg (39.7 and 70.5 lb). It takes two persons to safely lift this part or unit. (C009)**

- Install the system at the bottom of your configuration, so that loops extend above your system.

DANGER

> **To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet. (R001 part 1 of 2)**

For additional rack safety notices, refer to "Rack safety" on page vii.

- When installing expansion unit units in a rack, do not exceed the maximum storage limit for your system.
- Make sure that the ID on the back panel of each expansion unit matches the ID specified on its label.
- Always install the expansion units fully loaded. Do not remove disk drives to reduce the weight.

Guide to the installation process

The following table provides a guide to the N3300 and N3600 installation process.

Refer to the *Installation and Setup Instructions* that came with your system or expansion unit for complete installation details.

Table 12. Installation process procedures

Stage	Procedure	Is the procedure required?	Procedure is performed by...	For instructions, see...
1	Install the system in a standard IBM 19-inch rack.	Yes (unless your system was shipped already assembled and cabled in a rack)	Customer	The *Installation and Setup Instructions* for your system
2	Connect the system to the IP (Internet Protocol) network.	Yes	Customer	"Connecting your system to an IP network" on page 13, or the *Installation and Setup Instructions* that came with your system
3	Connect the system to expansion units.	Yes (if you are connecting your system to expansion units)	Customer	"Connecting your system to expansion units" on page 15, or the *Installation and Setup Instructions* that came with your system
4	Connect the system to a power source.	Yes	Customer	"Connecting your system to a power source" on page 14, or the *Installation and Setup Instructions* that came with your system
5	Configure the system.	Yes	Customer	The *IBM System Storage N series Data ONTAP Software Setup Guide* for your version of Data ONTAP, or the *Installation and Setup Instructions* that came with your system

Table 12. Installation process procedures (continued)

Stage	Procedure	Is the procedure required?	Procedure is performed by...	For instructions, see...
6	Connect the system to a supported tape device.	No	Customer	"Connecting to a supported tape device" on page 19

Chapter 2. Connecting your system

This chapter describes how to connect an N3300 and N3600 system in the following topics:

- "Handling fiber-optic cables"
- "Connecting your system to an IP network"
- "Connecting your system to a power source" on page 14
- "Connecting your system to storage" on page 14

Handling fiber-optic cables

Before you use fiber-optic cables, read the following precautions.

Attention: To avoid damage to the fiber-optic cables, follow these guidelines:

- Do not route the cable along a folding cable-management arm.
- When attaching to a device on slide rails, leave enough slack in the cable so that it does not bend to a radius of less than 38 mm (1.5 in.) when extended or become pinched when retracted.
- Route the cable away from places where it can be snagged by other devices in the rack cabinet.
- Do not overtighten the cable straps or bend the cables to a radius of less than 38 mm (1.5 in.).
- Do not put excess weight on the cable at the connection point. Be sure that the cable is well supported.

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

Connecting your system to an IP network

Each node of your N3300 or N3600 system connects to an IP network. If you have an active-active (clustered) system, both nodes need to connect to the network. For information that describes how to connect your N3300 or N3600 series system, refer to the *Installation and Setup Instructions* that came with your system.

The N3300 or N3600 series system has two onboard Ethernet ports, labelled e0a and e0b, as shown in Figure 1 on page 14.

Note: Each node of the N3600 has one PCIe slot available for either a network interface card (NIC) or a host bus adapter (HBA). To support additional Ethernet connections for the N3600, a maximum of one Network Interface Card (NIC) per controller node can be plugged into the PCIe slot or slots. There are no PCI slots on the N3300.

The integrated Ethernet RJ-45 twisted-pair connectors are compatible with the IEEE 802.3 Ethernet network 10/100/1000 BASE-TX link. When connecting to the Ethernet port, connect a twisted-pair (CAT-5 or better) cable to the RJ-45 Ethernet port located on the back of the system drawer.

If you are connecting to a copper NIC, use RJ-45 CAT-5 or better copper cables.

If you are connecting to a fiber NIC, use (50- or 62.5-micron) fiber-optic cables with LC connectors.
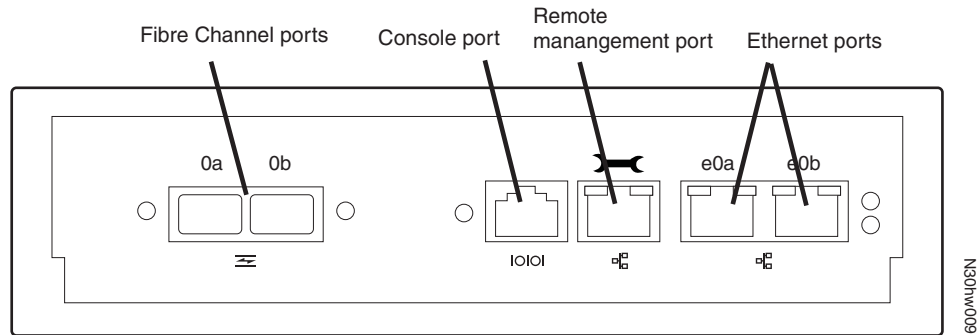
Figure 1. Onboard port locations (Ethernet)

For information about monitoring the Ethernet port LEDs, see "Monitoring the rear panel LEDs" on page 28.

Connecting your system to a power source

The N3300 and N3600 systems are shipped with redundant power supplies, referred to as PSU1 and PSU2. Each power supply has its own AC power cord. You should have separate circuit breakers for each power supply to ensure power redundancy.

For information on connecting your N3300 and N3600 system to a power source, see the *Installation and Setup Instructions* that came with your system.

Connecting your system to storage

The N3300 or N3600 has two onboard Fibre Channel ports, labelled 0a and 0b, as shown in Figure 2 on page 15. SFPs must be firmly seated in the FC ports before making connections.

Note: Each node of the N3600 has one PCIe slot available for either a network interface card (NIC) or a host bus adapter (HBA). To support additional Fibre Channel ports for the N3600, a maximum of one host bus adapter (HBA) per node can be plugged into the PCIe slot or slots. Attach the (50- or 62.5-micron) fiber-optic cables with LC connectors to the Fibre Channel ports. There are no PCI slots on the N3300.

Fibre Channel ports   Console port   Remote manangement port   Ethernet ports

0a   0b   e0a   e0b

N30hw009
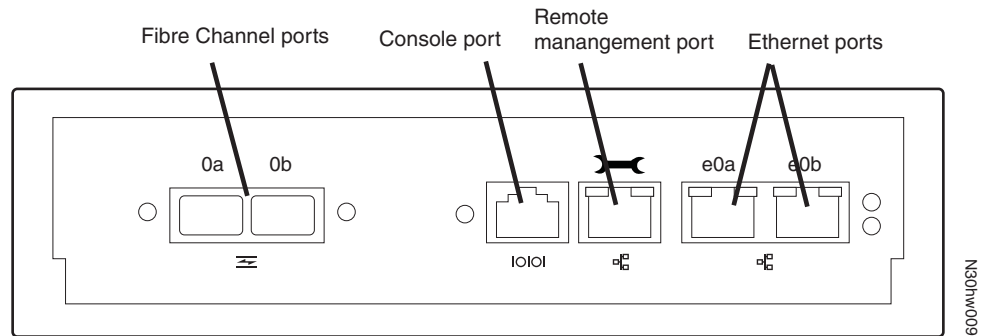
Figure 2. Onboard port locations (Fibre Channel)

Connecting your system to expansion units

For information that describes how to connect your N3300 or N3600 system using the onboard Fibre Channel ports to expansion units, see the *Installation and Setup Instructions* that came with your system.

This section presents two cabling examples for connecting N3300 and N3600 configurations with expansion units and Fibre Channel switches.
- "Cabling your N3300 system to a Fibre Channel switch"
- "Cabling your N3600 system to Fibre Channel switches using a Fibre Channel expansion adapter" on page 17

Fiber-optic cables must be used for the connection from the filer to the first expansion unit.

Attention: Make sure that all expansion unit 1Gb/2Gb(/4Gb) switches are set to the correct position. If necessary, refer to the documents that came with the expansion unit for information about checking and changing the switch setting.

Attention: For the N3600 only: If you are using optional adapter cards instead of the onboard Fibre Channel ports to connect your N3600 to expansion units, see the cabling instructions described in "Cabling your N3600 system to Fibre Channel switches using a Fibre Channel expansion adapter" on page 17.

Dual-path Fibre Channel cabling is supported for N3300 and N3600. Dual-path cabling is designed to improve reliability, availability and serviceability of the expansion units attached to the storage controller by creating two redundant paths from each storage controller to each loop of the expansion units. For more information about using dual-path cabling, see the *Installation and Setup Instructions* that came with your system.

Cabling your N3300 system to a Fibre Channel switch

This section describes how to cable your N3300 to a Fibre Channel switch, using the N3300 0b ports for expansion unit storage. The example shown in this section illustrates the connections for a dual-controller N3300.

Important: If you are not using the onboard ports for storage, then you must set your onboard ports to Target mode, as described in the *IBM System Storage N series Data ONTAP Block Access Management Guide* for your version of Data ONTAP.

Note: The following illustrations show connections to EXN2000 or EXN4000 expansion units. In EXN1000 expansion units, the positions of the In and Out ports are reversed from those of the EXN2000 and EXN4000.

1. As shown in Figure 3, cable onboard port 0a of the top controller module (CM-A) to a port on the Fibre Channel switch.

2. As shown in Figure 3, cable onboard port 0a of the bottom controller module (CM-B) to a port on the Fibre Channel switch.
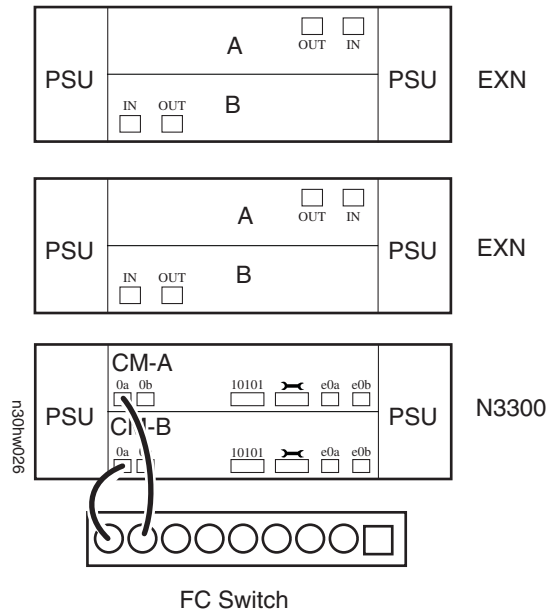
Figure 3. Cabling the N3300 to a Fibre Channel switch

3. As shown in Figure 4 on page 17, cable port 0b on the top controller module (CM-A) to the first expansion unit Channel A ESH2/ESH4 or AT-FCX IN port.

4. As shown in Figure 4 on page 17, cable port 0b on the bottom controller module (CM-B) to the first expansion unit Channel B ESH2/ESH4 or AT-FCX IN port.

5. As shown in Figure 4 on page 17, cable the first expansion unit Channel A ESH2/ESH4 or AT-FCX OUT port to the next expansion unit Channel A ESH2/ESH4 or AT-FCX IN port. Label this cable with a solid-colored label.

6. As shown in Figure 4 on page 17, cable the first expansion unit Channel B ESH2/ESH4 or AT-FCX OUT port to the expansion unit Channel B ESH2/ESH4 or AT-FCX IN port. Label this cable with a solid-colored label.

7. Repeat Steps 5 and 6, connecting OUT port to IN port, for the remaining expansion units in the loop.

   Do not plug any cables in the ESH2/ESH4 or AT-FCX OUT port of the last unit. The expansion units are self-terminating.

   Note: The ESH2/ESH4 is self-terminating and does not have a terminate switch. The AT-FCX is self-terminating.

PSU A OUT IN PSU EXN

PSU IN OUT B PSU

PSU A OUT IN PSU EXN

PSU IN OUT B PSU

CM-A
0a 0b 10101 e0a e0b
PSU CM-B PSU N3300
0a 0b 10101 e0a e0b

n30hw027

FC Switch

Figure 4. Cabling the N3300 to expansion units

Cabling your N3600 system to Fibre Channel switches using a Fibre Channel expansion adapter

This section describes how to cable your N3600 to Fibre Channel switches using a dual-port optical Fibre Channel expansion adapter for expansion unit storage. The example shown in this section illustrates the connections for a dual-controller N3600.

For additional information about optional adapter cards, see Appendix C, "Optional adapter cards (N3600 only)," on page 71.

Important: If you are not using the onboard ports for storage, then you must set your onboard ports to Target mode, as described in the *IBM System Storage N series Data ONTAP Block Access Management Guide* for your version of Data ONTAP.

Note: The illustrations in the following sections show connections to EXN2000 or EXN4000 expansion units. In EXN1000 expansion units, the positions of the In and Out ports are reversed from those of the EXN2000 and EXN4000.

1. As shown in Figure 5 on page 18, cable onboard ports 0a of both the top and bottom controller modules (CM-A and CM-B) to two ports on one Fibre Channel switch.
2. As shown in Figure 5 on page 18, cable onboard ports 0b of both the top and bottom controller modules (CM-A and CM-B) to two ports on a second Fibre Channel switch.
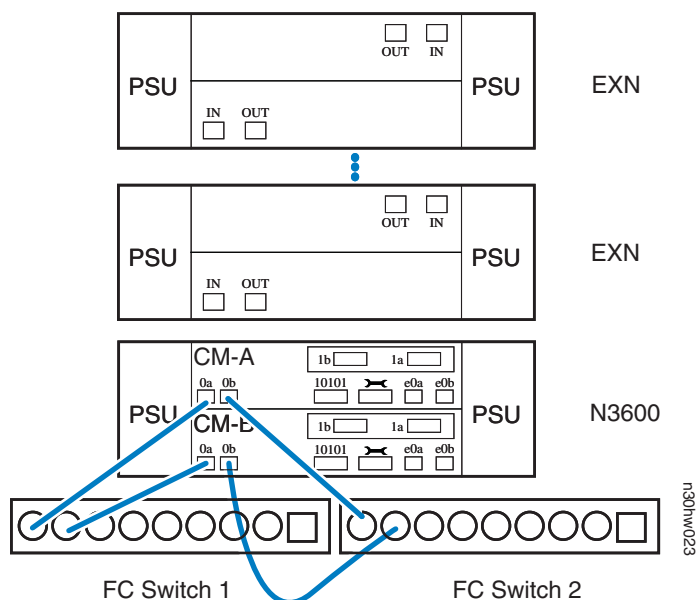
Figure 5. Cabling the N3600 to Fibre Channel switches

3. As shown in Figure 6 on page 19, cable the dual-port expansion adapter Port 1a on the top controller module (CM-A) to the first expansion unit Channel A ESH2/ESH4 or AT-FCX IN port.

4. As shown in Figure 6 on page 19, cable the dual-port expansion adapter Port 1a on the bottom controller module (CM-B) to the first expansion unit Channel B ESH2/ESH4 or AT-FCX IN port.

5. As shown in Figure 6 on page 19, cable the first expansion unit Channel A ESH2/ESH4 or AT-FCX OUT port to the next expansion unit Channel A ESH2/ESH4 or AT-FCX IN port. Label this cable with a solid-colored label.

6. As shown in Figure 6 on page 19, cable the first expansion unit Channel B ESH2/ESH4 or AT-FCX OUT port to the expansion unit Channel B ESH2/ESH4 or AT-FCX IN port. Label this cable with a solid-colored label.

7. Repeat Steps 5 and 6, connecting OUT port to IN port, for the remaining expansion units in the loop.

   Do not plug any cables in the ESH2/ESH4 or AT-FCX OUT port of the last unit. The expansion units are self-terminating.

   Note: The ESH2/ESH4 is self-terminating and does not have a terminate switch. The AT-FCX is self-terminating.

Figure 6. Cabling the N3600 expansion adapter to expansion units

8. As shown in Figure 7, cable the dual-port expansion adapter Port 1b on the top controller module (CM-A) to the last expansion unit Channel B ESH2/ESH4 or AT-FCX OUT port.

9. As shown in Figure 7, cable the dual-port expansion adapter Port 1b on the bottom controller module (CM-B) to the last expansion unit Channel A ESH2/ESH4 or AT-FCX OUT port.
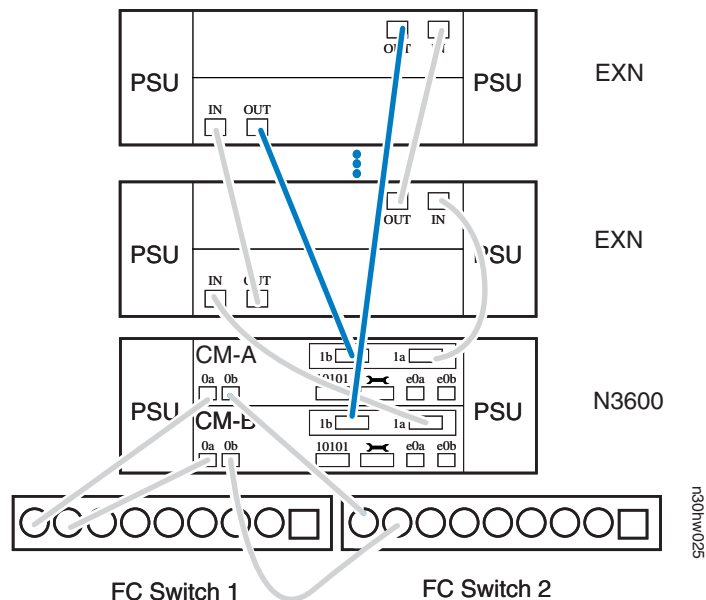
Figure 7. Cabling the N3600 expansion adapter to expansion units

Connecting to a supported tape device

You can connect supported tape devices to your N3300 or N3600 through an optical Fibre Channel interface using any Fibre Channel port on the back of the chassis.

The N3300 and N3600 series systems only support tape devices with an optical Fibre Channel interface. See the *Interoperability Matrix* at the following Web site for supported tape devices for your N3300 and N3600 system:

www.ibm.com/systems/storage/network/interophome.html

Refer to the documentation that comes with the supported tape device for connection information.

Rules for connecting supported tape devices

Observe the following rules for connecting the supported tape devices:

- Use a fiber-optic cable that is:
    - Appropriate to the Fibre Channel connection on your N3300 and N3600 system
    - Of an approved length for the supported tape device

        Note: See the documentation for the supported tape device.

- Check the *Interoperability Matrix* at the following Web site to verify support for your supported tape device:

    www.ibm.com/systems/storage/network/interophome.html

    An unsupported tape backup device might cause the N3300 and N3600 system to halt.

- For additional information about Fibre Channel cables, see the following Web site:

    www.ibm.com/storage/support/nas/

Connecting your system to an ASCII terminal console

The ASCII terminal console enables you to monitor the boot process, helps you configure your N3300 or N3600 system after it boots, and enables you to perform system administration.

ASCII terminal console wiring

The following table lists the RJ-45 connection pinout for the ASCII terminal console wiring.

Table 13. RJ-45 connection pinout for the ASCII terminal wiring

Pin number	Signal
1	Connected to pin 8
2	Not connected
3	TXD (from N3300 or N3600)
4	GND
5	GND
6	RXD (to N3300 or N3600)
7	Not connected
8	Connected to pin 1

DB-9 to RJ-45 console adapter pin connections

You use the DB-9 to RJ-45 console adapter to connect the ASCII terminal console to your N3300 or N3600. Its purpose is to convert the RJ-45 pinout on the N3300 or N3600 to the DB-9 pinout, like those on other IBM products, and all PCs.

The following table lists the console adapter pin number connections between the PC-style DB-9 male connector and the RJ-45 connection on your N3300 or N3600.

Table 14. Console adapter pin number connections

DB-9 male		Connects to	RJ-45	
Pin number	Signal		Pin number	Signal
1	Not connected	-	1	Not connected
4	Not connected	-	2	Not connected
3	TXD	⟶	3	TXD
5	GND	⟶	4	GND
6	Not connected	-	5	Not connected
2	RXD	⟶	6	RXD
7	Not connected	-	7	Not connected
8	Not connected	-	8	Not connected
9	Not connected	-	-	-

Connecting to an ASCII terminal console

To connect an ASCII terminal console to the N3300 or N3600, complete the following steps.

1. Set the following communications parameters to the same values for both the N3300 or N3600 and the ASCII terminal.

Table 15. Communication parameters

Parameter	Setting
Baud	9600
Data bit	8
Parity	None
Stop bits	1
Flow control	None

> **Note:** See your terminal documentation for information about changing your ASCII console terminal settings.

2. Connect the DB-9 null modem cable to the DB-9 to RJ-45 adapter cable, and then connect the RJ-45 end to the console port on the N3300 or N3600 and the other end to the ASCII terminal.

Chapter 3. Configuring the system

This chapter describes how to configure an N3300 or N3600 system in the following topics:
- "Configuring the system"
- "Configuring the Fibre Channel port" on page 25

Configuring the system

Gather and record information about each N3300 or N3600 system node in "System setup information worksheet ."

For information about how to boot your filer for the first time, refer to the *Installation and Setup Instructions* that came with your system.

For gateway systems, initial startup and configuration tasks must be performed by IBM. For additional information about gateway systems, see the documentation listed in Appendix D, "IBM System Storage N series documentation," on page 75.

System setup information worksheet

You need the following information to complete the setup script.

Table 16. System setup worksheet

Setup Parameters	Node A (top node)	Node B (bottom node)
Hostname:		
Network Configuration Information for e0a		
Virtual interfaces: [Y/N]		
IP address for e0a		
Netmask for e0a		
Should interface e0a take over partner IP address during failover? [Y/N]		
IP address or interface name to be taken over by e0a:		
Media type/speed (100tx-fd, 100tx, auto [100/1000])		
Flow control (none, receive, send, full):		
Enable jumbo frames? [Y/N]		
Network Configuration Information for e0b		
IP address for e0b		
Netmask for e0b		
Should interface e0b take over partner IP address during failover? [Y/N]		
IP address or interface name to be taken over by e0b:		
Media type/speed (100tx-fd, 100tx, auto [100/1000])		
Flow control (none, receive, send, full):		

Table 16. System setup worksheet (continued)

Setup Parameters	Node A (top node)	Node B (bottom node)
Enable jumbo frames? [Y/N]		
Complete setup through the Web interface? [Y/N]		
Default Gateway IP Address		
Administration Host Connection Setup	**Note:** The administration host is given root access to the filer's /etc files for system administration. To allow access to /etc root access to all NFS clients, enter RETURN below.	
Name or IP address of the administration host		
Timezone (name of city or region in /etc/zoneinfo file) [EST5EDT]		
Filer location		
Enter the root directory for HTTP files [/vol/vol0/home/http]		
Do you want to run DNS resolver? [Y/N]		
DNS domain name (You can enter up to three nameservers.)		
IP address for DNS first nameserver		
Do you want another nameserver? [Y/N]		
IP address for alternate nameserver		
Do you want another nameserver? [Y/N]		
IP address for alternate nameserver		
Do you want to run NIS client? [Y/N] (default is N)		
The Baseboard Management Controller (BMC) provides remote management capabilities including console redirection, logging, and power control. It also extends Autosupport by sending down filer event alerts.		
Would you like to configure the BMC? [Y/N] (default is Y)		
Enable DHCP on the BMC LAN interface? [Y/N] (default is N)		
IP address for the BMC		
Netmask for the BMC		
IP address for the BMC Gateway		
Gratuitous ARP interval for the BMC [10 sec (max 60)]		
The mail host is required by your system to enable BMC to sense ASUP messages when the filer is down.		
IP address or name of the mail host		
IP address for the mail host		
You may use Autosupport options to configure alert destinations.		

Configuring the Fibre Channel port

The N3300 and N3600 systems provide two independent Fibre Channel ports, identified as 0a and 0b. SFPs must be firmly seated in both ports before connecting cables.

The Fibre Channel ports can operate in target or initiator mode. Fibre Channel ports do not support mixed initiator/target mode. The default mode for the ports is initiator mode. You do not need to configure the ports to use them in initiator mode.

The Fibre Channel ports should be used in initiator mode to communicate with tape backup devices, such as in a TapeSAN backup configuration.

Fibre Channel ports on HBAs cannot be configured in target mode. They can only be used in initiator mode.

Active-active (clustered) configurations

Active-active (clustered) configurations must be cabled to switches that support public loop topology. To connect an N3300 or N3600 system to a fabric topology that includes switches that only support point-to-point topology, such as McDATA Director class switches, you must connect the active-active (clustered) configuration to an edge switch and use this switch as a bridge to the fabric. For information about specific switch models supported and fabric configuration guidelines, see the *IBM System Storage N series FCP Configuration Guide* at the following Web site:

www.ibm.com/storage/support/nas/

Configuring for initiator mode

To configure the N3300 or N3600 system back to initiator mode, complete the following steps.

1. Set the specified onboard ports to operate in initiator mode by entering the following command:

   ```
   fcadmin config -t initiator adapter
   ```

   where *adapter* is the port number. You can specify more than one port.

   Example: The following example sets onboard port 0b to initiator mode.

   ```
   fcadmin config -t initiator 0b
   ```

2. Reboot the system by entering the following command:

   ```
   reboot
   ```

3. Verify that the Fibre Channel ports are online and configured in the correct state for your configuration by entering the following command:

   ```
   fcadmin config
   ```

   Example: The following output example shows one port configured as Fibre Channel target and one port configured as initiator.

   ```
   n3300a> fcadmin config
                   Local
   Adapter Type      State             Status
   ---------------------------------------------------
     0a   target      CONFIGURED          online
     0b   initiator   CONFIGURED          online
   ```

For information on converting the onboard ports to target mode and configuring your SAN, see the *IBM System Storage N series Data ONTAP Block Access Management Guide* for your version of Data ONTAP.

Configuring and using the remote management port

The following table provides a list of manuals for configuring and using the remote management (RM) port. You can view the manuals at www.ibm.com/storage/nas.

Table 17. RM configuration manuals

Manual Title	Information Provided
Installation and Setup Instructions that came with your system	Describes the system and RM cabling.
IBM System Storage N series Diagnostics Guide	Lists and describes the diagnostic tests for a new or existing RM.
IBM System Storage N series Data ONTAP System Administration Guide for your version of Data ONTAP	Describes RM configuration and use.
IBM System Storage N series Platform Monitoring Guide	Lists RM error messages and gives corrective action for the error.

Chapter 4. Monitoring your system

This chapter identifies the location of the various LEDs on your N3300 and N3600 system and explains how to interpret LEDs for basic monitoring.

Note: For information about monitoring the LEDs for optional adapter cards, refer to the *IBM System Storage N series Platform Monitoring Guide*.

This chapter discusses the following topics:
- "Monitoring the front operation panel"
- "Monitoring the rear panel LEDs" on page 28
- "Monitoring the power supply" on page 31

Monitoring the front operation panel

The front operation panel has LEDs that indicate whether your system is active and functioning normally or whether there are problems with the hardware.

You can also identify any hardware failure associated with the front operation panel of the N3300 and N3600 system from the error messages displayed on your system console.
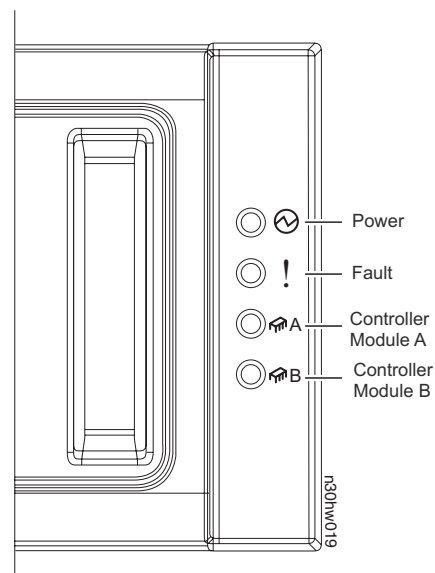
Figure 8. Front panel LEDs

Note: See "Interpreting the front panel LEDs" for an explanation of what the LEDs mean.

Interpreting the front panel LEDs

Use the following table to interpret the front panel LEDs on an N3300 and N3600 system.

Table 18. N3300 and N3600 system front panel LED descriptions

LED label	Status indicator	Description
A/B (controller A or B)	Green	The system is operating and is active.
	Blinking	This LED blinks in proportion to activity; the greater the activity, the more frequently the LED blinks. When activity is absent or very low, the LED does not blink.
	Off	No activity is detected.
Fault	Amber	The system halted or a fault occurred in the chassis. The error might be in a PSU, fan, controller module, or internal disk. The LED is lit when there is a FRU failure.
	Off	The system is operating normally.
Power	Green	The system is receiving power.
	Off	The system is not receiving power.

Monitoring the rear panel LEDs

The LEDs on the rear of the system are used to monitor the onboard ports.

Location of rear panel LEDs on the N3600

The following illustration shows the location of the following LEDs on the system rear panel for the N3600 storage system:

- Fibre Channel port LED
- Remote management (RM) port LEDs
- Ethernet port LEDs
- NVMEM LED
- Controller module fault LED

Figure 9. Rear panel LED locations

Table 19. N3600 system rear panel LED descriptions

LED label		Status indicator	Description
Fibre Channel	LNK	Green	Link is established and communication is happening.
		Off	No link is established.
RM port	LNK (Left)	Green	A valid network connection is established.
		Off	There is no network connection present.
	ACT (Right)	Amber	There is data activity.
		Off	There is no network activity present.
Ethernet	LNK (Left)	Green	A valid network connection is established.
		Off	There is no network connection present.
	ACT (Right)	Amber	There is data activity.
		Off	There is no network activity present.
NVMEM	Battery	Blinking green	NVMEM is in battery-backed standby mode.
		Off	NVMEM is running normally.
Controller module fault	!	Amber	Controller is starting up, Data ONTAP is initializing, or controller module fault is detected.
		Off	Controller module is functioning properly.

Location of rear panel LEDs on the N3300

The following illustration shows the location of the following LEDs on the system rear panel for the N3300 storage system:

- Fibre Channel port LED
- Remote management (RM) port LEDs
- Ethernet port LEDs
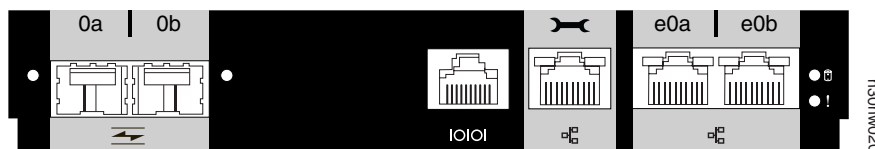- NVMEM LED
- Controller module fault LED
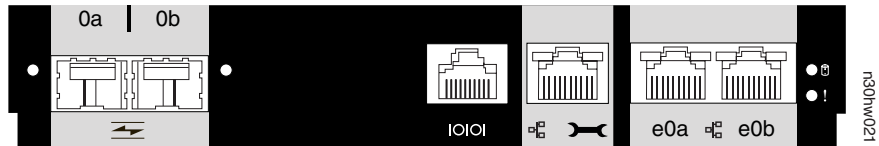
Figure 10. N3300 system rear panel LED locations

Table 20. N3300 system rear panel LED descriptions

LED label		Status indicator	Description
Fibre Channel	LNK	Green	Link is established and communication is happening.
		Off	No link is established.
RM port	LNK (Left)	Green	A valid network connection is established.
		Off	There is no network connection present.
	ACT (Right)	Amber	There is data activity.
		Off	There is no network activity present.
Ethernet	LNK (Left)	Off	No valid network connection is established.
		Green	Link is established and communication is happening.
	ACT (Right)	On	There is data activity.
		Off	There is no network activity present.
NVMEM	Battery	Blinking green	NVMEM is in battery-backed standby mode.
		Off	NVMEM is running normally.
Controller module fault	!	Amber	Controller is starting up, Data ONTAP is initializing, or controller module fault is detected.
		Off	Controller module is functioning properly.

Admonitions about NVMEM status

Several actions should not be performed on either the N3600 or N3300 storage system if the NVMEM status LED is blinking or if NVMEM is armed.

Attention: Do not replace any system hardware when the NVMEM status LED is blinking. Otherwise, you might lose data. Always flush NVMEM contents to disk by doing entering a `halt` command at the system prompt before replacing the hardware.

Attention: Do not update firmware when NVMEM is armed. Doing so causes the system to hang when it is rebooted, requiring you to remove the battery for awhile. To ensure that NVMEM is not armed, boot to Data ONTAP and enter the halt command. After you see the `OK>` prompt, it is safe to reboot to the bootloader to enter a flash command to update your firmware.

Monitoring the power supply

The following illustration shows the location of the power supply LEDs, which are visible from the back of the system.

Note: The following illustration shows an N3600 power supply. The LEDs on the N3300 are located in a different place, but are functionally identical.
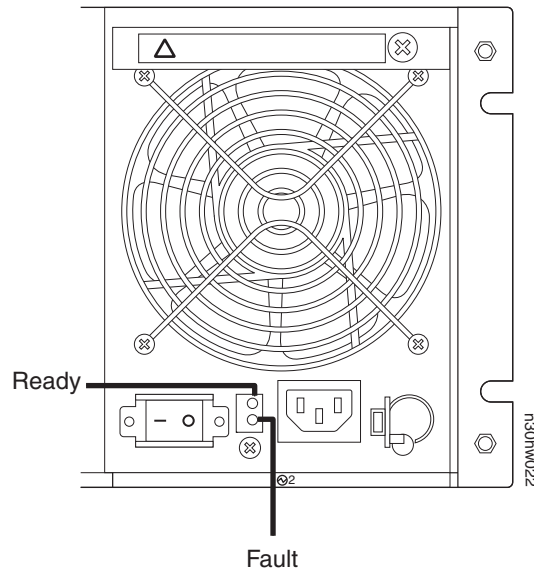
Figure 11. Power supply (PSU) LED locations

Interpreting power supply LEDs

Use the following table to interpret the LEDs on your system power supplies.

Table 21. Power supply LED descriptions

LED	LED Color	Description
Ready	Green	The power supply is functioning correctly.
Fault	Amber	The power supply is not functioning properly and needs service. See the system console for any applicable error messages.

LED behavior and onboard drive failures

If an internal disk drive fails or is disabled, the fault light on the front of a N3600/N3300 storage system turns on. When the faulty or disabled disk drive is removed, the fault light on the front of the system turns off.

The failure of disk drives in expansion disk shelves does not affect the fault light on the front of the system.

Chapter 5. Replacing N3300 and N3600 system devices

This chapter describes how to shut down, open and close, and replace parts in your N3300 or N3600 system.

This chapter discusses the following topics:
- "Shutting down a controller module" on page 34
- "Opening the system" on page 35
- "Closing the system" on page 38
- "Replacing a disk in the N3300 or N3600 chassis" on page 39
- "Replacing a power supply" on page 40
- "Replacing an NVMEM battery" on page 41
- "Replacing DIMMs in an N3300 and N3600 system" on page 46
- "Replacing a PCI Card in an N3600 system" on page 50
- "Replacing the controller module in an N3300 and N3600 system" on page 53
- "Replacing a CompactFlash card in a single controller N3300 or N3600 system" on page 56
- "Nondisruptively replacing a CompactFlash card in an N3300 or N3600 active/active configuration" on page 60

The following illustrations show front and rear views of the N3300 and N3600 systems.
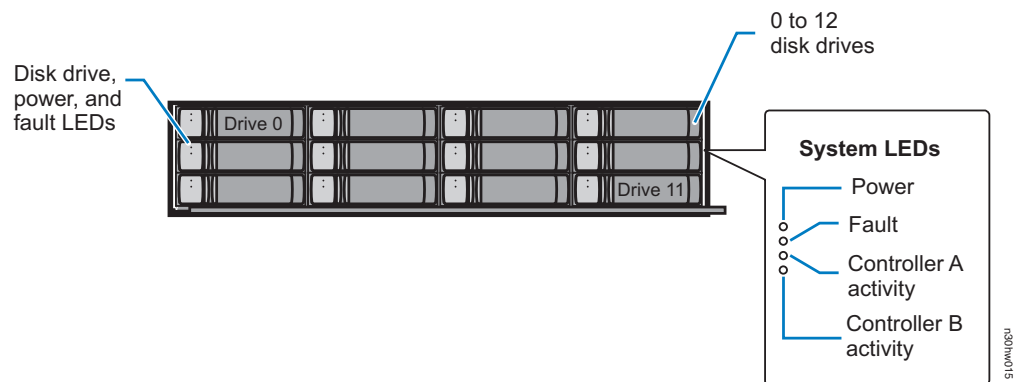
Figure 12. N3300 - Front view

33

Power
supplies

Second controller
module (for active/
active configurations
only)

n30hw016

Controller
module

NVMEM status
LED

Two Fibre Channel ports

Fault status LED

Two networks ports

Console port

RM (remote management) port
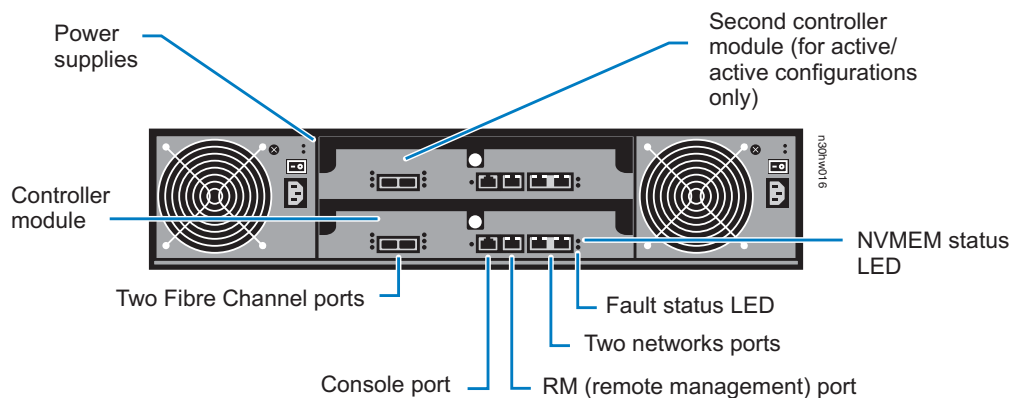
Figure 13. N3300 - Rear view

Disk drive,
power, and
fault LEDs

Drive 0

Drive 19

System LEDs

Power

Fault

Controller A
activity

Controller B
activity

n30hw018

X4 filler panel

Figure 14. N3600 - Front view

Power
supplies

Second controller
module (for active/
active configurations
only)

n30hw017

Controller
module

PCI slot

Two Fibre Channel ports

Two networks ports

RM (remote management) port

Console port

Figure 15. N3600 - Rear view

Shutting down a controller module

Shut down the target controller module (called a "node" in an active/active
configuration) by completing the applicable procedure:

- **Shutting down a node in an active/active configuration:**

  1. Check the status of the target node by entering the following command at the
     system console of either node: `cf status`

2. Take one of the following actions, depending on the result of the `cf status` command:

   – If clustering is enabled and neither node is in takeover mode, go to step 3.
   – If clustering is enabled and the partner node took over the target node, go to "Opening the system."
   – If clustering is enabled and the target node took over the partner node, correct the problem, run the `cf giveback` command from the target node console, and go back to step 1.

3. Take over the target node by entering the following command from the partner node's console:

   `partner> cf takeover`

4. Go to "Opening the system" when each node has shut down.

- **Shutting down a controller module in a single-controller configuration:**

   1. Enter the following command from the system console:

      `halt`

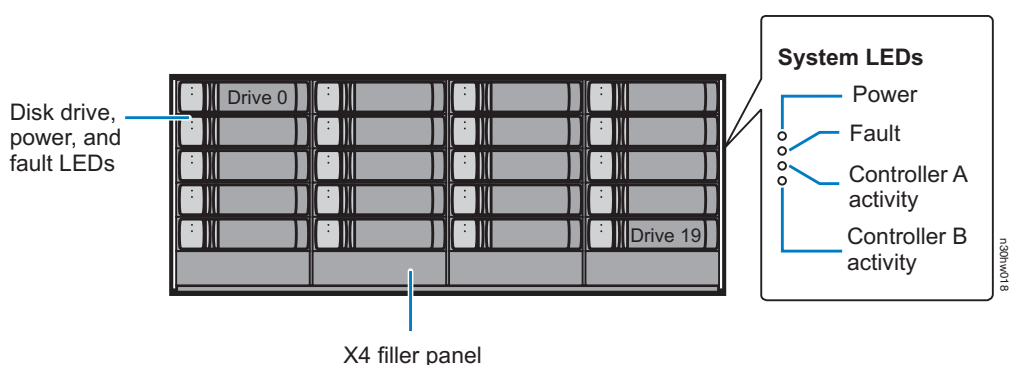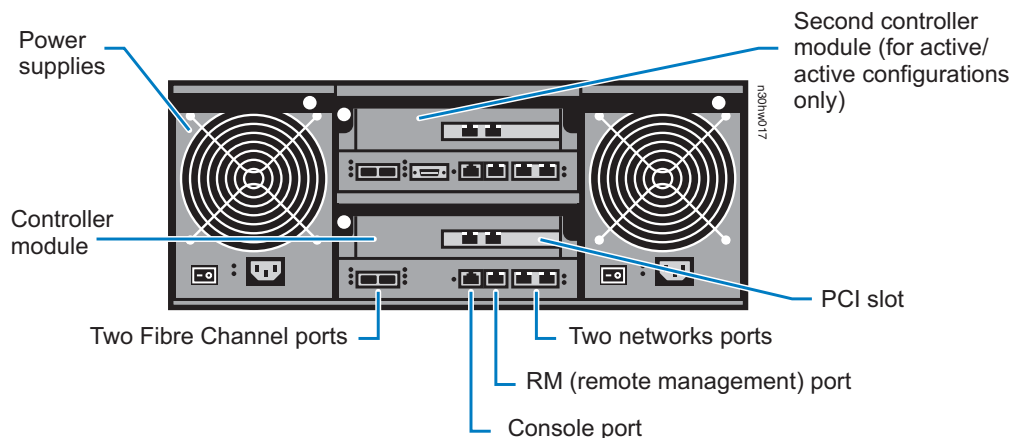   2. Turn off the power supplies and unplug both power cords from the power source.

   3. Check the nonvolatile memory (NVMEM) LED.

      If the LED is not flashing, go to "Opening the system."

      If the LED is flashing, there is content in the NVMEM that has not been saved to disk. Reconnect the power supplies to the power source, reboot the controller module, and repeat steps 1 through 3. If repeated attempts to cleanly shut down the controller module fail, be aware that you might lose any data that was not saved to disk. Go to "Opening the system."

Opening the system

To open the system, complete the following steps, using Figure 16 on page 36 or Figure 17 on page 36 for reference:

1. If you have not done so yet, perform a clean system shutdown as described in "Shutting down a controller module" on page 34.

2. Ground yourself to the system chassis using the grounding leash.

3. Turn off the power to your system.

4. Unplug system cables from the controller module, as needed. Make sure that you keep track of where cables were connected to the controller module.

5. Loosen the thumbscrew on the controller module cam handle.

6. Pull the controller module cam handle downward and slide the controller module out of the system. Make sure that you support the bottom of the controller module with your free hand.
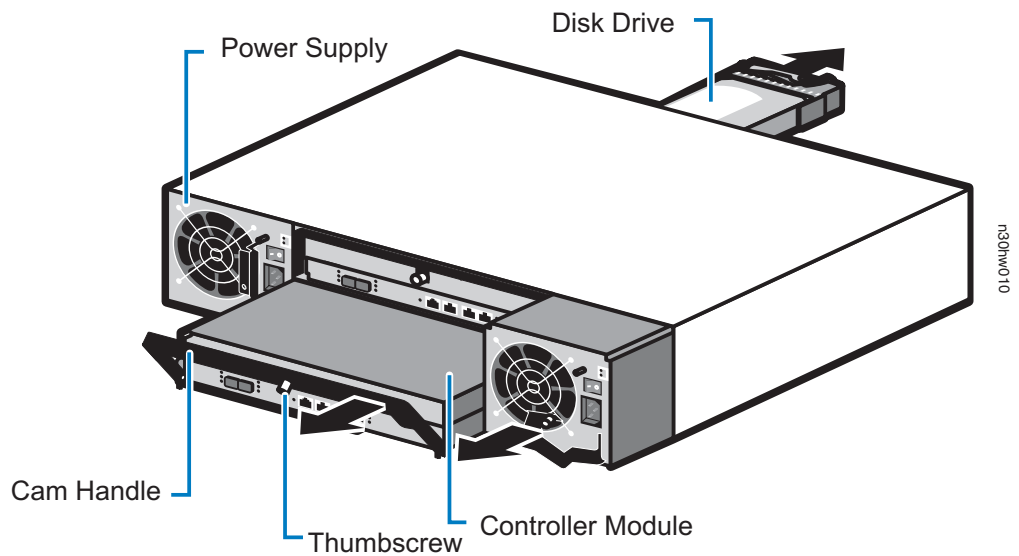
Figure 16. Removing the controller module - N3300
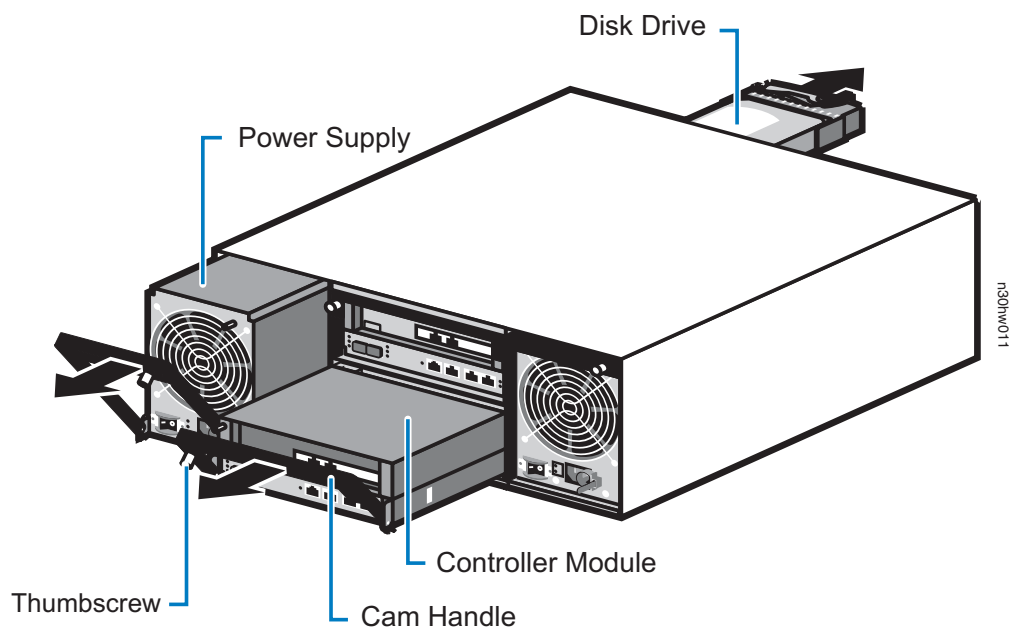
Figure 17. Removing the controller module - N3600

7. Remove the controller module cover by completing the following substeps, using Figure 18 on page 37 or Figure 19 on page 38 for reference:

   a. Loosen the thumbscrew on the back of the controller module.

   b. Gently press the heel of your hand on the controller module cover closest to the cam handle, and then slide the cover toward the back of the module.

   c. Lift the cover straight up off the controller module.

Controller Module Cover   Thumbscrew

DIMMs

Battery

CompactFlash card

CompactFlash cover

n30hw012
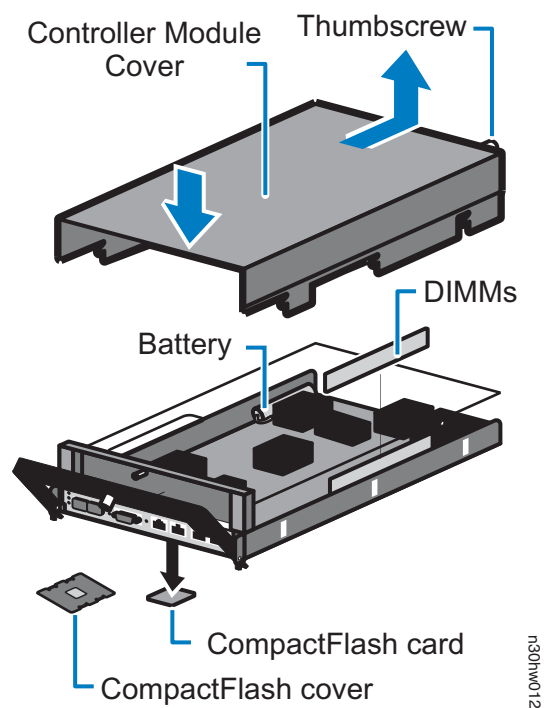
Figure 18. Opening the controller module - N3300
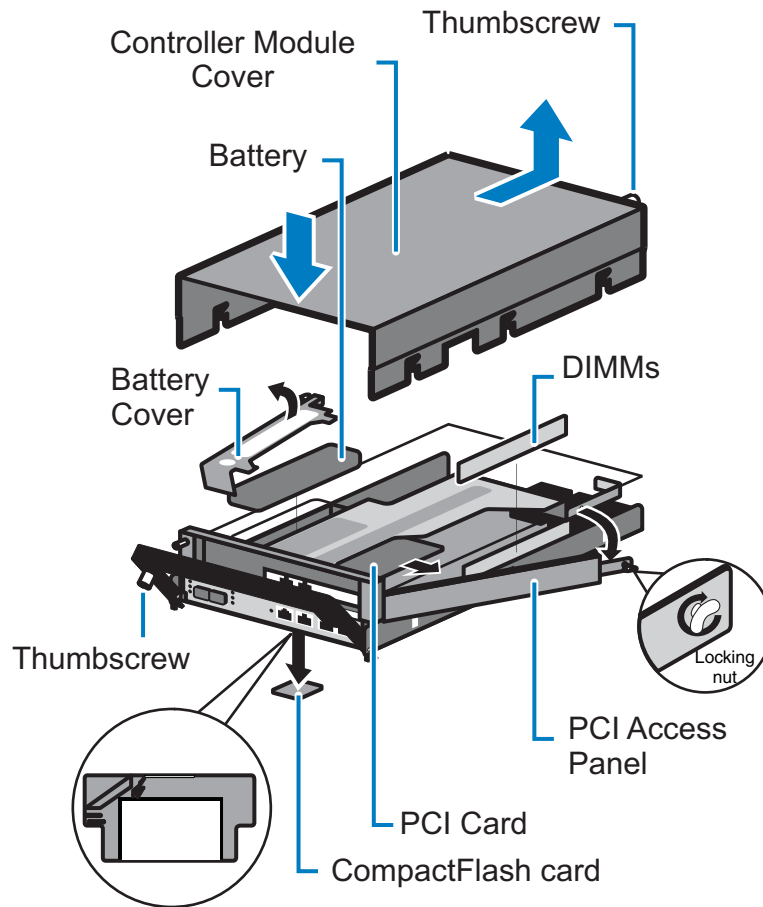
Figure 19. Opening the controller module - N3600

Closing the system

To close the system, complete the following steps:

1. Align the controller module cover with the notches on the sides of the controller module, and then slide the cover down and forward to seat it.

2. Tighten the thumbscrew on the back of the controller module.

3. Align the end of the controller module with the opening in the chassis.

4. Gently push the controller module halfway into the chassis and recable the controller module, and then push the controller module all the way into the chassis.

   Result: For systems in an active/active configuration, the node reboots as soon as you seat the controller module completely into the chassis.

5. Firmly push up the cam handle to finish seating the controller module in the system, and then push the cam handle to the closed position and tighten the thumbscrew on the cam handle.

6. Complete the boot process.

   • If your system has a single controller module, plug in the power supply and turn on the power.

   • If your system is in an active/active configuration, wait a few seconds for the node to boot, then enter the following command from the partner console:

Replacing a disk in the N3300 or N3600 chassis

Replacing a disk in the N3300 or N3600 chassis consists of the following procedures:

- "Removing a disk"
- "Installing a disk" on page 40

Note: If you are replacing several disks in the N3300 or N3600 chassis or if you are installing several disks into a half-empty chassis, replace or install the disks one at a time to allow your storage unit to recognize the existence of each new disk.

Removing a disk

To remove a disk from the N3300 or N3600 chassis, complete the following steps:

1. Do one of the following:
   - If you are removing a disk that is a member of a volume, then enter:
     ```
     disk fail disk_name
     ```
   - If you are removing a disk that is a spare disk, then enter:
     ```
     disk remove disk_name
     ```

   Note: Either command causes the amber fault LED on the disk to illuminate.

   For more information about disk commands, see the *Data ONTAP System Administrator's Guide* for your version of Data ONTAP.

2. Put on the antistatic ESD strap and grounding leash.
3. Gently remove the bezel from the front of the system.
4. Gently remove the disk drive from the chassis by pinching the tab at the top of the cam handle and swinging the cam handle out. The disk drive should disengage from the chassis, allowing it to slide free of the chassis.
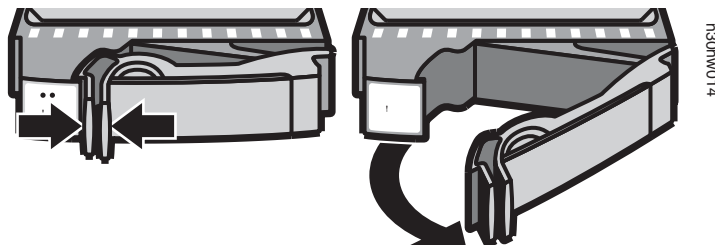

Figure 20. Removing a disk drive

Attention: Disk drives are fragile. Handle them as little as possible to prevent damage to them.

5. Gently slide the disk until it disengages. Wait 30 seconds for the disk to stop spinning; then continue removing the disk from the chassis.

   Attention: When removing a disk, always use two hands to support its weight.

Installing a disk

To install a disk in an N3300 or N3600 chassis, complete the following steps:

1. Put on the antistatic ESD strap and grounding leash.
2. Align the disk drive with the bay opening in the new chassis.
3. Gently push the disk drive into the chassis as far as it will go. The cam handle engages and begins to close.
4. Firmly push the disk drive the rest of the way into the chassis and lock the cam handle by pushing it up and against the disk drive holder. You will hear it click when it is secure.

   Note: If the device carrier does not fully seat in the drive bay, you may be trying to install an unsupported disk drive in the system.

   Attention: Do not slam the device carrier into place.

Replacing a power supply

This section describes the following tasks:

- "Removing a power supply"
- "Installing a power supply" on page 41
- "Completing the replacement process" on page 41

This procedure is written with the following assumptions:

- You are replacing only one power supply at a time. This prevents system downtime.
- All other components in the system are functioning properly.

If your system does not meet these criteria, contact IBM technical support.
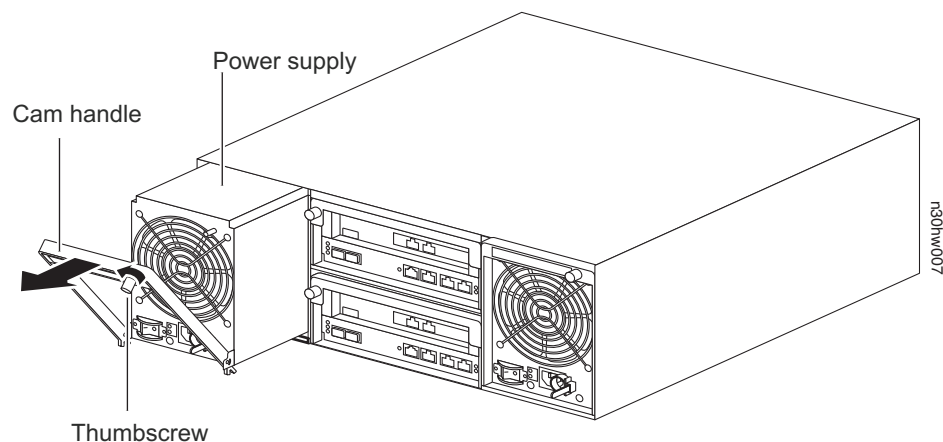
Removing a power supply

Figure 21. Removing a power supply

1. Make sure that you are properly grounded, then turn off the target power supply.

   Attention: You must replace the power supply within two minutes of removing it from the chassis. System air flow is disrupted and the system shuts down after two minutes to avoid overheating.

2. Remove the power cord by completing the following substeps.

   a. Pinch the tab on the locking mechanism of the cable retainer clip, and open the retainer clip.

   b. Slide the retainer clip off the cable.

   c. Unplug the power cord from the power supply and the power source.

3. Loosen the thumbscrew on the power supply cam handle, lower the cam handle, and slide the power supply out of the chassis. Make sure that you support the power supply with your free hand.

Installing a power supply

1. Align the edges of the new power supply with the opening in the system chassis and gently push the power supply into the chassis until the cam handle begins to rise.

2. Push on the edges of the power supply to seat it all the way into the chassis, and then push the cam handle to the closed position.

3. Tighten the thumbscrew on the power supply cam handle.

4. Reconnect the power cord and secure it to the power supply using the cable retaining clip.

5. Reconnect the power supply to the power source, and then turn it on. The power supply should run with no fault LEDs lit.

6. Go to "Completing the replacement process."

Completing the replacement process

Return the failed part to IBM. Contact IBM Service and Support at 1-800-IBM-SERV (1-800-426-7378) for more information on the return procedure.

Replacing an NVMEM battery

This section describes the following tasks:

- "Removing the NVMEM battery"
- "Installing the NVMEM battery" on page 44
- "Resetting the date and time on the controller module" on page 46
- "Completing the replacement process" on page 46

Removing the NVMEM battery

1. Shut down the target controller module (called a "node" in an active/active configuration) by completing the applicable procedure:

   • **Shutting down a node in an active/active configuration:**

    a. Check the status of the target node by entering the following command at the system console of either node:

     `cf status`

    b. Take one of the following actions, depending on the result of the `cf status` command:

     If clustering is enabled and neither node is in takeover mode, go to substep c.

     If clustering is enabled and the partner node took over the target node, go to Step 2.

If clustering is enabled and the target node took over the partner node, correct the problem, run the `cf giveback` command from the target node console, and go back to substep a.

c. Take over the target node by entering the following command from the partner node's console:

`partner> cf takeover`

d. Go to Step 2 when the takeover is complete.

- **Shutting down a controller module in a single-controller configuration:**

a. Enter the following command from the system console:

`halt`

b. Turn off the power supplies and unplug both power cords from the power source.

c. Check the nonvolatile memory (NVMEM) LED.

If the LED is not flashing, go to Step 2.

If the LED is flashing, there is content in the NVMEM that has not been saved to disk. Reconnect the power supplies to the power source, reboot the controller module, and repeat substeps a through c. If repeated attempts to cleanly shut down the controller module fail, be aware that you might lose any data that was not saved to disk. Go to Step 2.

Figure 22. NVMEM LED

Note: The illustration above shows an N3600 system. The NVMEM LEDs are in a similar location on a N3300 system. See the *Platform Monitoring Guide* for more information about the NVMEM LEDs.

2. While grounded, remove any cabling from the controller module. Make sure that you keep track of where the cables were connected to the controller module.

3. Remove and open the controller module, as described in "Opening the system" on page 35.

4. Remove the NVMEM battery by completing the substeps applicable to your system and using the related figure for reference.

- **If you have an N3600 system:**
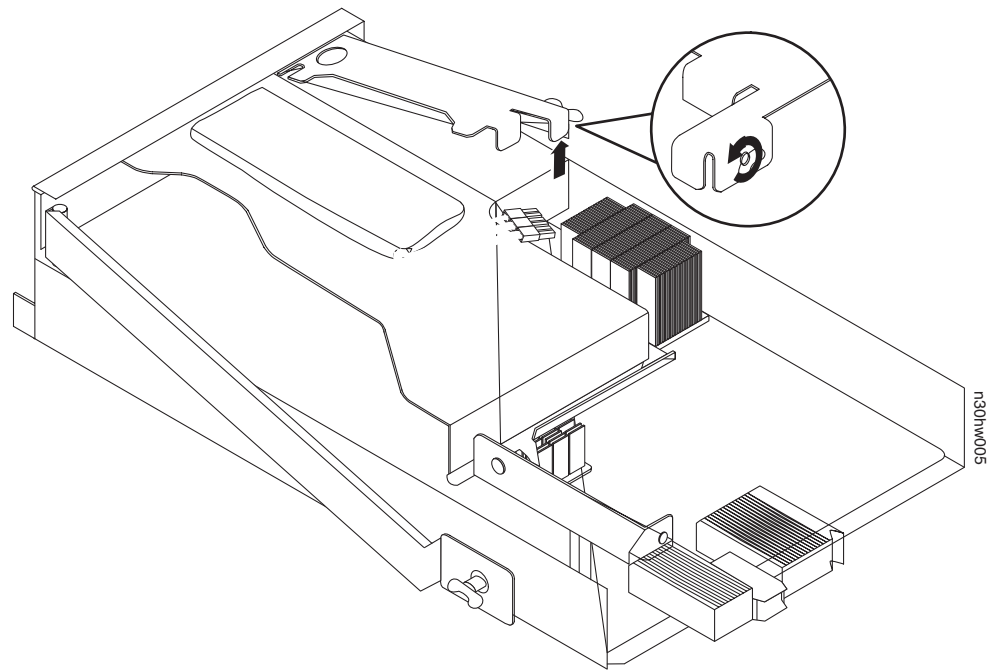
Figure 23. Removing the NVMEM battery from a N3600 system

a. Locate the locking wing nut on the battery cover and push and turn the locking wing nut one quarter turn to the left to unlock it.

b. Swing the cover up and away from the battery.

c. Press the clip on the face of the battery plug to release the lock clip from the plug socket, and unplug the battery cable.

d. Lift the battery out of the holder and controller module.

• **If you have an N3300 system:**
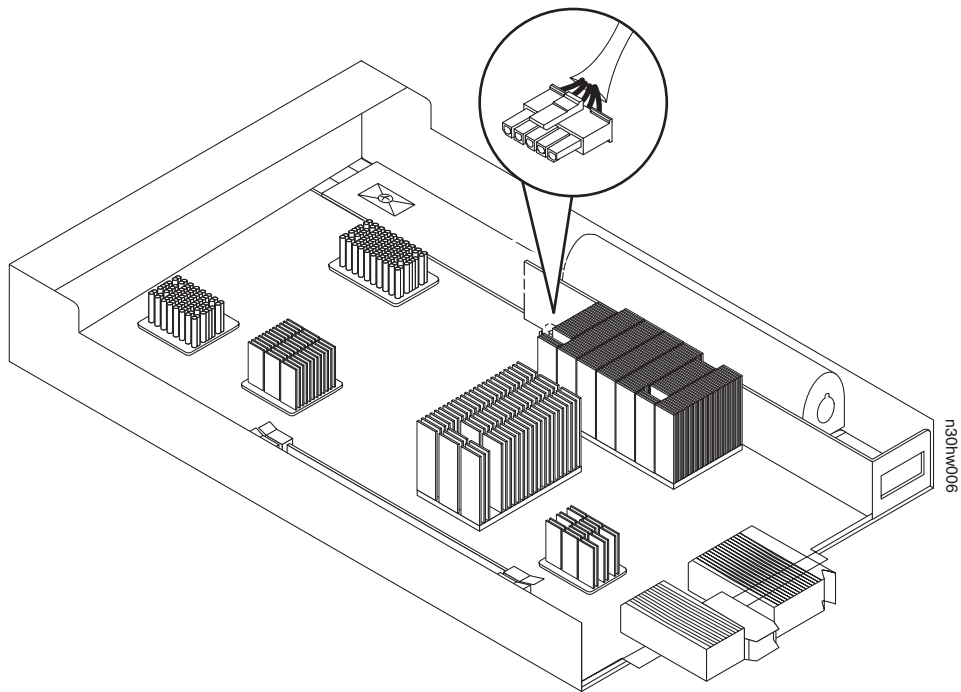
Figure 24. Removing the NVMEM battery from a N3300 system

a. Locate the battery, press the clip on the face of the battery plug to release the lock clip from the plug socket, and unplug the battery cable from the socket.

   Attention: The battery plug is close to a heat sink. The heat sink is very hot immediately after you shut down your system. Let the controller module sit to let the heat sink cool before you attempt to unplug the battery.

b. Lift the battery out of the holder and controller module. It is attached to the controller module with a velcro strip.

Installing the NVMEM battery

1. Use the appropriate instructions for your product to install the battery:

   • **For the N3300:**

   a. Align the battery with the holder in the controller module. Make sure that the plug is facing in the correct direction. Line up the velcro and seat the battery in the holder.

   b. Plug the battery connector into the controller module. The plug should lock down into the socket on the controller module motherboard.

   c. Continue with step 2.

   • **For the N3600:**

   a. Align the battery with the holder in the controller module. Make sure that the plug is facing in the correct direction. Seat the battery in the holder.

   b. Plug the battery connector into the controller module battery socket, making sure the connector locks in place.

   c. Close and lock the battery cover, pushing the locking wing nut and turning it a quarter turn to the right.

d. Continue with step 2.

2. Install the controller module into the system chassis and recable it, as described in "Closing the system" on page 38.

3. Boot the system and check the status of the NVMEM battery from the system command prompt on the console by completing the following substeps:

   a. Press Ctrl-g from the console to go to the Baseboard Management Controller (BMC).

   b. Show the battery status by entering the following command:

   ```
   bmc shell->priv set advanced
   ```

   ```
   bmc shell*->battery show
   ```

   Result:

   The output display shows the following information if the battery is good or charging, and fails if the battery is improperly installed or bad:

   ```
   chemistry :LION
   device-name :bq20z80
   expected-load-mw:81
   id :27100010
   manufacturer :AVT
   manufacture-date:3/16/2006
   rev_cell :1
   rev_firmware :200
   rev_hardware :c0
   serial :00e7
   status :full
   test-capacity :disabled
   ```

   Note: The displayed fields values can change without notice. All fields will be present and have values.

   If this command fails, reinstall the battery and run the test again.

   If the test is completed successfully, go to substep c.

   c. Enter the following command to verify that the battery is charging:

   ```
   bmc shell*->sensors show
   ```

   Result:

   The sensor show display shows the following information if the battery is good:

   `Batt Run Time Critical-Low` (battery is very low and is charging)

   or

   `Batt Run Time Warning-Low` (battery is currently charging)

   Note: When fully charged, the sensor state should be normal. It displays the number of hours of charge held by the battery.

   d. Exit the BMC by entering the following command to return to the system console:

   ```
   system console
   ```

4. Boot the controller module and run diagnostics on the new NVMEM battery (Diagnostics menu option nine), as desired.

   Note: Data ONTAP checks the battery charge during system boot. If the battery is not charged enough to hold the NVMEM contents for a sufficient period, the boot process is stopped until the battery is properly

recharged. The system also prints an error message and gives an override command on the console screen.

If you want to run diagnostics, stop the boot process before `LOADER` completes loading, and enter `boot_diags` from the `LOADER>` prompt. After you complete the tests, exit `LOADER`, boot Data ONTAP, and go to "Resetting the date and time on the controller module." See the *Diagnostics Guide* for information about specific diagnostics tests you can perform.

If you do not want to run diagnostics, go to "Resetting the date and time on the controller module."

Attention: If your system is in an active/active configuration, you must enable it again. Use the `cf enable` command from the partner node's console to enable your active/active configuration.

Resetting the date and time on the controller module

You must reset the date and time on the controller module after reconnecting the NVMEM battery and rebooting Data ONTAP.

1. Display the current date on the node by entering the following command:

    `date`

    Attention: If your system is in an active/active configuration, make sure that you display the date and time on the partner node and set the target node to the same date and time.

2. Set the date by entering the following command:

    `date [-u] [[[CC]yy]mmddhhmm>[.<ss>]]`

    -u sets the date and time to Greenwich Mean Time instead of the local time.

    `CC` is the first two digits of the current year.

    `yy` is the second two digits of the current year.

    `mm` is the current month. If the month is omitted, the default is the current month.

    `dd` is the current day. If the day is omitted, the default is the current day.

    `hh` is the current hour, using a 24-hour clock.

    `mm` is the current minute.

    `ss` is the current second. If the seconds are omitted, the default is 0.

    Example:

    The following command sets the date and time to 22 May 2002 at 9:25 a.m.

    `date 200205220925`

    Note: See the *System Administration Guide* for more information.

3. Go to "Completing the replacement process."

Completing the replacement process

Return the failed part to IBM. Contact IBM Service and Support at 1-800-IBM-SERV (1-800-426-7378) for more information on the return procedure.

Replacing DIMMs in an N3300 and N3600 system

This section describes the following tasks:

- "Removing a DIMM" on page 47
- "Installing a DIMM" on page 49
- "Resetting the date and time on the controller module" on page 49
- "Completing the replacement process" on page 50

Removing a DIMM

1. Shut down the target controller module (called a "node" in an active/active configuration) by completing the applicable procedure:

   - **Shutting down a node in an active/active configuration:**

     a. Check the status of the target node by entering the following command at the system console of either node:

        `cf status`

     b. Take one of the following actions, depending on the result of the `cf status` command:

        If clustering is enabled and neither node is in takeover mode, go to substep c.

        If clustering is enabled and the partner node took over the target node, go to Step 2.

        If clustering is enabled and the target node took over the partner node, correct the problem, run the `cf giveback` command from the target node console, and go back to substep a.

     c. Take over the target node by entering the following command from the partner node's console:

        `partner> cf takeover`

     d. Go to Step 2 when the takeover is complete.

   - **Shutting down a controller module in a single-controller configuration:**

     a. Enter the following command from the system console:

        `halt`

     b. Turn off the power supplies and unplug both power cords from the power source.

     c. Check the nonvolatile memory (NVMEM) LED.

        If the LED is not flashing, go to Step 2.

        If the LED is flashing, there is content in the NVMEM that has not been saved to disk. Reconnect the power supplies to the power source, reboot the controller module, and repeat substeps a through c. If repeated attempts to cleanly shut down the controller module fail, be aware that you might lose any data that was not saved to disk. Go to Step 2.

2. While grounded, remove any cabling from the controller module. Make sure that you keep track of where the cables were connected to the controller module.

3. Remove and open the controller module, as described in "Opening the system" on page 35.

4. Unplug the NVMEM battery by pressing the clip on the face of the battery plug to release the lock clip and unplugging the plug from the socket.

5. Locate the DIMM that you want to remove: DIMM A, DIMM B, or both.

   Attention: You might receive more than one replacement DIMM. You must replace the same number of DIMMs as you receive in your replacement package.

   Figure 25 on page 48 shows the DIMM locations on an N3300 system.
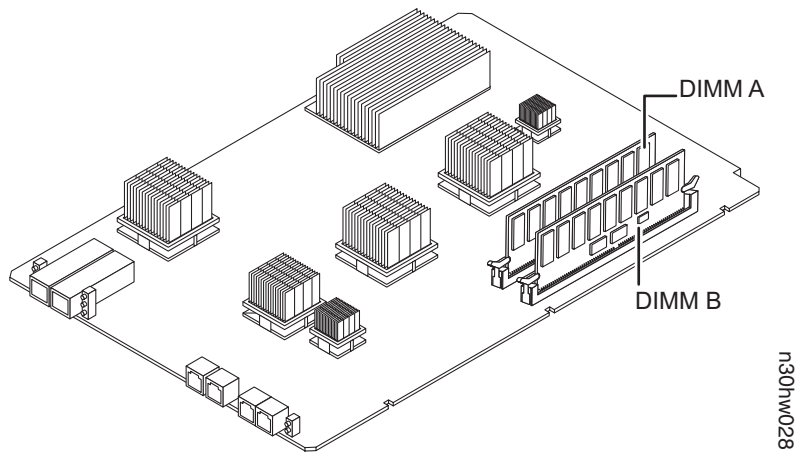
Figure 25. DIMM locations on an N3300 system

Figure 26 shows the DIMM locations on an N3600 system.
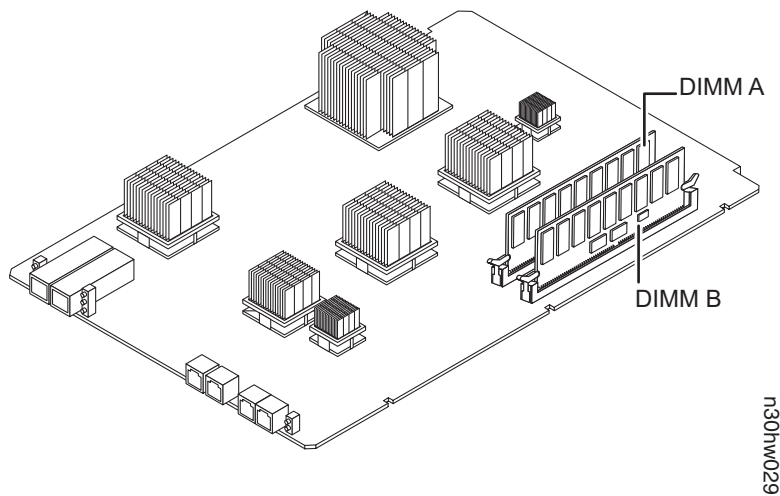

Figure 26. DIMM locations on an N3600 system

> **Note:** For an N3600, you may need to remove the PCI access panel for easier access to the DIMMs. For details on removing this access panel, see step 4 on page 51.

6. Push apart the latches on either side of the DIMM to release the DIMM from its slot, and then lift it out of the slot.
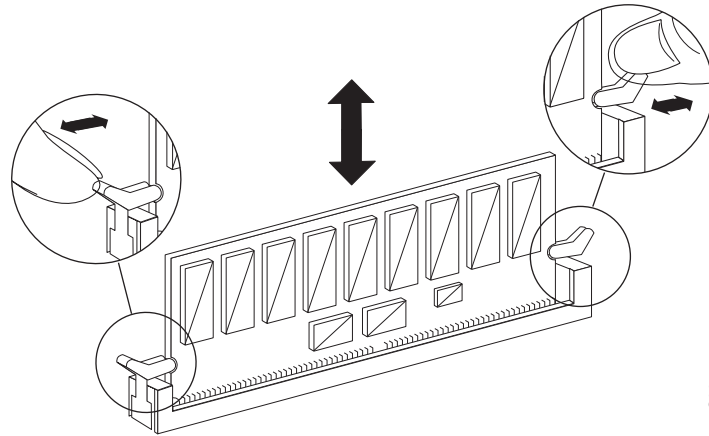
Figure 27. Removing the DIMM

7. Go to "Installing a DIMM."

Installing a DIMM

1. While grounded, remove the replacement DIMM from the antistatic shipping bag.
2. Locate the slot where you are installing the new DIMM.
3. Hold the DIMM by the corners and 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 reinsert it.

   Attention: Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot. The edge connector on the DIMM must make complete contact with the slot.
4. Push carefully, but firmly, on the top edge of the DIMM until the latches snap into place over the notches at the ends of the DIMM.
5. Plug the NVMEM battery into the controller module. Make sure that the plug locks down to the socket on the controller module.
6. Close and boot the system, as described in "Closing the system" on page 38.

   If you want to run diagnostics, stop the boot process before `LOADER` completes loading, and enter `boot_diags` from the `LOADER>` prompt. After you complete the tests, exit `LOADER`, boot Data ONTAP, and go to "Resetting the date and time on the controller module." See the *Diagnostics Guide* for information about specific diagnostics tests you can perform.

   If you do not want to run diagnostics, go to "Resetting the date and time on the controller module."

   Attention: If your system is in an active/active configuration, you must enable it again. Use the `cf enable` command from the partner node's console to enable your active/active configuration.

Resetting the date and time on the controller module

You must reset the date and time on the controller module after reconnecting the NVMEM battery and rebooting Data ONTAP.

1. Display the current date on the node by entering the following command:

   `date`

Attention: If your system is in an active/active configuration, make sure that you display the date and time on the partner node and set the target node to the same date and time.

2. Set the date by entering the following command:

   `date [-u] [[[CC]yy]mmddhhmm>[.<ss>]]`

   -u sets the date and time to Greenwich Mean Time instead of the local time.

   `CC` is the first two digits of the current year.

   `yy` is the second two digits of the current year.

   `mm` is the current month. If the month is omitted, the default is the current month.

   `dd` is the current day. If the day is omitted, the default is the current day.

   `hh` is the current hour, using a 24-hour clock.

   `mm` is the current minute.

   `ss` is the current second. If the seconds are omitted, the default is 0.

   Example:

   The following command sets the date and time to 22 May 2002 at 9:25 a.m.

   `date 200205220925`

   Note: See the *Data ONTAP System Administration Guide* for more information.

3. Go to "Completing the replacement process."

Completing the replacement process

Return the failed part to IBM. Contact IBM Service and Support at 1-800-IBM-SERV (1-800-426-7378) for more information on the return procedure.

Replacing a PCI Card in an N3600 system

This section describes the following tasks:

- "Removing a PCI card"
- "Installing a PCI card" on page 52
- "Completing the replacement process" on page 53

This procedure is written with the following assumptions:

- You are replacing or installing an existing PCIe card; the N3600 does not support PCI-X cards.
- All other components in the system are functioning properly.

If your system does not meet these criteria, contact IBM technical support.

Removing a PCI card

1. Shut down the target controller module (called a "node" in an active/active configuration) by completing the applicable procedure:

   - **Shutting down a node in an active/active configuration**

     a. Check the status of the target node by entering the following command at the system console of either node:

        `cf status`

     b. Take one of the following actions, depending on the result of the `cf status` command:

        – If clustering is enabled and neither node is in takeover mode, go to substep c.

- If clustering is enabled and the partner node took over the target node, go to Step 2.
- If clustering is enabled and the target node took over the partner node, correct the problem, run the `cf giveback` command from the target node console, and go back to substep a.

   c. Take over the target node by entering the following command from the partner node's console:

```
partner> cf takeover
```

   d. Go to Step 2 when the takeover is complete.

- **Shutting down a controller module in a single-controller configuration**

   a. Enter the following command from the system console:

```
halt
```

   b. Turn off the power supplies and unplug both power cords from the power source.

   c. Check the nonvolatile memory (NVMEM) LED.

     If the LED is not flashing, go to Step 2.

     If the LED is flashing, there is content in the NVMEM that has not been saved to disk. Reconnect the power supplies to the power source, reboot the controller module, and repeat substeps a through c. If repeated attempts to cleanly shut down the controller module fail, be aware that you might lose any data that was not saved to disk. Go to Step 2.

2. While grounded, remove any cabling from the controller module. Make sure that you keep track of where the cables were connected to the controller module.

3. Remove and open the controller module, as described in "Opening the system" on page 35.

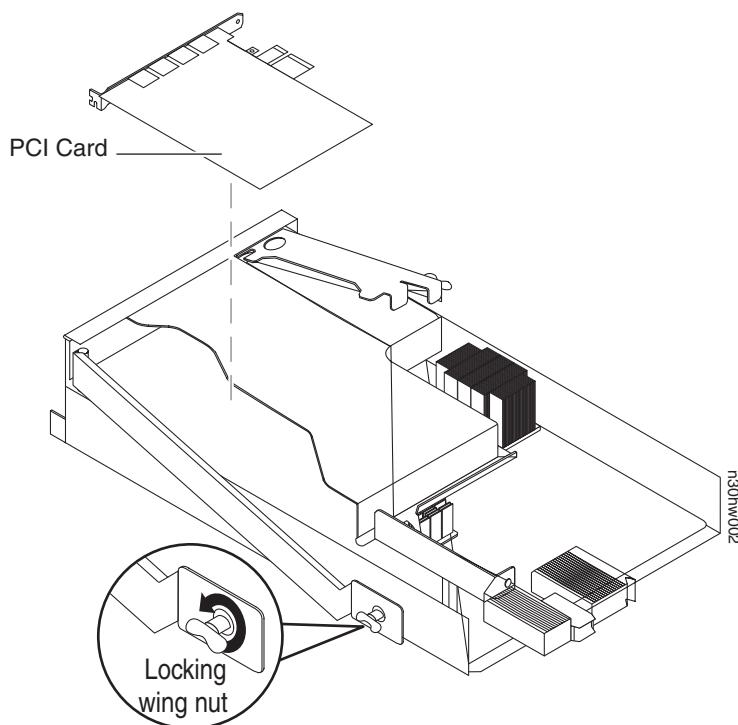4. Remove the target PCI card by completing the following substeps, using Figure 28 on page 52 for reference:

PCI Card

Locking wing nut

n30hw002

Figure 28. Removing a PCI card

    a. Locate the locking wing nut on the side panel and push and turn the locking wing nut one quarter turn to the left to unlock it.

    b. Swing the side panel away from the controller module and lift the panel off the controller module.

    c. Remove the PCI card from the controller module and set it aside.

       Attention: Do not remove the EMI gasket installed in the PCI slot.

    d. Go to "Installing a PCI card."

Installing a PCI card

1. While grounded, shut down the system, remove the controller module from the chassis, and open the chassis, if necessary, as described in "Opening the system" on page 35.

   Attention: The EMI gasket is preinstalled in the N3600 chassis. Do not install the EMI gasket that comes with your PCI card. You could damage the PCI card by installing the gasket and then installing the PCI card.

2. Open the controller module side panel, if necessary, and install the PCI card. Be sure that you properly align the card in the slot and exert even pressure on the card when seating it in the socket.

3. Close and lock the side panel. When locking the side panel, push the locking wing nut and turn it a quarter turn to the right.

4. Reinstall the controller module, as described in "Closing the system" on page 38.

   Attention: If you have an active/active configuration, the system attempts to reboot the node as soon as you completely seat it in the chassis. Do not completely seat the node, but go to Step 5.

5. Cable the PCI card as needed.

Attention: If you have an active/active configuration, seat the node in the chassis, then go to Step 6.

6. Boot the controller module and run diagnostics on the new PCI card, as desired.

If you want to run diagnostics, stop the boot process before `LOADER` completes loading, and enter `boot_diags` from the `LOADER>` prompt. After you complete the tests, exit `LOADER`, boot Data ONTAP, and go to Step 7. See the *Diagnostics Guide* for information about specific diagnostics tests you can perform.

If you do not want to run diagnostics, go to Step 7.

Attention: If your system is an active/active configuration, you must enable it again. Use the `cf enable` command from the partner node's console to enable your active/active configuration.

7. Check the functioning of the new card. Look for the card in the system configuration tables on the controller module, and also check that the card LEDs report traffic or network connections. Make corrections as needed.

8. Go to "Completing the replacement process."

Completing the replacement process

Return the failed part to IBM. Contact IBM Service and Support at 1-800-IBM-SERV (1-800-426-7378) for more information on the return procedure.

Replacing the controller module in an N3300 and N3600 system

The controller module field-replaceable unit (FRU) arrives without the optional PCI card (for N3600 systems only) and the CompactFlash card. You must remove these components from the old controller module and install them in the replacement controller module.

This section describes the following tasks:
- "Removing the controller module"
- "Installing the controller module" on page 55
- "Completing the replacement process" on page 56

This procedure is written with the following assumptions:
- All disk drives are working properly.
- If your system is in an active/active configuration, the partner node can take over the target node.

If your system does not meet these criteria, contact IBM technical support.

Removing the controller module

This section describes the following tasks:
- "Shutting down the controller module"
- "Removing the PCI card" on page 54
- "Removing the CompactFlash card" on page 54

Shutting down the controller module

1. Shut down the target controller module (called a "node" in an active/active configuration) by completing the applicable procedure:
   - **Shutting down a node in an active/active configuration**
     a. Check the status of the target node by entering the following command at the system console of either node:

```
cf status
```
b. Take one of the following actions, depending on the result of the `cf status` command:

   – If clustering is enabled and neither node is in takeover mode, go to substep c.

   – If clustering is enabled and the partner node took over the target node, go to Step 2.

   – If clustering is enabled and the target node took over the partner node, correct the problem, run the `cf giveback` command from the target node console, and go back to substep a.

c. Take over the target node by entering the following command from the partner node's console:

```
partner> cf takeover
```
d. Go to Step 2 when the takeover is complete.

- **Shutting down a controller module in a single-controller configuration**

   a. Enter the following command from the system console:

   ```
   halt
   ```
   b. Turn off the power supplies and unplug both power cords from the power source.

   c. Check the nonvolatile memory (NVMEM) LED.

   If the LED is not flashing, go to Step 2.

   If the LED is flashing, there is content in the NVMEM that has not been saved to disk. Reconnect the power supplies to the power source, reboot the controller module, and repeat substeps a through c. If repeated attempts to cleanly shut down the controller module fail, be aware that you might lose any data that was not saved to disk. Go to Step 2.

2. While grounded, remove any cabling from the controller module. Make sure that you keep track of where the cables were connected to the controller module.

3. Remove and open the controller module, as described in "Opening the system" on page 35.

4. If you have an N3600 with an optional PCI card, go to "Removing the PCI card."

   If you have an N3600 without an optional PCI card, or if you have an N3300, go to "Removing the CompactFlash card."

Removing the PCI card

1. Locate the locking wing nut on the side panel and push and turn the locking wing nut one quarter turn to the left.

2. Swing the side panel away from the controller module.

3. Remove the PCI card and set it on an antistatic mat. Close and lock the side panel back into the chassis. When locking the side panel, push on the locking wing nut and turn it one quarter turn to the right.

4. Replace the controller module cover, as described in "Closing the system" on page 38.

5. Go to "Removing the CompactFlash card."

Removing the CompactFlash card

1. Locate the CompactFlash compartment on the underside of the controller module, to the right of center near the I/O ports.

2. Firmly push on the CompactFlash cover, slide the cover toward the rear (for the N3600) or toward the side (for the N3300) of the controller module, and lift the cover off of the controller module.

3. Slide the CompactFlash card out of the controller module and set it on an antistatic mat.

4. Go to "Installing the controller module."

Installing the controller module

This section describes the following tasks:

- "Installing the CompactFlash card"
- "Installing a PCI card"

Installing the CompactFlash card

1. While grounded, install the old CompactFlash card into the new controller module by aligning the CompactFlash card with the edges of the CompactFlash card slot in the new controller module. Seat the CompactFlash card by pushing it into the CompactFlash reader. The CompactFlash card should be squarely seated and should not move. Reseat the CompactFlash card, if necessary.

2. Reinstall the CompactFlash cover onto the controller module.

3. Go to "Installing a PCI card."

Installing a PCI card

1. Remove the cover from the new controller module, as described in "Opening the system" on page 35.

2. Locate the locking wing nut on the side panel and push and turn the locking wing nut one quarter turn to the left.

3. Swing the side panel away from the controller module.

4. Install the PCI card by properly aligning the card in the slot and exerting even pressure on the card when seating it in the socket.

5. Close and lock the side panel. When locking the side panel, push on the locking wing nut and turn it a quarter turn to the right.

6. Install the controller module into the system, as described in "Closing the system" on page 38.

7. Go to "Rebooting the controller module."

Rebooting the controller module

1. Reboot the controller module and press Ctrl-C to interrupt the boot process.

2. Select Maintenance mode from the boot menu.

3. Check the new system ID, all disks, and the old system ID by entering the following command:

   ```
   disk show -v
   ```

4. Reassign disk ownership by entering the following command:

   - If the controller module is a node in an active/active configuration, complete the following substeps:

     a. Enter the following command from the partner node:

        ```
        priv set advanced
        ```

     b. Reassign the disks to the new controller, using the new system ID you obtained in Step 3, by entering the following command from the partner console:

        ```
        disk reassign -o old systemname -d new system ID
        ```

- If the controller module is part of a single-controller system, enter the following command at the Maintenance mode prompt:

  `disk reassign -o old systemname`

5. Check to ensure that the disks were assigned correctly by examining the output from the following command:

   `disk show -v`

6. Run diagnostics, if desired, by entering the following commands:

   `halt`

   `LOADER> boot_diags`

   Run the appropriate test, examine the results and make the appropriate changes, then exit Diagnostics.

7. Boot the system by entering the following command:

   `boot`

   If your system is an active/active configuration, the message `Waiting for Giveback` is displayed during the boot process. you must enable it again. Complete the boot process by entering the `cf enable` command from the partner node's console to enable your active/active configuration.

   Attention: If the message `Waiting for Giveback` is not displayed prior to giveback, reboot the controller module. If this continues, contact IBM technical support.

8. Go to "Completing the replacement process."

Completing the replacement process

Return the failed part to IBM. Contact IBM Service and Support at 1-800-IBM-SERV (1-800-426-7378) for more information on the return procedure.

Replacing a CompactFlash card in a single controller N3300 or N3600 system

This section describes the following tasks:
- "Replacing the CompactFlash card in a single controller system" on page 57
- "Completing the replacement process" on page 59

You also need the following documentation to perform the identified procedures:
- *Data ONTAP Upgrade Guide*, as applicable
- *Data ONTAP Commands: Manual Page Reference*, if applicable
- *Data ONTAP System Administration Guide*, if applicable

This procedure is written with the following assumptions:
- You are replacing the CompactFlash card in a system with a single controller module.
- You have access to either a PC with a card reader/writer and with access to the IBM Web site or access to a networked system for netboot.
- All other components in the system are functioning properly.

If your system does not meet these criteria, contact IBM technical support.

Replacing the CompactFlash card in a single controller system

This section describes the following tasks:

- "Removing the CompactFlash card"
- "Installing the CompactFlash card" on page 58
- "Placing the system files on the CompactFlash card" on page 58
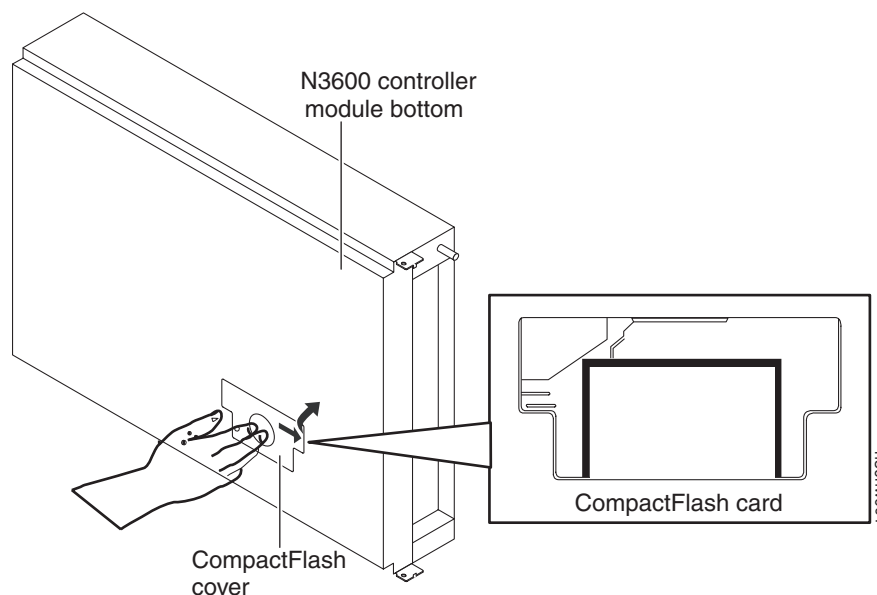- "Updating the CompactFlash card" on page 59

Removing the CompactFlash card

Figure 29. Removing the CompactFlash card

1. Shut down the target controller module by completing the following subprocedure:

   a. Enter the following command from the system console:

      `halt`

   b. Turn off the power supplies and unplug both power cords from the power source.

   c. Check the nonvolatile memory (NVMEM) LED.

      If the LED is not flashing, go to Step 2.

      If the LED is flashing, there is content in the NVMEM that has not been saved to disk. Reconnect the power supplies to the power source, reboot the controller module, and repeat substeps a through c. If repeated attempts to cleanly shut down the controller module fail, be aware that you might lose any data that was not saved to disk. Go to Step 2.

2. While grounded, remove any cabling from the controller module. Make sure that you keep track of where the cables were connected to the controller module.

3. Remove and open the controller module, as described in "Opening the system" on page 35

4. Locate the CompactFlash compartment on the underside of the controller module, to the right of center near the I/O ports, and remove the CompactFlash cover.

5. Slide the CompactFlash card out of the controller module and set it on an antistatic mat.

Installing the CompactFlash card

Attention: If you are copying the system files to the CompactFlash card using a PC or laptop with a card writer, you must copy the system files to the CompactFlash card prior to installing it in the controller module. See "Transferring the system files using a PC or laptop" on page 59 for information.

1. While grounded, align the CompactFlash card with the edges of the CompactFlash card slot. Seat the CompactFlash card by sliding it into the CompactFlash reader. The CompactFlash card should be squarely seated and should not move. Reseat the CompactFlash card, if necessary.

2. Install the CompactFlash cover.

3. Reinstall the controller module, as described in"Closing the system" on page 38.

4. Cable the controller module as needed.

5. Go to "Placing the system files on the CompactFlash card."

Placing the system files on the CompactFlash card

This section describes the following tasks:

- "Transferring the system files using netboot"
- "Transferring the system files using a PC or laptop" on page 59

> **Note:** This procedure is written with the assumption that you have access to a PC running Windows® XP or higher and have a zip program.

Transferring the system files using netboot:

1. Per the recommendations in the *Upgrade Guide*, place the system files on the server you use for netbooting. You can copy the system files from the system boot directory, at /etc/boot/x86_elf, or download them from the following Web site:

   www.ibm.com/storage/support/nas/

2. Turn on your system and press Ctrl-C to stop the boot process at the `LOADER>` prompt.

3. Configure your network connection, if needed.

   If you have DHCP running on your network, enter the following command at the prompt:

   `ifconfig e0a -auto`

   If you do not have DHCP running, configure the connection by entering the following command at the prompt:

   `ifconfig e0a -addr=filer_addr -mask=netmask -gw=gateway -dns=dns_addr -domain=dns_domain`

   `filer_addr` is the IP address of the system.

   `netmask` is the network mask of the system.

   `gateway` is the gateway for the system.

   `dns_addr` is the IP address of a name server on your network.

   `dns_domain` is the DNS domain name.

4. Enter the following command at the `LOADER>` prompt:

   `netboot URL`

   `URL` is the location of the remote system files. It can be either an HTTP or a TFTP network path.

5. At the Special Boot Menu, select Option 1 for Normal Boot.

6. Go to "Updating the CompactFlash card."

Transferring the system files using a PC or laptop:

1. Download `<rlse>_setup_e.exe` to your PC.

   `rlse` is the Data ONTAP release you are using.

   You can download the system files from the following Web site.

   www.ibm.com/storage/support/nas/

   You can also copy the system files from the system boot directory of another system at `/etc/boot/x86_elf`. Contact technical support if you cannot get the system files from these sources.

   Attention: Make sure that you download the correct file, designated for PC administration.

2. Extract the contents of `<rlse>_setup_e.exe` to a temporary folder on your PC.

3. Insert the CompactFlash card into the CompactFlash card reader.

   Note: The CompactFlash card is pre-formatted. Do *not* format the CompactFlash card.

4. Create a folder called `x86_elf` in the root partition of the CompactFlash card, and then create a subfolder called `KERNEL` in the `x86_elf` folder.

5. In the `\boot` folder, copy the file `netapp_<rlse>-x86` into the `KERNEL` subfolder in Windows Explorer.

6. Rename the file `netapp_<rlse>-x86` to `Primary.KRN`.

7. Install the CompactFlash card with the kernel image into the system.

8. Go to "Updating the CompactFlash card."

Updating the CompactFlash card

1. Download the system files to the CompactFlash card by entering the following command:

   `download`

   Attention: If the download fails with the following error message, you must run `setup` to reinstall the proper files on the system that enable you to execute the `download` command on the CompactFlash card:

   `Failed to open download script file /etc/boot/x86_elf/kernel_1024.cmds:`
   `No such file`
   `[download.requestDoneError:error]: Operator requested download failed,`

2. Check the version of the image by entering the following command:

   `version -b`

3. Reboot the system by entering the following command:

   `reboot`

4. Go to "Completing the replacement process."

Completing the replacement process

Return the failed part to IBM. Contact IBM Service and Support at 1-800-IBM-SERV (1-800-426-7378) for more information on the return procedure.

Nondisruptively replacing a CompactFlash card in an N3300 or N3600 active/active configuration

This section describes how to nondisruptively replace the CompactFlash card in an N3300 and N3600 system active/active configuration. Specifically, it describes the following tasks:

- "Preparing for the CompactFlash card replacement"
- "Removing the CompactFlash card" on page 61
- "Installing the replacement CompactFlash card" on page 61
- "Completing the replacement process" on page 64

You also need the following documentation to perform the identified procedures:

- *Data ONTAP Upgrade Guide*, as applicable
- *Data ONTAP Commands: Manual Page Reference*, if applicable
- *Data ONTAP System Administration Guide*, if applicable

This procedure is written with the following assumptions:

- You are replacing the CompactFlash card in a system with an active/active configuration.
- You have access to either a PC with a card reader/writer and with access to the IBM site or access to a networked system for netboot.
- You can perform a takeover of the target node.
- All other components in the system are functioning properly.

If your system does not meet these criteria, contact IBM technical support.

Preparing for the CompactFlash card replacement

1. Check the status of the active/active configuration.

   If you can connect to the target node through normal means, complete the following substeps:

   a. Check that the active/active configuration is enabled by entering the following command:

      `cf status`

      If it is enabled, go to substep b.

      If it is not enabled, enable it by entering the following command:

      `cf enable`

   b. Take over the target node by entering the following command from the partner console:

      `cf takeover`

   c. Connect the console to the target node.

      If the target node prompts you with the message: `Waiting for giveback..... (Press Ctrl-C to abort wait)`, press Ctrl-C and then answer `y` to the prompt `Do you wish to halt this node rather than wait [y/n]?`

   d. Go to Step 2.

   If you cannot connect to the target node through normal means and the node is receiving power, complete the following substeps:

   a. Connect a console directly to the target node through the marked console port. Follow the manufacturer's installation instructions for configuration. The

`LOADER>` prompt should be accessible after the console connection is established. If it is not, contact technical support.

   b. Boot the system from the backup system files on the CompactFlash card. You might need to rename the backup system file so that it boots as the primary file.

   c. Return to the partner node and enable clustering by entering the following command:

```
cf enable
```

   d. Take over the target node by entering the following command from the partner console:

```
cf takeover
```

   e. Press Ctrl-C during the node reboot to go to the `LOADER>` prompt.

   f. Go to Step 2.

2. At the `LOADER>` prompt, display the environment variables for the target node by entering the following command:

```
printenv
```

3. Copy the values for the variables and save them for later use when you restore the environment variables on the new CompactFlash card.

4. Go to the partner console and enter the following command:

```
partner fcadmin config
```

5. Copy the values for the onboard Fibre Channel settings and save them for later use when you restore the settings on the new CompactFlash card.

6. Copy the system files to the replacement CompactFlash card.

You can choose from one of three methods:

- If you have access to the IBM Web site and a server, use the procedure described in "Transferring the system files using netboot."
- If you have access to the IBM Web site and have a PC with a CompactFlash reader/writer, use the procedure described in "Transferring the system files using a PC or laptop" on page 62.

Removing the CompactFlash card

1. While grounded, remove any cabling from the controller module. Make sure that you keep track of where the cables were connected to the controller module.

2. Locate the CompactFlash compartment on the underside of the controller module, to the right of center near the I/O ports, and remove the cover.

3. Slide the CompactFlash card out of the controller module and set it on an antistatic mat.

4. Go to "Installing the replacement CompactFlash card."

Installing the replacement CompactFlash card

This section describes the following tasks:

- "Transferring the system files using netboot"
- "Transferring the system files using a PC or laptop" on page 62

Transferring the system files using netboot

1. Make sure that you are properly grounded.

2. Per the recommendations in the *Data ONTAP Upgrade Guide*, place the system files on the server you use for netbooting. You can copy the system files from the system boot directory, at /etc/boot/x86_elf, or download them from the following Web site:

   www.ibm.com/storage/support/nas/

3. Align the CompactFlash card with the edges of the CompactFlash card slot. Seat the CompactFlash card by sliding it into the CompactFlash reader. The CompactFlash card should be squarely seated and should not move. Reseat the CompactFlash card, if necessary.

4. Install the CompactFlash cover.

5. Reinstall the controller module into the system and recable it, as described in "Closing the system" on page 38.

   Note: The node starts to reboot as soon as you insert it fully back into the chassis.

6. Press Ctrl-C to stop the boot process and go to the `LOADER>` prompt.

7. Configure your network connection, if needed.

   If you have DHCP running on your network, enter the following command at the prompt:

   `ifconfig e0a -auto`

   If you do not have DHCP running, configure the connection by entering the following command at the prompt:

   `ifconfig e0a -addr=filer_addr -mask=netmask -gw=gateway -dns=dns_addr -domain=dns_domain`

   `filer_addr` is the IP address of the system.

   `netmask` is the network mask of the system.

   `gateway` is the gateway for the system.

   `dns_addr` is the IP address of a name server on your network.

   `dns_domain` is the DNS domain name.

8. Enter the following command at the `LOADER>` prompt:

   `netboot URL`

   `URL` is the location of the remote system files from Step 2. It can be either an HTTP or a TFTP network path.

9. At the Special Boot Menu, select Option 1 for Normal Boot. Wait until you receive the prompt: `waiting for giveback....`(Press Ctrl-C to abort wait)

10. On the partner node, type the following command:

    `cf giveback`

11. After the target node completes booting, go to "Updating the CompactFlash card" on page 63.

Transferring the system files using a PC or laptop

1. Download `<rlse>_setup_e.exe` to your PC.

   `rlse` is the Data ONTAP release you are using.

   You can download the system files from www.ibm.com/storage/support/nas/. You can also copy the system files from the system boot directory of another storage system at /etc/boot/x86_elf. Contact technical support if you cannot get the system files from these sources.

   Attention: Make sure that you download the correct file, designated for PC administration.

2. Extract the contents of `<rlse>_setup_e.exe` to a temporary folder on your PC.

3. Insert the CompactFlash card into the CompactFlash card reader.

   Note: The CompactFlash card is pre-formatted. Do *not* format the CompactFlash card.

4. Create a folder called `x86_elf` in the root partition of the CompactFlash card, and then create a subfolder called `KERNEL` in the `x86_elf` folder.

5. In the `\boot` folder, copy the file `netapp_<rlse>-x86` into the `KERNEL` subfolder in Windows Explorer.

6. Rename the file `netapp_<rlse>-x86` to `Primary.KRN`.

7. Make sure that you are properly grounded and install the CompactFlash card into the controller module.

8. Install the CompactFlash cover.

9. Reinstall the controller module into the system and recable it, as described in "Closing the system" on page 38.

   Note: The node tries to reboot as soon as you insert it back into the chassis. After booting it will display the following message: `Waiting for giveback`

10. On the partner node, type the following command: `cf giveback`.

11. After the target node completes booting, go to "Updating the CompactFlash card."

Updating the CompactFlash card

1. Download the system files to the CompactFlash card by entering the following commands:

   `download`

   Attention: If the download fails with the following error message, you must run `setup` to reinstall the proper files on the system that enable you to execute the `download` command on the CompactFlash card:
   `Failed to open download script file /etc/boot/x86_elf/kernel_1024.cmds: No such file`
   `[download.requestDoneError:error]: Operator requested download failed,`

2. Check the version of the image by entering the following command:

   `version -b`

3. Reboot the system by entering the following command:

   `reboot`

4. Press Ctrl-C to stop the system at the `LOADER>` prompt, then go to "Restoring environment variables and onboard Fibre Channel port configurations."

Restoring environment variables and onboard Fibre Channel port configurations

1. Retrieve the environment variables you saved in "Preparing for the CompactFlash card replacement" on page 60.

2. Enter the following command for each variable you must reset:

   `setenv variable "value"`

   `variable` is the variable name.

   `value` is the setting you are assigning to the variable.

3. Boot Data ONTAP by entering the following command from the target node's console:

   `boot_ontap`

4. Check the configuration of the onboard Fibre Channel ports by entering the following command:

`fcadmin config`

If the displayed information is the same as what you captured for the onboard Fibre Channel ports in Step 5 of "Preparing for the CompactFlash card replacement" on page 60, then go to "Completing the replacement process."

If the displayed information is different from what you captured for the onboard Fibre Channel ports, complete the following substeps:

   a. Reboot the node and press Ctrl-C when `Press CTRL-C for special boot menu` appears.

   b. Press Ctrl-C again when `Press CTRL-C for Maintenance menu to release disks` appears.

   c. Confirm disk release when prompted.

   d. Reset the Fibre Channel ports in one of three ways:
      • To reset the target ports, enter the following command for each port:

      `fcadmin config -t target adapter_name`

      • To reset the initiator ports, enter the following command for each port:

      `fcadmin config -t initiator adapter_name`

      • To reset the ports to unconfigured, enter the following command for each port:

      `fcadmin config -t unconfig adapter_name`

5. Halt the system by entering the `halt` command, then boot Data ONTAP.

6. Go to "Completing the replacement process."

Completing the replacement process

Return the failed part to IBM. Contact IBM Service and Support at 1-800-IBM-SERV (1-800-426-7378) for more information on the return procedure.

Appendix A. Recommended power line sizes

This appendix discusses how to determine the power line lengths running from your system to the power source.

Recommended AC power line sizes

Longer AC power feeds need to be properly designed to preserve voltage levels to the equipment. The wiring from the breaker panel to the power strip, which supplies power to your system and expansion units, can often exceed 50 feet.

Note: Total AC wire length = breaker to wall or ceiling outlet + extension cable or ceiling drop.

The following table lists the recommended conductor size for 2% voltage drop for a particular distance in feet (taken from the *Radio Engineer's Handbook*).

Table 22. 110V, single phase recommended conductor sizes

110V, single-phase	20A circuit	30A circuit	40A circuit	50A circuit
25 feet	12 AWG	10 AWG	8 AWG	8 AWG
50 feet	8 AWG	6 AWG	6 AWG	4 AWG
75 feet	6 AWG	4 AWG	4 AWG	2 AWG

Table 23. 220V, single phase recommended conductor sizes

220V, single-phase	20A circuit	30A circuit	40A circuit	50A circuit
25 feet	14 AWG	12 AWG	12 AWG	10 AWG
50 feet	12 AWG	10 AWG	8 AWG	8 AWG
75 feet	10 AWG	8 AWG	6 AWG	6 AWG

The following table list the approximate equivalent wire gauge (American Wire Gauge (AWG) to Harmonized Cordage).

Table 24. American Wire Gage to Harmonized Cordage equivalents

AWG	8	10	12
Harmonized, mm-mm [1]	4.0	2.5	1.5

[1] mm-mm = millimeter squared

Appendix B. FRU/CRU and power cord list for N series products

This appendix contains information about FRU/CRUs and power cords for N series products.

FRU/CRU list for N series products

For the most current FRU/CRU list for your N series product, see the following Web site:

www.ibm.com/storage/support/nas/

Power cord list for N series products

The following list details the power cord feature codes (FCs) for N series products.

FC 9000 (All countries)
Power cord, Rack PDU

- 27 inches
- Rated 250 V/15 A
- Product end uses C14; PDU end uses C13.

FC 9001 Europe and others
Provides power cords for Austria, Belgium, Bolivia, Bulgaria, Chile, Croatia, Czech Republic, Egypt, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Latvia, Lebanon, Lithuania, Luxemburg, Morocco, Netherlands, Norway, Peru, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Suriname, Sweden, Turkey

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 211 (CEE 7-VII) designed for 200-240 V ac input.

FC 9002 United Kingdom and others
Provides power cords for United Kingdom, Costa Rica, Cyprus, Guyana, Hong Kong, Ireland, Kuwait, Malta, Oman, Singapore, Sri Lanka

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 210 (13A fuse) designed for 200-240 V ac input.

FC 9003 Japan
Provides power cords for Japan

- 1.83 m (6 feet), unshielded, rated 125 V/15 A.
- Attached plug EL 302 (JIS C3306) designed for 100-110 V ac input.

FC 9004 U.S., Six Feet (2 m)
Provides power cords for U.S., Canada, Mexico, Belize, Columbia, Ecuador, El Salvador, Guatemala, Honduras, Korea, Nicaragua, Panama, Philippines, Puerto Rico, Saudi Arabia, Thailand, Venezuela

- 1.83 m (6 feet), unshielded, rated 125 V/15 A.
- Attached plug EL 302 (Nema 5-15P) designed for 100-120 V ac input.

FC 9005 Australia, New Zealand
Provides power cords for Australia, New Zealand, Uruguay

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 206 (AS 3112) designed for 200-240 V ac input.

FC 9006 Switzerland, Liechtenstein

Provides power cords for Switzerland, Liechtenstein

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 203 (SEV 1011) designed for 200-240 V ac input.

FC 9007 Argentina

Provides power cords for Argentina

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 219 (IRAM 2073) designed for 200-240 V ac input.

FC 9008 China

Provides power cords for China

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 602 (GB 2099/GB 1002) designed for 200-240 V ac input.

FC 9009 Denmark

Provides power cords for Denmark

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 213 (DHCR 107-2-D1) designed for 200-240 V ac input.

FC 9010 India, Pakistan, South Africa

Provides power cords for India, Macau, Pakistan, South Africa

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 208 (BS 164-1, BS 546) designed for 200-240 V ac input.

FC 9011 Israel

Provides power cords for Israel

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 212 (SI 32) designed for 200-240 V ac input.

FC 9012 Italy

Provides power cords for Italy

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 502 (CEI 23-16) designed for 200-240 V ac input.

FC 9013 North America (250 V)

Provides power cords for U.S.

- 1.83 m (6 feet), unshielded, rated 250 V/15 A.
- Attached plug EL 309 (NEMA 6-15P) designed for 200-240 V ac input.

FC 9014 Brazil

Provides power cords for Brazil

- 2.5 m (9 feet), unshielded, rated 250 V/10 A.
- Attached plug EL 211 (NBR 6147/2000) designed for 200-240 V ac input

FC 9015 Taiwan

Provides 125 V power cords for Taiwan

- 2.5 m (9 feet), unshielded, rated 125 V/15 A.
- Attached plug EL 302 (CNS 10917-3) designed for 100-120 V ac input.

FC 9016 Taiwan (250 V)

Provides 250 V power cords for Taiwan

- 1.83 m (6 feet), unshielded, rated 250 V/10 A.

- Attached plug EL 610 (CNS 10917, CNS 690) designed for 250 V ac input.

Appendix C. Optional adapter cards (N3600 only)

IBM supports the following optional PCIe adapter cards in the N3600.

Note: The N3300 does not support optional adapter cards.

Table 25. Optional adapter cards supported by the N3600

Feature Code	Feature Code Description
1012	Dual-port Gigabit Ethernet (GbE) adapter (optical)
1013	Dual-port 10/100/1000 Ethernet adapter (copper)
1014	Dual-port 4-Gbps FC HBA for disk attachment
1015	Dual-port 4-Gbps FC HBA for tape attachment
1021	Dual-port GbE iSCSI target adapter (optical)
1024	Dual-port SCSI Ultra320 HBA for tape attachment
1026	Dual-port Gigabit Ethernet iSCSI target adapter (copper)
1029	Quad-port 4-Gbps Fibre Channel HBA for disk attachment

For the single-node models, the total number of PCIe adapters cannot exceed one. For the dual-node models the total number of PCIe adapters cannot exceed two.

For information about monitoring the LEDs for your optional adapter cards, refer to the *IBM System Storage N series Platform Monitoring Guide*.

Dual-port Gigabit Ethernet (GbE) adapter (optical) (FC 1012)

Feature code 1012 is a dual-port Gigabit Ethernet (1000BASE-SX) adapter. This adapter has two LC duplex connectors and supports a maximum distance of 275m using 62.5-micron MMF media and 550m using 50-micron MMF media.

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

Dual-port 10/100/1000 Ethernet adapter (copper) (FC 1013)

Feature code 1013 is a dual-port 10/100/1000 Ethernet adapter. This adapter supports 10BASE-T, 100BASE-TX and 1000BASE-T Ethernet standards. This adapter has two RJ-45 connectors and supports a maximum distance of 100m using Category 5 or better unshielded twisted pair (UTP) four-pair media.

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

Dual-port 4-Gbps FC HBA for disk attachment (FC 1014)

Feature code 1014 is a dual-port 4-Gbps Fibre Channel HBA. This adapter auto-negotiates to 4, 2 and 1 Gbps. This adapter may only be used for attaching storage expansion units (EXN1000, EXN2000, and EXN4000). The FC ports on this adapter may not be used as FCP target ports.

This adapter has two small form factor (SFF) multi-mode optics with LC-style connectors. This adapter supports the following maximum cable lengths.

Table 26. Dual-port 4 Gbps FC HBA for disk - maximum cable lengths

Link operating speed	50 micron multi-mode fibre	62.5 micron multi-mode fibre
1 Gbps	500m	300m
2 Gbps	300m	150m
4 Gbps	150m	70m

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

Dual-port 4-Gbps FC HBA for tape attachment (FC 1015)

Feature code 1015 is a dual-port 4-Gbps Fibre Channel HBA for tape attachment. This adapter auto-negotiates to 4, 2 and 1 Gbps.

This adapter has two SFF multi-mode optics with LC-style connectors. This adapter supports the following maximum cable lengths.

Table 27. Dual-port 4-Gbps FC HBA for tape - maximum cable lengths

Link operating speed	50 micron multi-mode fibre	62.5 micron multi-mode fibre
1 Gbps	500m	300m
2 Gbps	300m	150m
4 Gbps	150m	70m

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

This feature code includes a 50-micron optical loopback cable with LC connectors.

Dual-port GbE iSCSI target adapter (optical) (FC 1021)

Feature code 1021 is a Gigabit Ethernet iSCSI PCIe TCP/IP offload engine (TOE) adapter that provides two optical LC duplex connectors for connection to iSCSI hosts.

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

SCSI Ultra320 HBA for tape attachment (FC 1024)

Feature code 1024 is a SCSI Ultra320 dual-channel host bus adapter (HBA) designed to support connection to a tape device. The adapter includes two 68-pin VHDCI external connectors (Channel A and Channel B). Two SCSI LVD two-meter cables (for connecting to the tape device) are included. These cables have 68-pin VHDCI connectors on each end.

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

Dual-port Gigabit Ethernet iSCSI target adapter (copper) (FC 1026)

Feature code 1026 is a gigabit Ethernet iSCSI target PCIe adapter that provides two Ethernet iSCSI ports to be configured as target connections for iSCSI hosts.

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

Quad-port 4-Gbps Fibre Channel HBA for disk attachment (FC 1029)

Feature code 1029 is a PCIe quad-port 4-Gbps HBA for attaching disk expansion units (EXN1000, EXN2000, and EXN4000) to N series storage controllers. This adapter auto-negotiates connections of 1-Gbps, 2-Gbps, or 4-Gbps. Four small form factor (SFF) multimode optical ports with LC connectors support the following cable lengths:

Table 28. Quad-port 4-Gbps Fibre Channel HBA for disk attachment (FC 1029) - maximum cable lengths

Link operating speed	50 micron multi-mode fibre	62.5 micron multi-mode fibre
1 Gbps	500 meters	300 meters
2 Gbps	300 meters	150 meters
4 Gbps	150 meters	70 meters

The ports of this adapter may not be used as FCP target ports.

For a single-node model (2862-A10), the maximum number of this adapter is one. For a dual-node model (2862-A20), the maximum number of this adapter is two.

Appendix D. IBM System Storage N series documentation

The following lists present an overview of the IBM System Storage N series hardware and Data ONTAP product libraries, as well as other related documents.

You can access the documents listed in these tables at the following Web site:

www.ibm.com/storage/support/nas/

N7000 series systems library

- *IBM System Storage N7000 Series Hardware and Service Guide*, GC26-7953
- *IBM System Storage N7000 Series Filer Installation and Setup Instructions*, GC26-7954
- *IBM System Storage N7000 Series Gateway Installation and Setup Instructions*, GC26-7956

N5000 series systems library

- *IBM System Storage N5000 Series Hardware and Service Guide*, GC26-7785
- *IBM System Storage N5000 Series Filer Installation and Setup Instructions*, GC26-7784
- *IBM System Storage N5000 Series Gateway Installation and Setup Instructions*, GC26-7838

N3300 and N3600 storage systems library

- *IBM System Storage N3300 and N3600 Hardware and Service Guide*, GC27-2087
- *IBM System Storage N3300 Installation and Setup Instructions*, GC27-2086
- *IBM System Storage N3600 Installation and Setup Instructions*, GC27-2089

N3700 storage system library

- *IBM System Storage N3700 Hardware and Service Guide*, GA32-0515
- *IBM System Storage N3700 Installation and Setup Instructions*, GA32-0517

EXN1000, EXN2000 and EXN4000 expansion units library

- *IBM System Storage EXN1000 Storage Expansion Unit Hardware and Service Guide*, GC26-7802
- *IBM System Storage EXN1000 Installation and Setup Instructions*, GC26-7786
- *IBM System Storage EXN2000 Storage Expansion Unit Hardware and Service Guide*, GA32-0516
- *IBM System Storage EXN2000 Installation and Setup Instructions*, GC27-2064
- *IBM System Storage EXN4000 Storage Expansion Unit Hardware and Service Guide*, GC27-2080
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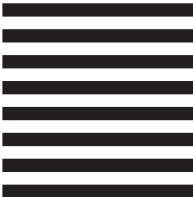Fold and Tape   **Please do not staple**   Fold and Tape

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