IBM System Storage N series

N3700 Hardware and Service Guide

GA32-0515-04

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GA32-0515-04

Note:
Before using this information and the product it supports, be sure to read the general information in “Notices” on page 65.

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

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.

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

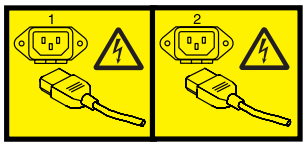
As an added precaution, safety labels are often installed directly on products or product components to warn of potential hazards.

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-optic 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

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

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.**

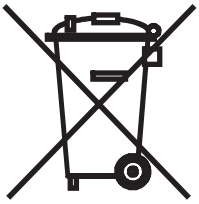
(R002)

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:

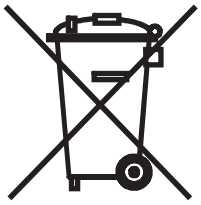
www.ibm.com/ibm/environment/products/batteryrecycle.shtml

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 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.

Contents

Figures

Tables

About this document

This guide describes how to connect, manage, and troubleshoot an IBM System Storage™ N3700 (model number 2863-A10 or 2863-A20) storage system.

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

Compliance ID 2863–NAS covers the following models: 2863–A10, 2863–A20, and 2863–001.

Who should read this document

This guide is for qualified system administrators and service personnel who are familiar with IBM storage systems.

Supported features

IBM System Storage N series filers 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 an N3700 storage system,” on page 7 describes how to connect an N3700 storage system.
- Chapter 3, “Configuring an N3700 storage system,” on page 11 describes how to configure an N3700 storage system.
- Chapter 4, “Monitoring your system,” on page 19 describes how to monitor your system based on the LEDs for your system.
- Chapter 5, “Replacing N3700 storage system devices,” on page 27 describes how to replace disks and other devices in your N3700 storage system.
- Chapter 6, “Error messages and troubleshooting,” on page 43 lists error messages you might encounter during the boot process and provides troubleshooting information.
- Appendix A, “Recommended power line sizes,” on page 55 discusses how to determine the power line lengths running from your N3700 storage system to the power source.

- Appendix B, “FRU/CRU and power cord list for N series products,” on page 57 lists the feature codes for the power cords and FRU/CRUs for the EXN4000 expansion unit.

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:

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.
- Refer to the IBM Support Web site for information on 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/

Accessing online technical support

For online Technical Support for your IBM N series product, visit the following Web site:

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

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/storage/support/nas/

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* or *storage system* describes IBM N series models that either contain internal disk storage or attach to the disk storage expansion units specifically designed for the IBM N series storage systems.

Note: In previous releases, the EXN2000 expansion unit was referred to as the *EXP600* expansion unit.

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.

- *CPU module* refers to the system controller module that executes the software on an N3700. The CPU modules are at the rear-center of the N3700 storage system.
- *Device carrier* refers to the container that encases a fan/power supply unit or a disk.
- *Disk* applies to any hard disk drive.
- *Disk shelf* or *expansion unit* refers to any shelf or expansion unit containing hard disk drives.
- *ESH2* refers to the controller module of the fibre-channel disk storage expansion unit (EXN2000).
- *ESH4* refers to the controller module of the fibre-channel disk storage expansion unit (EXN4000).
- *Loop* refers to the daisy-chained disk shelves (expansion units) connected to an N3700 storage system.
- *Node* refers to a CPU module when used in an active-active (clustered) configuration.
- *System* and *storage system* refer to the N3700 storage system (filer), either by itself or with additional disk shelves.
- *SES* refers to SCSI enclosure services.

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.
`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 N series N3700 system installation process, hardware specifications, and the appropriate documentation references for the procedures. Refer to the *Installation and Setup Instructions* for your storage system for further information about installing your equipment.

This chapter discusses the following topics:

Understanding the differences between early and current N3700 CPU modules

N3700 storage systems with system serial numbers between 13-00001 and 13-01000 shipped with an early CPU module design. (In general, these are N3700 systems that shipped prior to January 31, 2006.) Current N3700 systems (with system serial numbers 13-01001 and higher) ship with the current CPU module design, which uses different Fibre Channel connectors. (In general, these are N3700 systems that shipped after January 31, 2006.)

Regardless of the CPU module design, all N3700 storage systems offer the same functionality. Field repairs or upgrades may use the current CPU module design on any N3700 system.

The early CPU module is easily distinguished from the current CPU module design by the rear port labeling, shown in Figure 1. The early CPU module uses an integrated SFP for Fibre Channel Port C (used for third-party devices), and it uses a special HSS connector for Fibre Channel Port B to connect the N3700 to expansion units.

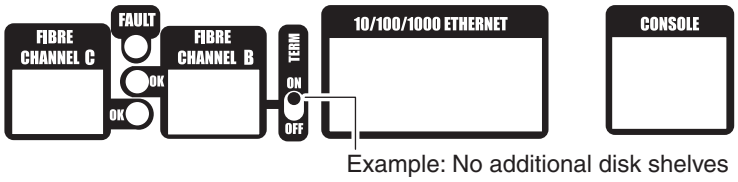


Figure 1. Port labeling for early N3700 CPU module designs

The current CPU module design uses pluggable SFP connections for both Fibre Channel ports. The current CPU module labeling is shown in Figure 2 on page 2. The SFP required for connections to the Fibre Channel Port C (used for third-party devices) is included with all N3700s that ship with the current CPU module design. For Port B (used for connections to expansion units), an SFP is required only for connections using optical cables (recommended). The SFP for Port B is shipped with the cables ordered with your expansion unit.

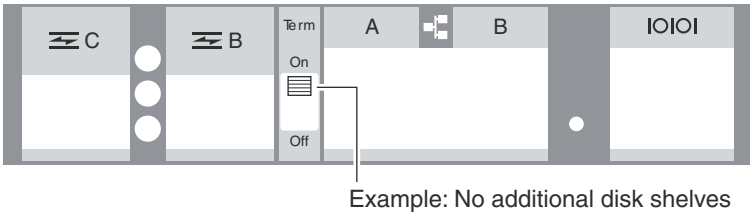


Figure 2. Port labeling for current N3700 CPU module designs

Attention: Depending on the design of your N3700 CPU module, direct connections to expansion units must be made with either Fibre Channel copper cables or Fibre Channel optical cables, as described in the following bullets:

- **For direct connections to N3700 early CPU module designs:** Use NAS-to-EXP Fibre Channel copper cables (FC #2020 or 2022). For attachment to an N3700 Model A10, one NAS-to-EXP Fibre Channel copper cable is required. For attachment to an N3700 Model A20, two NAS-to-EXP Fibre Channel copper cables are required.
- **For direct connections to N3700 current CPU module designs:** Use an LC-to-LC Fibre Channel optical cable and two SFPs for attachment to an N3700 Model A10. Use two LC-to-LC Fibre Channel optical cables and four SFPs for attachment to an N3700 Model A20.

Required manuals, tools and equipment

You need the following manuals:

- *Installation and Setup Instructions* for your N3700 storage system
- *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 Cluster Installation and Administration Guide* or *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)
- #2 Phillips screwdriver and slotted screwdriver
- Pointed tool for setting termination switches
- 7-mm nut driver
- Grounding leash and ESD strap

Note: To verify your shipping contents, see the *IBM System Storage N3700 Installation and Setup Instructions*.

Handling static-sensitive devices

Attention: The N3700 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.
- 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

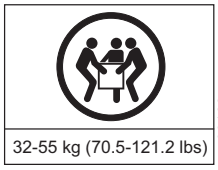
This section identifies the shipment contents and the rules and regulations you need to observe for the proper installation of your N3700. It also provides an overview of the entire system installation process and the appropriate documentation references for the procedures.

For detailed information, see the following topics:

- "Hardware specifications"
- "Rules for installing the N3700 in a rack" on page 5
- "Guide to the installation process" on page 6

Hardware specifications

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



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.

Table 1. N3700 physical characteristics and environmental requirements

Physical characteristics

Table 1. N3700 physical characteristics and environmental requirements (continued)

	Weight	With maximum number of disk drives	78.8 lbs (35.8 kg)
		Empty	50.6 lbs (23 kg)
	Rack units		3U
	Height		5.25 in. (13.3 cm)
	Width		17.6 in. (44.8 cm)
	Depth		20 in. (50.9 cm)
Clearance dimensions			
	Front-cooling	All versions	6 in. (15.3 cm)
	Rear-cooling	All versions	12 in. (30.5 cm)
	Rear-maintenance	All versions	12 in. (30.5 cm)
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 149° F (-40° C to 65° C)
	Relative humidity		10 to 90% 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		56.4 dBA @ 23° C 5.64 bels @ 23° C

Table 2. N3700 electrical requirements

Input voltage		**100 to 120V**		**200 to 240V**	
		Worst-case	Typical single PSU/system	Worst-case	Typical single PSU/system
Input current measured, A	10K drives	3.12	1.88/3.76	1.52	0.92/1.83
	15K drives	3.83	2.15/4.30	1.83	1.04
Input power measured, W	10K drives	311	187.5/375	299	177.5/355
	15K drives	382	214.5/429	361	202.5/405
Thermal dissipation, BTU/hr	10K drives	1062	639.5/1279	1020	606/1212
	15K drives	1302	731.5/1463	1230	690/1380
Inrush peak, A	10K drives	21	20	12.5	12
	15K drives	21	20	12.5	12

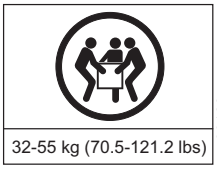
Table 2. N3700 electrical requirements (continued)

Input voltage	**100 to 120V**	**200 to 240V**
Maximum electrical power	7 A	3.5 A
Input power frequency, Hz	50 to 60	

Note: *Worst-case* indicates a system running with one PSU and high fan speed. *Typical* indicates a system running two PSUs on two circuits.

Rules for installing the N3700 in a rack

You need to observe the following rules and restrictions when installing an N3700 in a standard 19-inch (48.26 cm) equipment rack with mounting rails:



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.

- You must work with two other people.

  DANGER

  The N3700 series system unit is extremely heavy. To avoid injuring yourself or damaging the unit, you must work with at least two other people when you install the unit in the rack. Remove the power supplies and fan units from the chassis before attempting to lift the unit.

- Install the N3700 storage system at the bottom of the rack. Installing the N3700 storage system at the bottom of the rack adds support for the expansion units.

  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 units in a rack, do not exceed the maximum storage limit for your N3700 storage 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 the disk drives or drive blank covers to reduce the weight.
- For information on grounding expansion units, refer to the *IBM System Storage N3700 Installation and Setup Instructions*.

Guide to the installation process

The following table provides a guide to the storage system installation process.

Refer to the *IBM System Storage N3700 Installation and Setup Instructions* for complete installation details.

Table 3. Installation process procedures

Stage	Procedure	Is the procedure required?	For instructions, see...
1	Install the N3700 storage system in a freestanding rack.	Yes	The *Installation and Setup Instructions* that came with your N3700 storage system.
2	Connect the N3700 storage system to the network.	Yes	"Connecting your N3700 storage system to a network" on page 7, or the *Installation and Setup Instructions* for your storage system.
3	Connect the N3700 storage system to additional disk shelves.	No	"Connecting expansion units" on page 7, or the *Installation and Setup Instructions* for your storage system.
4	Connect the N3700 storage system to a power source.	Yes	"Connecting your N3700 storage system to a power source" on page 8, or the *Installation and Setup Instructions* for your storage system.
5	Configure the system.	Yes	The *IBM System Storage N series Data ONTAP Software Setup Guide* for your version of Data ONTAP, or the *Installation and Setup Instructions* for your storage system.
6	Connect the N3700 storage system to a third-party device.	No	"Connecting to third-party devices or Fibre Channel switches" on page 8.

Chapter 2. Connecting an N3700 storage system

This chapter describes how to connect an N3700 storage system in the following topics:

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 N3700 storage system to a network

Each node of your N3700 storage system connects to the 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 N3700, refer to the *Installation and Setup Instructions* for your storage system.

Connecting expansion units

You can connect additional expansion units to an N3700. For information that describes how to connect your N3700 storage system up to a maximum of three expansion units, see the *Installation and Setup Instructions* for your storage system.

On all N3700 storage systems, Port B is designated for use in connections to expansion units.

Note: The N3700 only operates at 1 Gbps. Make sure that the speed setting switches on the expansion units are set to 1Gb.

The N3700 load board feature enables the N3700 (A10 and A20) to operate in a SATA-only storage environment. If the N3700 load board is ordered, the N3700 is ordered with no Fibre Channel hard drives and only EXN1000s (SATA drives) are attached to the storage controller.

Attention: If your N3700 storage system shipped with load boards, exactly two load boards are installed in the system. The two load boards must be installed in bays 0 and 1.

Attention: Depending on the design of your N3700 CPU module, direct connections to expansion units must be made with either Fibre Channel copper cables or Fibre Channel optical cables, as described in the following bullets. Copper or optical cables are ordered with the expansion unit.

- **For direct connections to N3700 early CPU module designs:** Use NAS-to-EXP Fibre Channel copper cables (FC #2020 or 2022). For attachment to an N3700 Model A10, one NAS-to-EXP Fibre Channel copper cable is required. For attachment to an N3700 Model A20, two NAS-to-EXP Fibre Channel copper cables are required.
- **For direct connections to N3700 current CPU module designs:** Use an LC-to-LC Fibre Channel optical cable and two SFPs for attachment to an N3700 Model A10. Use two LC-to-LC Fibre Channel optical cables and four SFPs for attachment to an N3700 Model A20.

For more information about the differences between the early and current N3700 CPU module designs, see “Understanding the differences between early and current N3700 CPU modules” on page 1.

Connecting your N3700 storage system to a power source

The N3700 storage systems and expansion unit disk shelves 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 N3700 to a power source, see the *Installation and Setup Instructions* for your storage system.

Connecting to third-party devices or Fibre Channel switches

You can connect third-party devices to your N3700 storage system through an optical Fibre Channel interface using any Fibre Channel port on the back of the chassis. Refer to the documentation that comes with the third-party device for connection information.

Attention: On all N3700 storage systems, Port C is designated for use in connections to third-party devices.

Rules for connecting the third-party devices

Observe the following rules for connecting the third-party devices:

- Port C is designated for use in connections to third-party devices. Port C is the leftmost port on the bottom CPU module.
- For N3700 storage systems with the current CPU module design, you must plug an SFP module into port C before cabling or terminating it.

Note: N3700 storage systems with the current CPU module design ship with the SFP module required for Port C. The early CPU module design uses an integrated SFP for Fibre Channel Port C, so no external SFP module is required for connections to Port C in early CPU module designs.

For more information about the differences between the early and current N3700 CPU module designs, see "Understanding the differences between early and current N3700 CPU modules" on page 1.

- Use a fiber-optic cable that is:
  - Appropriate to the Fibre Channel connection on your N3700 storage system
  - Of an approved length for the third-party device

    Note: See the documentation for the third-party device.
- Check the *Interoperability Matrix* at the following Web site to verify support for your third-party device:

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

  An unsupported tape backup device might cause the N3700 storage system to halt.
- For additional information about Fibre Channel cables, see the following Web site:

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

Connecting your N3700 storage system to an ASCII terminal console

The ASCII terminal console enables you to monitor the boot process, helps you configure your N3700 storage system after it boots, and enables you to perform system administration.

ASCII terminal console wiring

The following table lists the RJ-45 connection pinout of the N3700 console port on the CPU module for use in connecting to your ASCII terminal console.

Table 4. RJ-45 connection pinout for the ASCII terminal wiring

Pin number	Signal
1	Connected to pin 8
2	Not connected
3	TXD (from N3700 storage system)
4	GND
5	GND
6	RXD (to N3700 storage system)
7	Not connected
8	Connected to pin 1

DB-9 to RJ-45 console adapter pin connections

You use the included DB-9 to RJ-45 console adapter to connect an ASCII terminal console to your N3700 storage system. Its purpose is to convert the RJ-45 pinout on the N3700 storage system to a DB-9 pinout.

The following table lists the console adapter pin number connections between the DB-9 male connector and the RJ-45 connector.

Table 5. 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 N3700 storage system, complete the following steps.

1. Use the following communications parameters.

Table 6. 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 a DB-9 serial cable to the DB-9 end of the DB-9 to RJ-45 console adapter. Then connect the RJ-45 end of the console adapter to the console port on the N3700 storage system CPU module. Finally, connect the other end of the serial cable to the ASCII terminal.

Chapter 3. Configuring an N3700 storage system

This chapter describes how to configure an N3700 storage system in the following topics:

- "Configuring the N3700 storage system"
- "Configuring the Fibre Channel port" on page 17

Configuring the N3700 storage system

These instructions address the initial setup of Data ONTAP software on a N3700 storage system. The instructions include planning worksheets and installation procedures for the following tasks:

- Gathering and recording information about the two nodes in "System setup information worksheet."
- Assigning disks to each node, as needed, in "Disk assignments" on page 12.
- Configuring the system at initial boot by completing the instructions in "Booting your N3700 storage system for the first time" on page 14.

Attention: If you have a dual-controller N3700 (2863–A20), assign disks to each node using the "Disk ownership worksheet" on page 13.

System setup information worksheet

You need the following information to complete the setup script. See "Setup script questions" on page 16 for an example of the setup script questions.

Attention: If you are configuring a single-controller N3700 (2863–A10), complete information for Node B only. Node A is not present in the N3700 2863–A10.

Table 7. System setup worksheet

Setup parameters	**Node B**	**Node A (not present in N3700 2863–A10)**
Host name:		
Network configuration information		
Virtual interfaces:		
IP address-first interface, e0a:		
IP address-second interface, e0b:		
Netmask-first interface, e0a:		
Netmask-second interface, e0b:		
Media type/speed (100tx-fd, 100tx, auto [100/1000])-first interface, e0a:		
Media type/speed (100tx-fd, 100tx, auto [100/1000])-second interface, e0b:		
Flow control (none, receive, send, full)-e0a:		

Table 7. System setup worksheet (continued)

Setup parameters	Node B	Node A (not present in N3700 2863–A10)
Flow control (none, receive, send, full)-e0b:		
Enable jumbo frames?-first interface, e0a:		
Enable jumbo frames?-second interface, e0b:		
IP address or name of default gateway:		
IP address or name of administration host: (Leave blank for root access to /etc from any NFS client)		
Where is filer located? (Text string)		
Do you want to run DNS resolver?		
Do you want to run NIS client?		

Disk assignments

In the N3700 storage system, each node must have ownership of at least one SES disk in each disk shelf in the system. For example, in a single disk shelf system, Node A could own the disk in bay 0, and Node B would then own the disk in bay 1.

In a factory-configured system, one node has ownership of one SES bay disk and the other node owns the second SES bay disk. In addition, each node has ownership of one parity disk and one spare disk. Node B owns disks 0b.16, 0b.18, and 0b.20, and Node A owns disks 0b.17, 0b.19, and 0b.21. The balance of the disks are unowned.

If you add storage to your N3700 storage system, it arrives with unowned disks. You must assign ownership of the SES disks to the appropriate node.

Notes:

1. Always install the hard disk drives sequentially in adjacent drive bays in the N3700, starting with drive bay 0 and continuing from right to left.
2. You can change the disk ownership pattern after initial setup. For information about how to change disk ownership, see the *IBM System Storage N series Data ONTAP Storage Management Guide* for your version of Data ONTAP.

Figure 3 on page 13 identifies the SES bays in the N3700 storage system or in an expansion unit disk shelf.

Note: N3700 systems with the load board feature must contain no Fibre Channel disks. If the load feature is ordered for your N3700, all disk drive bays except bays 0 and 1 contain disk drive blanks. Bays 0 and 1 contain N3700 load boards.

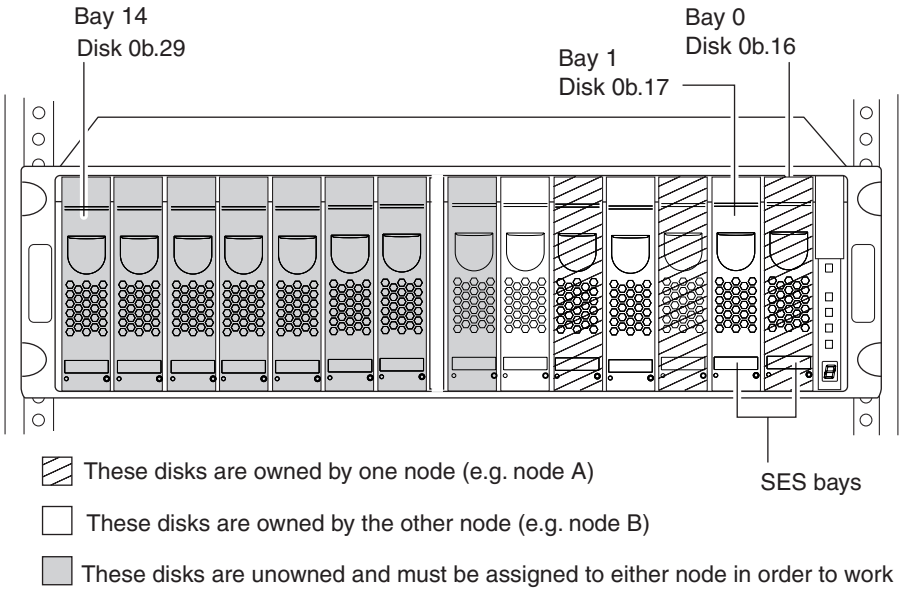


Figure 3. SES bays example

Disk ownership worksheet

Complete the following worksheet to determine disk assignments for your active-active (clustered) configuration. Identify any disks whose ownership you want to change, and mark in the worksheet which node will own the disk. You should use this sheet to check ownership during the setup process.

Table 8. Disk shelf 1 and disk shelf 2 disk ownership worksheet

Bay	Disk shelf 1			Disk shelf 2		
	Disk ID	**Node A**	**Node B**	**Disk ID**	**Node A**	**Node B**
0	0b.16 SES disk			0b.32 SES disk		
1	0b.17 SES disk			0b.33 SES disk		
2	0b.18			0b.34		
3	0b.19			0b.35		
4	0b.20			0b.36		
5	0b.21			0b.37		
6	0b.22			0b.38		
7	0b.23			0b.39		
8	0b.24			0b.40		
9	0b.25			0b.41		
10	0b.26			0b.42		
11	0b.27			0b.43		
12	0b.28			0b.44		
13	0b.29			0b.45		

Table 9. Disk shelf 3 and disk shelf 4 disk ownership worksheet

Bay	Disk shelf 3			Disk shelf 4		
	Disk ID	**Node A**	**Node B**	**Disk ID**	**Node A**	**Node B**

Table 9. Disk shelf 3 and disk shelf 4 disk ownership worksheet (continued)

0	0b.48 SES disk			0b.64 SES disk		
1	0b.49 SES disk			0b.65 SES disk		
2	0b.50			0b.66		
3	0b.51			0b.67		
4	0b.52			0b.68		
5	0b.53			0b.69		
6	0b.54			0b.70		
7	0b.55			0b.71		
8	0b.56			0b.72		
9	0b.57			0b.73		
10	0b.58			0b.74		
11	0b.59			0b.75		
12	0b.60			0b.76		
13	0b.61			0b.77		

Booting your N3700 storage system for the first time

To boot your active-active (clustered) configuration for the first time, complete the following steps for the appropriate node.

1. Complete the system setup worksheet for each node, as described in “System setup information worksheet” on page 11.
2. Complete the disk ownership worksheet, as described in “Disk ownership worksheet” on page 13.
3. Check that the disk shelf IDs and terminate switches are properly set, and confirm that the system is properly grounded.

   Confirm that the system console is properly connected and running.
4. Turn on the power first to the disk shelves, if applicable, and then to the N3700 storage system.

   Result: The system begins to boot and stops at the first installation question, which is displayed on each node’s console window:

   ```
   Please enter the new hostname []:
   ```
5. Answer the installation questions for each node:

   Node B

   Go to the system console for Node B and answer the installation questions for that node, using the information you collected in the “System setup information worksheet” on page 11. When asked for the takeover address, make sure that you enter the IP address for Node A, if you have an active-active (clustered) configuration.

   Node A (if an active-active [clustered] configuration)

   Go to the system console for Node A and answer the installation questions for that node, using the information you collected in the “System setup information worksheet” on page 11. When asked for the takeover address, make sure that you enter the IP address for Node B.

   Note: When you encounter the Timezone question, you can press Enter to accept the default setting, if you do not know how to set the timezone.

You can then set the timezone after you complete initial setup. See the Timezone manual (man) page for more information. For information about accessing man pages, see the *IBM System Storage N series Data ONTAP System Administration Guide* for your version of Data ONTAP.

6. For the single-controller N3700, assign all the disks to the system by entering the following at the command line interface prompt:

   ```
   disk assign all
   ```

   For the dual-controller N3700, assign disks to the proper controller by completing the following steps for *each* controller, using the Disk ownership worksheet:

   a. Determine disk ownership by entering the following command:

      ```
      disk show -v
      ```

   b. Assign the disk or disks to this controller by entering the following command:

      ```
      disk assign 0b.NN
      ```

      where *0b.NN* is the disk ID to assign.

7. Check the licenses on each node:

   a. Enter the following command:

      ```
      license
      ```

      Note: Active-active configurations (clustering) must be licensed on *both* nodes.

   b. Add any missing licenses by entering the following command for each missing license:

      ```
      license add xxxx
      ```

      where *xxxx* is the license code for the product.

   c. Repeat steps a and b for the next node, if an active-active (clustered) configuration.

8. Reboot the node by entering the following command:

   ```
   reboot
   ```

9. Enable the active-active (clustered) configuration, if applicable:

   Node A

   Enter the following command on a console:

   ```
   cf enable
   ```

   Node B

   N/A

   Attention: Active-active configurations (clustering) must be licensed on both controllers in a dual-controller N3700.

10. Check node status by entering the following command on each node:

    ```
    cf status
    ```

11. Test takeover and giveback on each node by completing the following steps:

    a. Initiate takeover by entering the following command:

       ```
       cf takeover
       ```

       Result: Takeover succeeds. If not, fix any errors, reboot the node, and repeat the test.

    b. Check the status of the takeover using the **cf status** command.

c. Give back the node by entering the following command:

```
cf giveback
```

d. Check the status of the active-active (clustered) configuration using the **cf status** command.

e. Repeat steps a through c for the next node.

12. Complete the booting procedure according to your system configuration:
    - If you are setting up a NAS active-active (clustered) configuration, go to the *IBM System Storage N series Data ONTAP Software Setup Guide* for your version of Data ONTAP for advanced system setup.
    - If you are setting up a SAN active-active (clustered) configuration with iSCSI, complete the following steps:
      a. License iSCSI services.
      b. Set up LUNs, as described in the *IBM System Storage N series Data ONTAP Block Access Management Guide* for your version of Data ONTAP.

Setup script questions

The following example lists the setup script questions and answers you see when you boot your system for the first time. Script feedback is in italics:

```
Please enter the new hostname []: bu-165

Do you want to configure virtual network interfaces? [n]: n

Please enter the IP address for Network Interface e0a []: 172.22.6.165

Please enter the netmask for Network Interface e0a []: 255.255.255.0

Should interface e0a take over a partner IP address during failover? [n]: y
```

The clustered failover software is not yet licensed. To enable network failover, you should run the **license** *command for clustered failover.*

```
Please enter the IP address or interface name to be taken over by e0a []:
172.22.6.164

Please enter the media type for e0a {100tx-fd, tp-fd, 100tx, tp, auto
(10/100/1000)} [auto]:

Please enter the flow control for e0a {none, receive, send, full} [full]:

Do you want e0a to support jumbo frames? [n]:

Please enter the IP address for Network Interface e0b []:

Should interface e0b take over a partner IP address during failover? [n]:

Please enter the name or IP address of the default gateway []: 172.22.6.1
```

The administration host is given root access to the filer's /etc files for system administration. To allow /etc root access to all NFS clients, enter RETURN below.

```
Please enter the name or IP address of the administration host:
```

```
Please enter timezone [GMT]: PST8PDT

Where is the filer located? []: orlab

Do you want to run DNS resolver? [n]: y

Please enter DNS domain name [xxx]:

You can enter up to three nameservers

Please enter the IP address for first nameserver []:

Do you want another nameserver? [y]: n

Do you want to run NIS client? [n]: n

Press the Return key to continue.

Setting the administrative (root) password for bu-165 ...

New password:

Retype new password:
```

Configuring the Fibre Channel port

The N3700 storage system CPU module provides two independent Fibre Channel ports, identified as B and C:

- You use the B port to communicate to the expansion unit.
- The C port has an external optical connector on the rear of the N3700 storage system. You can configure the C port to be used in initiator mode to communicate with tape backup devices, such as in a TapeSAN backup configuration.

Note: For N3700 storage systems with the current CPU module design, you must plug an SFP module into port C before cabling or terminating it. Port C is the leftmost port on the bottom CPU module.

Fibre Channel port C does not support mixed initiator/target mode. The default mode for port C is initiator mode. You do not need to configure the port.

N3700 storage system active-active (clustered) configurations

N3700 storage system active-active (clustered) configurations must be cabled to switches that support public loop topology. To connect an N3700 storage 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 Data ONTAP Block Access Management Guide* for your version of Data ONTAP at the following Web site:

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

Configuring for initiator mode

To configure the N3700 storage system for initiator mode, complete the following steps.

1. Remove the FCP license by entering the following command:

   ```
   license delete fcp
   ```

   Example:

   ```
   n3700a> license delete fcp
   Fri Dec  5 14:59:02 EST [n3700a: fcp.service.shutdown:info]: FCP service
   shutdown
   cf.takeover.on_panic is changed to off
   A reboot is required for TapeSAN service to become available.
   unlicensed fcp.
           FCP disabled.
   n3700a> Fri Dec  5 14:59:02 EST [n3700a: rc:notice]: fcp unlicensed
   ```

2. Reboot the system by entering the following command:

   ```
   reboot
   ```

3. After the reboot, verify that port C is in initiator mode by entering the following command:

   ```
   sysconfig
   ```

   Example:

   ```
   n3700a> sysconfig
     NetApp Release xxx: Mon Aug 25 02:20:04 PDT 2003
     System ID: 0084165669 (n3700a); partner ID: 0084165671 (n3700b)
     System Serial Number: 379589 (n3700a)
     slot 0: System Board
             Processors:         2
             Processor revision: B2
             Processor type:     1250
             Memory Size:        1022 MB
     slot 0: FC Host Adapter 0b
             14 Disks:            952.0GB
             1 shelf with EFH
     slot 0: FC Host Adapter 0c
     slot 0: SB1250-Gigabit Dual Ethernet Controller
             e0a MAC Address:  00:a0:98:00:d5:90 (100tx-fd-up)
             e0b MAC Address:  00:a0:98:00:d5:91 (auto-unknown-cfg_down)
     slot 0: NetApp ATA/IDE Adapter 0a (0x00000000000001f0)
                   0a.0                 122MB
   ```

   Note: In the above example, Fibre Channel port C is identified as *FC Host Adapter 0c*.

4. Enable port C by entering the following command.

   ```
   storage enable adapter 0c
   ```

   Example:

   ```
   n3700a> storage enable adapter 0c
   Mon Dec  8 08:55:09 GMT [rc:notice]: Onlining Fibre Channel adapter 0c.
   host adapter 0c enable succeeded
   ```

For more information about configuring your SAN, see the *IBM System Storage N series Data ONTAP Block Access Management Guide* for your version of Data ONTAP.

Chapter 4. Monitoring your system

This chapter identifies the location of the various LEDs on your N3700 storage system and explains how to interpret LEDs for basic monitoring.

Note: The quick reference card in the slide-out tray at the base of your N3700 storage system describes the functions of each LED on your N3700 storage system and the suggested course of action.

This chapter discusses the following topics:

Monitoring the front operation panel

The front operation panel has five LEDs and a disk shelf ID display. The LEDs indicate whether your system is 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 N3700 storage system from the error messages displayed on your system console.

Location of LEDs

Figure 4 shows the location of the disk shelf ID display and the front panel LEDs.

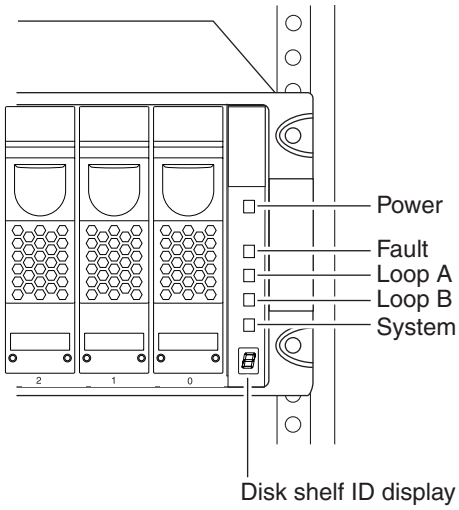


Figure 4. Disk shelf ID display and the front panel LEDs

Note: See "Interpreting the front panel LEDs" on page 20 for an explanation of what the LEDs mean.

About the disk shelf ID display

The disk shelf ID display shows the current disk shelf number setting from the rear shelf ID switch on the back of the N3700 storage system. For the N3700 storage system, the default and recommended setting for the ID switch is “1.”

Interpreting the front panel LEDs

The following illustration is of the first sheet of the quick reference cards that come with your N3700. It shows the normal and fault conditions that the LEDs indicate and recommends a corrective action.

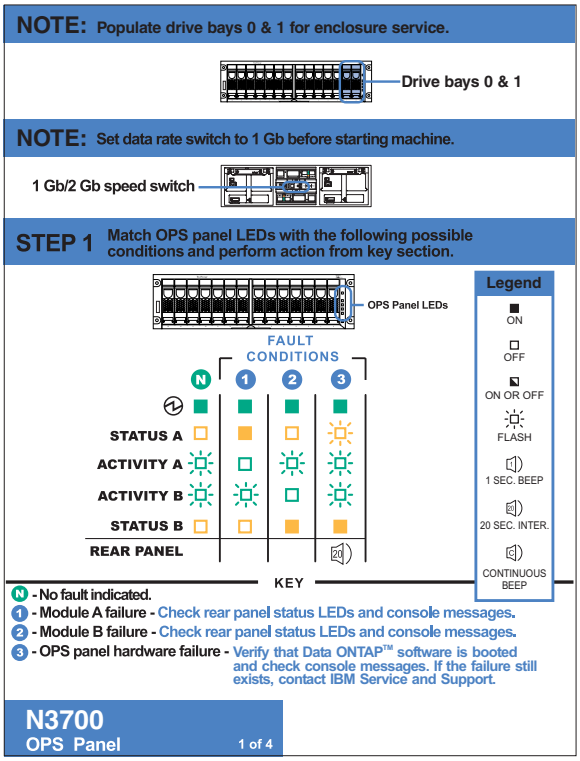


Figure 5. LED indications of normal and fault conditions

Use the following table to interpret the front panel LEDs on an N3700 storage system.

Table 10. N3700 front panel LEDs

	N3700 storage system LEDs					
Description	**Power**	**Activity A**	**Status A**	**Activity B**	**Status B**	**Action item**
Normal operation	Green on	Green on or flashing	Amber off	Green on or flashing	Amber off	None

Table 10. N3700 front panel LEDs (continued)

Description	N3700 storage system LEDs					Action item
	Power	**Activity A**	**Status A**	**Activity B**	**Status B**	
System fault detected	Green on	Green off	Amber on	Green on or flashing	Amber off	1. Check the LEDs on the modules at the rear of the N3700 storage system. 2. Check the system console for detailed messages. 3. Run diagnostics on the system. See the *IBM System Storage N series Diagnostics Guide* for more information. 4. Contact IBM technical support.
System fault detected	Green on	Green on or flashing	Amber off	Green off	Amber on	

Monitoring the power supply

The N3700 storage system power supply has four LEDs. The LEDs indicate whether the power supply or the integrated fan module is functioning normally or whether there are problems with the hardware. You can also identify any hardware failure associated with the power supplies from the error messages displayed on your system console.

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

Location of LEDs

Each power supply is encased in a device carrier and housed at the rear of your N3700 storage system. Figure 6 on page 22 shows the location of the power supply LEDs.

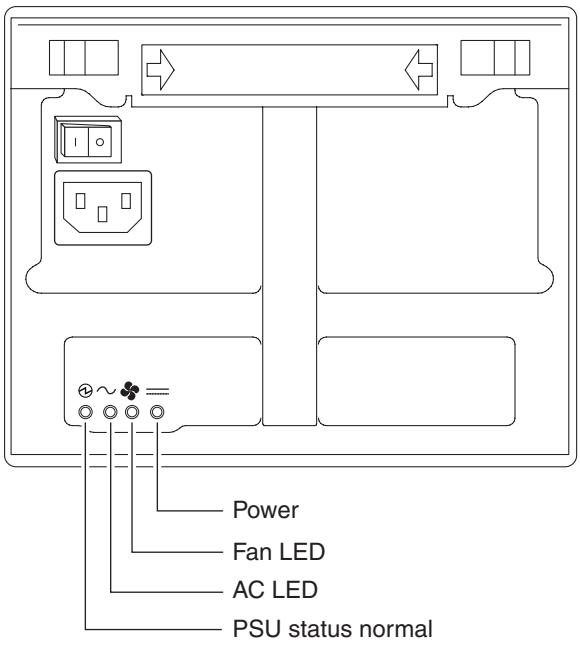


Figure 6. Power supply LED location

Interpreting power supply LEDs

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

Table 11. Power supply LED interpretation

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

Monitoring the Fibre Channel disk

The N3700 storage system Fibre Channel disk has two LEDs. The LEDs indicate whether the disk is functioning normally or whether there are problems with the hardware.

Location of LEDs

Figure 7 on page 23 shows the location of the Fibre Channel disk LEDs.

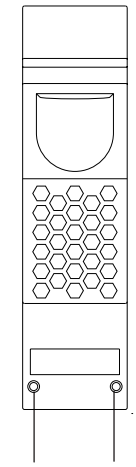


Figure 7. Fibre Channel disk LEDs

Interpreting Fibre Channel disk LEDs

Use the following table to interpret the disk LEDs.

Table 12. Fibre Channel disk LED interpretation

LED 1 (green)	**LED 2 (amber)**	**State**
Off	Off	No drive installed.
On/Blink off	Off	Drive installed and operational.
On	Flashes 1 second on and 1 second off	SES device identification set.
On or off	On	SES device fault bit set.
On or off	Flashes 3 seconds on and 1 second off	Disk port isolated (either port).

Monitoring the CPU module

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

Location of LEDs on the CPU module

Figure 8 on page 24 shows the location of the Ethernet and Fibre Channel LEDs at the rear of the CPU module.

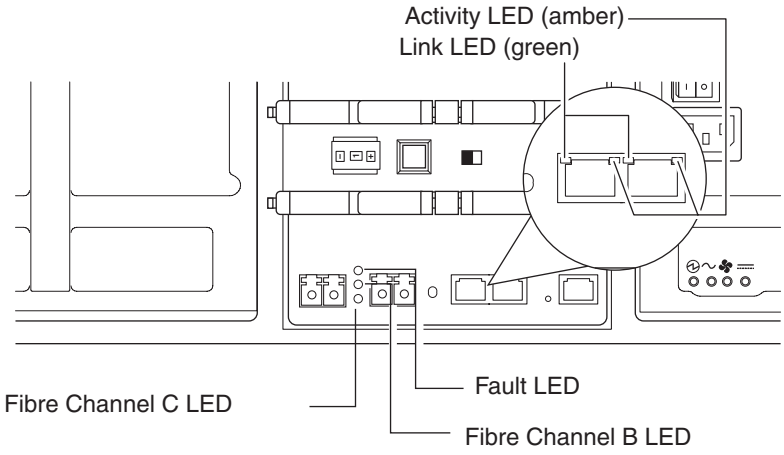


Figure 8. Ethernet and Fibre Channel LEDs

Interpreting Ethernet LEDs on an N3700 storage system

Use the following table to interpret the Ethernet port LEDs on the N3700 storage system CPU module.

Table 13. Ethernet LED interpretation

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

Interpreting Fibre Channel LEDs on an N3700 storage system

Use the following table to interpret the Fibre Channel LEDs on the N3700 storage system CPU module.

Table 14. Fibre Channel LED interpretation

Fault LED (amber)	Fibre Channel B LED (green)	Fibre Channel C LED (green)	State	Action
Off	On	On	Normal	None.
Off	Off	On	Loop B fault	Fibre Channel B loop is open and needs to be fixed.
Off	On	Off	Loop C fault	Fibre Channel C loop is open and needs to be fixed.
On	On	On	CPU module fault	See Note below.

Table 14. Fibre Channel LED interpretation (continued)

Fault LED (amber)	Fibre Channel B LED (green)	Fibre Channel C LED (green)	State	Action
On	Off	On	Loop B fault and module fault	See Note below.
On	On	Off	Loop C fault and module fault	See Note below.

Note: Perform the following steps until the problem is resolved:

1. Check the cables at the rear of the system.
2. Make sure that the 1 Gb/2 Gb switches are set to 1 Gb.
3. Check all terminate switches. Last shelf in the loop must be set to On. All other shelves must be set to Off.
4. If Fibre Channel C port is unused, install the Fibre Channel terminator or ignore the Fibre Channel C LED. It is alright for the LED to be off if the port is not used.
5. Run diagnostics to isolate the failure and decide whether CPU module replacement is necessary. See the *IBM System Storage N series Diagnostics Guide* for more information.
6. Call IBM technical support to replace the CPU module.

Chapter 5. Replacing N3700 storage system devices

This chapter describes how to replace disks, CPU modules, and other devices in your N3700 storage system.

This chapter discusses the following topics:

Replacing a disk

You can replace a disk in your storage system or disk shelf for any reason. However, the most common reason is disk failure. If a disk fails, the N3700 storage system logs a warning message to the system console indicating which disk failed.

About replacing a disk in your storage system

Replacing a disk in the storage system consists of the following procedures:

- "Removing a disk"
- "Installing a disk"

Removing a disk

To remove a disk, complete the following steps.

1. Enter one of the following commands, as appropriate.
   - To remove a disk that is a member of a volume, enter `disk fail` *disk_name*.
   - To remove a spare disk, enter `disk remove` *disk_name*.

   Either command causes the amber fault LED on the disk to illuminate. For more information about LEDs, see "Monitoring the Fibre Channel disk" on page 22.

   For more information about disk commands, see the *IBM System Storage N series Data ONTAP Storage Management Guide* for your version of Data ONTAP.
2. Wait 30 seconds for the disk to stop spinning.
3. Put on the antistatic ESD strap and grounding leash.
4. To remove the disk, press down on its release mechanism with one hand while grasping the top flange of the storage system with the other hand. Gently slide the disk out of your storage system.

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

   Attention: If you have any empty disk drive bays, make sure to install a cover over the empty slot to ensure proper cooling.

Installing a disk

To install a disk, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.
2. Orient the device carrier so that the release mechanism is at the top.

Note: The disks on your storage system use special drive keys to prevent the use of nonqualified disks in your storage system. If the device carrier does not slide into the open guide slot, check to make sure that the disk drive is qualified for use in your N3700 storage system.

3. Insert the device carrier into the guide slot in the N3700 storage system and gently push it in until it stops. Lift the handle on the drive carrier to engage the drive with the backplane, and push it until you see the release mechanism click into place.

   Attention: Do not slam the device carrier into place.

4. From the console screen, assign the disk to the CPU module receiving the disk by entering the following command:

   `disk assign` *disk_name*

Replacing a drive blank cover or N3700 load board

Replacing a drive blank cover or N3700 load board in the storage system consists of the following procedures:

- "Removing a drive blank cover or N3700 load board"
- "Installing a drive blank cover or N3700 load board"

Attention: If your N3700 storage system shipped with load boards, exactly two load boards are installed in the system. The two load boards must be installed in bays 0 and 1.

Removing a drive blank cover or N3700 load board

To remove a drive blank cover or N3700 load board, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.
2. To remove the drive blank cover or N3700 load board, press down on its release mechanism with one hand while grasping the top flange of the storage system with the other hand. Gently slide the device out of your storage system.

   CAUTION:
   When removing a drive blank cover or N3700 load board, use two hands to support its weight.

   Attention: If you have any empty disk drive bays, make sure to install a cover over the empty slot to ensure proper cooling.

Installing a drive blank cover or N3700 load board

To install a drive blank cover or N3700 load board, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.
2. Orient the drive blank cover or N3700 load board so that the release mechanism is at the top.
3. Insert the drive blank cover or N3700 load board into the guide slot in the N3700 storage system and gently push it in until it stops. Lift the handle on the drive carrier to engage the device with the backplane, and push it until you see the release mechanism click into place.

   Attention: Do not slam the drive blank cover or N3700 load board carrier into place.

Replacing the CPU module

Call IBM technical support if you need to replace the CPU module

CAUTION:
The CPU module is a field-replaceable unit (FRU). Replacement of the CPU module can only be performed by certified IBM service personnel.

Replacing the CPU module consists of the following procedures:

- "Removing the CPU module" on page 30
- "Moving the Data ONTAP software" on page 32
- "Procedures for installing the CPU module" on page 31

Location of the CPU module and blank filler module

The CPU module is at the center position on the back of your N3700 storage system. An active-active (clustered) N3700 storage system (2863–A20) has two CPU modules (nodes), with Node A above Node B. On a non-active-active (non-clustered) N3700 storage system (2863-A10), a blank filler module is in the top position directly above the bottom CPU module. Both modules use the same cam handle to remove and install the module.

Attention: Both modules must be in place with both bays plugged in during operation to ensure proper airflow through the N3700 storage system.

CPU module contents

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

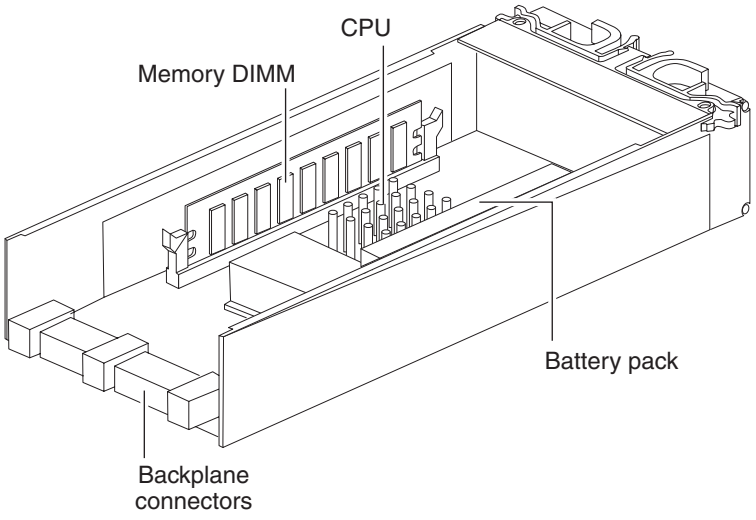


Figure 9. CPU module contents

Reasons for removing the CPU module

There are several reasons for removing the CPU module:

- Replacing a defective CPU module (IBM service representative only)

Note: If you are returning a defective CPU module, remove the SFP modules from the defective module. Save them for reuse in the replacement CPU module.

- Replacing the SDRAM DIMM
- Accessing the CompactFlash card
- System upgrade and conversion options (IBM service representative only)

Removing the CPU module

To remove the CPU module, complete the following steps.

1. Do one of the following:
   - Before removing the CPU module, on a non-active-active (non-clustered) 2863-A10, shut down the N3700 storage system by entering the following command at the console:

     ```
     halt
     ```

     Attention: Always use the **halt** command to perform a clean shutdown.
   - If you are performing an unplanned CPU module replacement on a non-active-active (non-clustered) 2863-A10, if possible, shut down the N3700 storage system by entering the following command at the console:

     ```
     halt
     ```
   - Before removing the CPU module on an active-active (clustered) N3700 storage system, determine which module is to be replaced. From the partner CPU module, perform a takeover operation by entering the following command:

     ```
     cf takeover
     ```
   - Before removing the CPU module on an active-active (clustered) N3700 storage system, where the partner node did or did not perform a takeover, proceed to Step 2.
2. Put on the antistatic ESD strap and attach the grounding leash to the N3700 storage system chassis.
3. Disconnect all cables to the CPU module that you are replacing.

   Note: If you are using SFPs, make sure you remove them as well.
4. At the rear-center of your N3700 storage system, using your thumb and index finger of both hands, press the cam mechanism levers in the middle of the CPU module to release it.

   Figure 10 on page 31 shows how to release the cam mechanism.

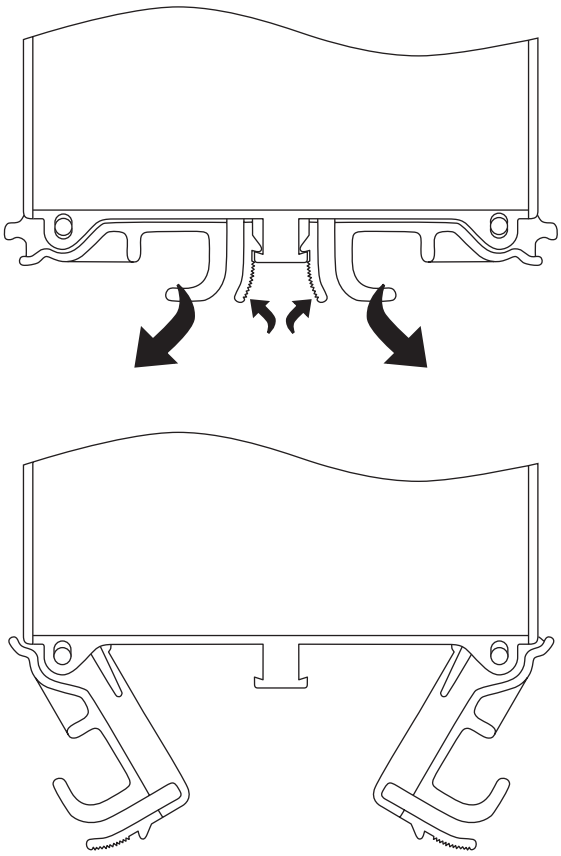


Figure 10. Cam mechanism

5. Carefully pull the cam handle so that the CPU module slides out from the chassis. The CPU module has a travel distance of approximately 10 inches (25.4 centimeters).
6. To finish servicing a component on the CPU module, see the appropriate procedure in this chapter and then proceed to “Procedures for installing the CPU module.”

   Note: To replace a defective CPU module, contact your IBM service representative.

Procedures for installing the CPU module

Attention: Before you can install the replacement CPU module, you need to move the CompactFlash card from the old CPU module to the replacement CPU module, as described in “Moving the Data ONTAP software” on page 32.

There are three separate cases to consider when installing a CPU module. To correctly install the new CPU module, you must first perform the tasks in “Moving the Data ONTAP software” on page 32, and then choose one of the following three procedures, based on your system criteria:

- “Installing the module in a non-active-active system” on page 32
- “Installing the module in an active-active (clustered) system with cf disabled” on page 33
- “Hot-swapping a module in an active-active (clustered) system while in takeover mode” on page 34

Moving the Data ONTAP software

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

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

1. Put on the antistatic ESD strap and grounding leash.
2. On the bottom side of the old CPU module, remove the CompactFlash card. Use your thumb to apply pressure to the exposed surface of the card, while gently sliding the card out of the socket.

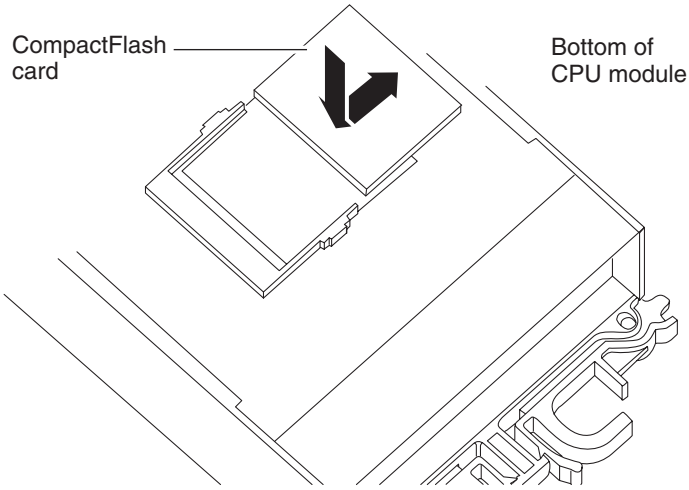


Figure 11. CompactFlash card

3. Repeat the same procedure by removing the CompactFlash card from the replacement CPU module.
4. Install the old CompactFlash card into the replacement CPU module by orienting the card so that the pin slots on the card engage properly with the pins inside the socket, and then gently sliding the card into place until it is firmly seated in the socket.

   Attention: Damage to the card socket and card can result if you do not orient the card properly during insertion.
5. Install the blank CompactFlash card from the replacement CPU module into the old CPU module and return the old CPU module to IBM.
6. Proceed with one of the following sections to install your replacement CPU module:
   - "Installing the module in a non-active-active system"
   - "Installing the module in an active-active (clustered) system with cf disabled" on page 33
   - "Hot-swapping a module in an active-active (clustered) system while in takeover mode" on page 34

Installing the module in a non-active-active system

To install the CPU module in a non-active-active (non-clustered) system, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.
2. Connect all cables to the CPU module before inserting the module into its CPU module bay. For more information, see “Connecting your N3700 storage system to a network” on page 7.
3. From the back of your N3700 storage system, slide the module into the CPU module bay and push the cam mechanism levers into place.
4. Set the terminate switch on the CPU module to the proper position.
5. If power was removed, reconnect the power to your N3700 storage system and turn on the power switch on both power supplies. See “Connecting your N3700 storage system to a power source” on page 8.
6. At the console screen, bring your system to the CFE (common firmware environment) prompt, or halt the system if it tries to autoboot Data ONTAP, by entering the following command:

   ```
   halt
   ```
7. Run diagnostics on the new CPU module by entering the following command:

   ```
   boot_diags
   ```
8. At the diagnostics prompt, run all tests by entering the following command:

   ```
   all
   ```

   Note: The RTC (real-time clock) uses the same battery as NVMEM. If the battery is disconnected and drained, the RTC loses its time, which can cause some tests to fail on startup. One solution is to ignore the message and set the clock in Data ONTAP later, or set the clock from within diagnostics and repeat the diagnostics tests.
9. Exit diagnostics by entering the following command:

   ```
   exit
   ```

   See the *IBM System Storage N series Diagnostics Guide* at the following Web site for more information:

   www.ibm.com/storage/support/nas/
10. Boot Data ONTAP by entering the following command:

    ```
    boot_ontap
    ```
11. Press Ctrl-C to enter the maintenance menu.
12. Select option 5 to enter maintenance mode.
13. Fix disk ownership.

    To see all disks and the old CPU module name, enter the following command:

    ```
    disk show -v
    ```
14. Reassign disk ownership by entering the following command:

    `disk reassign -o` *systemname*
15. Shut down the N3700 storage system by entering the following command at the console:

    ```
    halt
    ```
16. Boot Data ONTAP by entering the following command:

    ```
    boot_ontap
    ```

Installing the module in an active-active (clustered) system with cf disabled

To install the CPU module in an active-active (clustered) configuration system where the partner node has not performed a takeover, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.

2. Connect all cables to the CPU module before inserting the module into its CPU module bay. For more information, see “Connecting your N3700 storage system to a network” on page 7.
3. From the back of your N3700 storage system, slide the module into the CPU module bay and push the cam mechanism levers into place.
4. Set the terminate switch on the CPU module to the proper position.
5. If power was removed, reconnect the power to your N3700 storage system and turn on the power switch on both power supplies. See “Connecting your N3700 storage system to a power source” on page 8.
6. Press Ctrl-C to stop rebooting.
7. Run diagnostics on the new CPU module by entering the following command:

   ```
   boot_diags
   ```
8. At the diagnostics prompt, run all tests by entering the following command:

   ```
   all
   ```
9. Exit diagnostics by entering the following command:

   ```
   exit
   ```

   See the *IBM System Storage N series Diagnostics Guide* at the following Web site for more information:

   www.ibm.com/storage/support/nas/
10. Boot Data ONTAP by entering the following command:

    ```
    boot_ontap
    ```
11. Press Ctrl-C to enter the maintenance menu.
12. Select option 5 to enter maintenance mode.
13. Fix disk ownership.

    To see all disks and the old CPU module name, enter the following command:

    ```
    disk show -v
    ```
14. Reassign disk ownership by entering the following command:

    `disk reassign -o` *systemname*
15. Shut down the N3700 storage system by entering the following command at the console:

    ```
    halt
    ```
16. Boot Data ONTAP by entering the following command:

    ```
    boot_ontap
    ```

Hot-swapping a module in an active-active (clustered) system while in takeover mode

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

1. Put on the antistatic ESD strap and grounding leash.
2. Connect all cables to the CPU module before inserting it into the module bay. For more information, see “Connecting your N3700 storage system to a network” on page 7.
3. Set the terminate switch on the CPU module to the proper position.
4. From the back of your N3700 storage system, slide the module into the module bay and push the cam mechanism levers into place.
5. If you installed a new CompactFlash card, the card might not contain any data, in which case you need to boot your N3700 storage system from a remote image.

6. Capture the output from the console. Be sure to write down the system ID number, as shown in bold in the following example. The output should look something like this:

```
Loading: 0xffffffff80001000/8500653 Entry at 0xffffffff80001000
Closing network.
Starting program at 0xffffffff80001000
Press CTRL-C for special boot menu
.
.
WARNING: there do not appear to be any disks attached to the system.

Check that disks have been assigned ownership to this system (ID 84166052)
using the 'disk show' and 'disk assign' commands from maintenance mode

No root volume found.

Rebooting...
```

7. Press Ctrl-C to stop rebooting.
8. Reassign disk ownership for the new CPU module *from the partner node* with the new system ID, by entering the following commands at the takeover prompt:

   ```
   priv set advanced
   ```

9. Enter the following command using the recorded system ID from Step 6, for example:

   ```
   disk reassign -d 84166052
   ```

   The console screen should display something resembling the following:

   ```
   node x(takeover)> priv set advanced
   node x(takeover)*> disk reassign -d 84166083

   Disk ownership will be updated on all disks previously belonging to Filer
   with serial number 12345.
   Would you like to continue (y/n)?
   ```

10. Select `y`.
11. Verify disk ownership. Make sure that all disks that were supposed to be reassigned, were reassigned.

    To see all disks, enter the following command:

    ```
    disk show -v
    ```

12. The new CPU module should see the disk on the next reboot, accompanied by the following message:

    ```
    Waiting for cluster giveback
    ```

    From the *partner node*, enter the following command:

    ```
    cf giveback
    ```

    Note: If the giveback does not succeed, see the *IBM System Storage N series Data ONTAP System Administration Guide* and *IBM System Storage N series Data ONTAP Software Setup Guide* for your version of Data ONTAP for additional information.

Replacing the battery on the CPU module

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

- Removing the CPU module
- Replacing the battery

- Reinstalling the CPU module

To replace the battery, complete the following steps:

1. Put on the antistatic ESD strap and grounding leash.
2. Remove the CPU module by following the procedure in “Removing the CPU module” on page 30.
3. Disconnect the battery wire from the CPU module motherboard.
4. At the side of the CPU module, remove the four screws holding the battery housing, and remove the battery. See Figure 12.

   CAUTION:
   Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer’s instructions. For more information, see “Battery return program” on page xi.

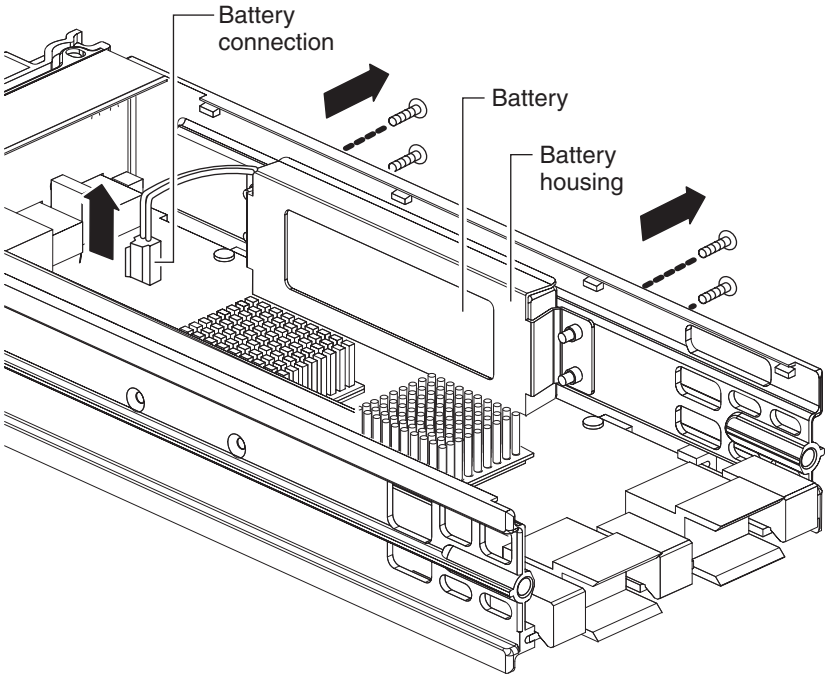


Figure 12. Battery housing in CPU module

5. Install the new battery by placing it into the battery housing, and secure the battery housing to the CPU module using the four screws.
6. Reconnect the battery wire to the CPU module.
7. Reinstall the CPU module.
8. After turning on your system, run diagnostics on the new battery. See the *IBM System Storage N series Diagnostics Guide* for more information.

   Note: The battery is rechargeable, and diagnostics might indicate a low charge after installation. This is normal. The battery will reach a full charge after your storage system has been turned on for several hours.
9. Check and set the date and time values on your storage system. Replacing the battery will likely cause these values to get reset.

Replacing the SDRAM DIMM on the CPU module

The SDRAM DIMM is on the CPU module motherboard. You must remove the CPU module from the chassis before replacing the DIMM.

Required memory configuration

The N3700 storage system supports one 1 GB, 2.5V 184P DDR SDRAM DIMM. The DIMM slot is inside the CPU module.

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

Replacing the SDRAM DIMM

To remove the SDRAM DIMM, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.
2. Perform a clean system shutdown before removing the DIMM.

   Attention: Perform a clean system shutdown before removing the DIMM. Removing the DIMM without first performing a clean system shutdown can result in data loss.
3. Remove the CPU module containing the DIMM to be replaced.

   Follow the procedure in “Removing the CPU module” on page 30.
4. Unplug the battery pack cable from the motherboard before removing the DIMM.
5. Push apart the latches on either side of the DIMM to release the DIMM from its slot, as shown in Figure 13.

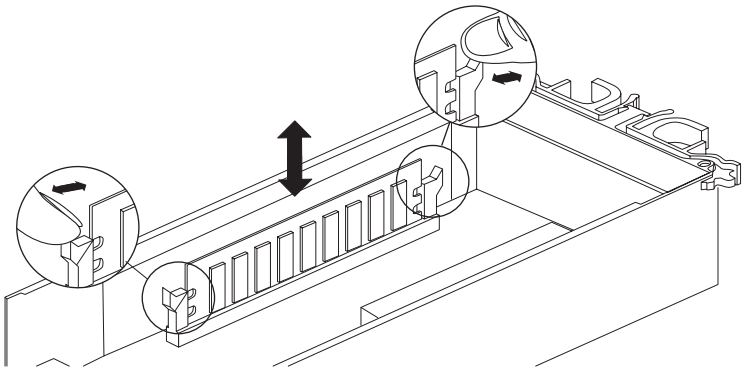


Figure 13. Releasing DIMM latches

6. Pull the DIMM out of the slot.
7. Set the old DIMM aside in an antistatic bag.
8. Pick up the new DIMM by its top corners to avoid damaging the components.
9. Insert the DIMM straight into the slot. The DIMM fits tightly in the slot, but should go in easily. If not, realign the DIMM with the slot and try again.

   Attention: Visually inspect the DIMM to verify that it is evenly aligned and fully inserted into the slot; otherwise, the edge connector on the DIMM does not make complete contact with the slot.
10. Push carefully but firmly on the top edge of the DIMM until the latches snap into place.

11. Plug the battery cable back into the motherboard.
12. Reinstall the CPU module. See “Procedures for installing the CPU module” on page 31.
13. After turning on your system, run diagnostics on the SDRAM DIMM. See the *IBM System Storage N series Diagnostics Guide* for more information.

Replacing the CompactFlash card on the CPU module

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

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

Replacing the CompactFlash card

To replace the CompactFlash card, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.
2. Remove the CPU module by following the procedure in “Removing the CPU module” on page 30.
3. On the bottom side of the CPU module, remove the CompactFlash card. Use your thumb to apply pressure to the exposed surface of the card, while gently sliding the card out of the socket, as shown in Figure 14.

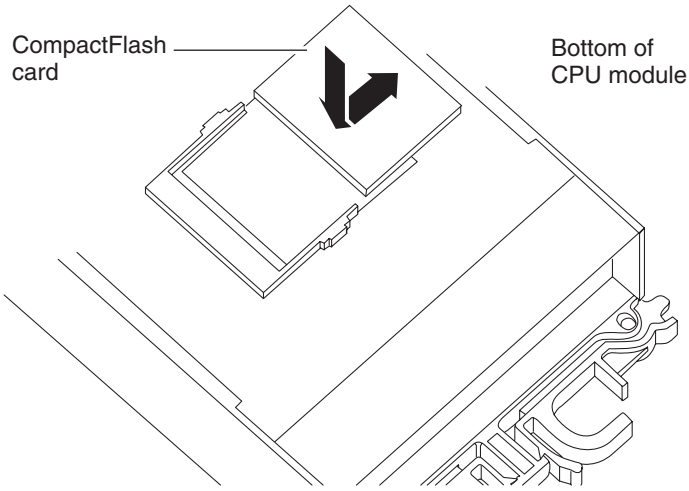


Figure 14. CompactFlash card removal

4. Install the CompactFlash card by orienting the card correctly so that the pin-slots on the card engage properly with the pins inside the socket, and gently sliding the card into place until it is firmly seated in the socket.

   Attention: Damage to the card socket and/or card can result if you do not orient the card properly during insertion.
5. Reinstall the CPU module. See “Procedures for installing the CPU module” on page 31.
6. Boot your N3700 storage system from a remote image. Refer to “Performing the netboot process from a remote image” on page 50 for more information.
7. Copy the correct Data ONTAP boot files to the CompactFlash card by entering the following command:

```
download
```

8. Test the CompactFlash card by using one of the following two options:

Table 15. CompactFlash card testing options

Option 1	Option 2

1. Reboot the N3700 storage system and let it autoboot by entering the following command:
`reboot`
2. After Data ONTAP boots, copy the boot files to the secondary backup area of the CompactFlash card by entering the following command:
`download`
	1. Shut down the N3700 storage system by entering the following command at the console:
	`halt`
	2. Run diagnostics by entering the following command:
	`boot_diags`
	See the *Diagnostics Guide* for more information.
	3. When finished, exit diagnostics by entering the following command:
	`exit`
	4. Boot Data ONTAP by entering the following command:
	`boot_ontap`

Replacing a power supply

Follow these procedures to replace a power supply in your N3700 storage system or disk shelf:

- "Removing a power supply" on page 40
- "Installing a power supply" on page 40

Rules for replacing power supplies

When replacing the power supply in your N3700 storage system, observe the following rules:

- You do not need to turn off the power to the N3700 storage system when you replace one power supply at a time.
- If you are replacing both power supplies, replace them one at a time to avoid powering down your N3700 storage system.
- Although a single fan failure in one of the power supplies is not a critical event, it is recommended that you install a new power supply when one of the two fans in either power supply stops working.
- When hot-swapping power supplies, replace and install the power supplies within two minutes of each other.

Attention: Your N3700 storage system can run with one power supply for a maximum of two minutes. The airflow through your N3700 storage system is degraded when only one power supply is present and operating. Therefore, if the power supplies are not replaced within two minutes of each other, the system halts and no data is accessible.

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

CAUTION:
Never remove the cover on a power supply-fan unit. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact an IBM service technician.

Removing a power supply

To remove a power supply, complete the following steps.

1. Put on the antistatic ESD strap and grounding leash.
2. Turn off the switch on the power supply that you are replacing. Disconnect the power cord from the AC power source.
3. Lift up the clip lock and unplug the power cord from your N3700 storage system's power supply.
4. At the top of the rear of the unit, using your thumb and index finger, press the cam mechanism levers toward each other to release the power supply handle.

   Figure 15 shows how to press the levers on the cam mechanism and release the power supply handle.

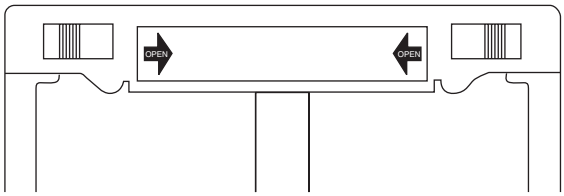


Figure 15. Releasing the power supply handle

5. Use the handle to pull the power supply out of the N3700 storage system.

   CAUTION:
   When removing a power supply, always use two hands to support its weight.

Installing a power supply

To install a power supply, complete the following steps.

Attention: Do not use excessive force when sliding the power supply into your N3700 storage system. You can damage the connector.

1. Put on the antistatic ESD strap and grounding leash.
2. Slide the power supply into the power supply bay until you hear the power supply connect with the connector inside your N3700 storage system chassis.
3. Raise the handle while pressing the cam mechanism levers toward each other, and push the power supply handle into place.

   Figure 16 on page 41 shows how to raise the handle into place.

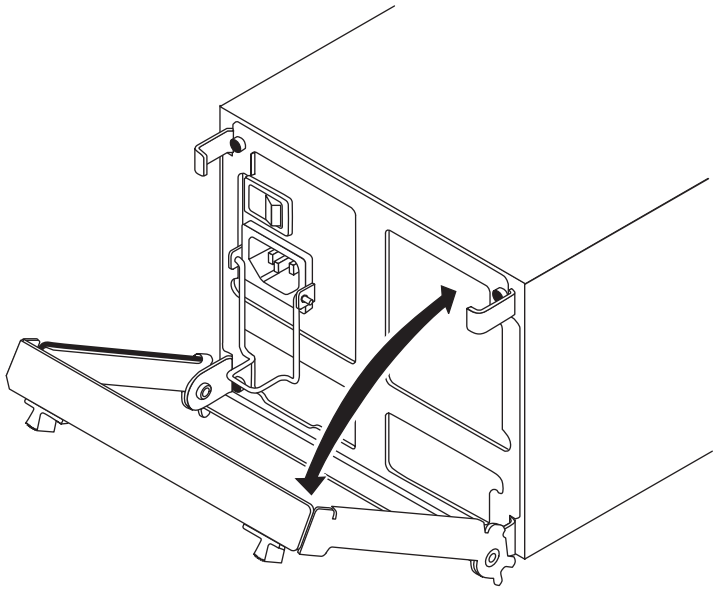


Figure 16. Raising the power supply handle

4. Lift up the clip lock and plug the power cord into the power receptacle and fasten it with the clip lock.
5. Plug the other end of the power cord into a grounded AC power source.
6. Turn on the power switch and confirm proper operation by checking the power supply LEDs. See “Monitoring the power supply” on page 21.
7. After turning on your system, run diagnostics. See the *IBM System Storage N series Diagnostics Guide* for more information.

Chapter 6. Error messages and troubleshooting

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

Note: If you contact IBM technical support, please have the console messages available.

This chapter discusses the following topics:

Where to get more information

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

Table 16. Corrective action documentation

If you are troubleshooting...	Then...
A hardware problem and need to access your N3700 storage system	SeeChapter 5, "Replacing N3700 storage system devices," on page 27.
Expansion Unit problems	See the hardware guide that came with your expansion shelf.
Software problems	See the *IBM System Storage N series Data ONTAP System Administration Guide* and the *Data ONTAP Storage Management Guide* for your version of Data ONTAP.

Startup error messages

When you apply power to your N3700 storage system, it verifies the hardware that is in the system, loads the operating system, and displays the Power-On Self-Test (POST) messages on the system console.

POST messages

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

POST Messages:

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

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

Boot messages

After the boot is successfully completed, your N3700 storage system loads the operating system. The following message is an example of the boot messages and questions that appear on the system console of an N3700 storage system at first boot. The exact boot messages that appear on your system console depend on your system configuration.

```
Release x.x.x: Mon Oct 20 04:06:00: PDT 2003
System ID: 0084170726 ();partner ID: 0084170777
System Serial Number: 999999
slot 0:     System board
            Processors:         1
            Processor revision:  B2
            Processor type:  1250
            Memory size:    1022 MB
slot 0:     FC Host Adapter  0b
            14 disks:    952.0 GB
            1 shelf with EFH
slot 0:     FC Host Adapter 0b
slot 0:     SB1250 Gigabit Dual Ethernet Controller
            e0a MAC Address: 00:a0:98:00:e9:b3 (auto-unknow
            e0a MAC Address: 00:a0:98:00:e9:b4 (auto-unknow
slot 0:     NetApp ATA/IDE Adapter 0a (0x00000000000001f0)
            0a.0    245MB
Please enter the new hostname []: hw-166
Do you want to configure virtual network interfaces? [n]:
Please enter the IP address for Network Interface e0a []: 172.22.6.166
Please enter the netmask for Network Interface e0a []:
Should interface e0a take over a partner IP address during failover? [n]: y
Please enter the IP address or interface name to be taken over by e0a []: 172.22.6.167
Please enter media type for e0a {100tx-fd, tp-fd, 100tx, tp, auto (10/100/1000)} [auto]:
Please enter flow control for e0a {none, receive, send, full} [full]:
Do you want e0a to support jumbo frames? [n]:
Please enter the IP address for Network Interface e0b []:
Should interface e0b take over a partner IP address during failover? [n]:
Would you like to continue setup through the web interface? [n]:
Please enter the name or IP address of the default gateway []:
   The administration host is given root access to the filer's
   /etc files for system administration.  To allow /etc root access
   to all NFS clients enter RETURN below.
Please enter the name or IP address of the administration host:
Please enter timezone [GMT]:
Where is the filer located? []: orlab
Do you want to run DNS resolver? [n]: y
Please enter DNS domain name []:
You may enter up to 3 nameservers
Please enter the IP address for first nameserver []:
Do you want another nameserver? [y]: n
Do you want to run NIS client? [n]:
```

POST error messages

The following table describes the extended POST error messages that might appear on the system console if your N3700 storage system encounters CPU-level system errors during the POST process.

Note: Always power-cycle your N3700 storage system when you receive any of the following errors. If the system repeats the error message, follow the corrective action for that error message.

Table 17. POST error message descriptions

Error message or code	Description	Corrective action
[RAMX]	No physical memory was found by the system.	This indicates that the system doesn't see any memory. Try resetting the DIMM. See "Replacing the SDRAM DIMM on the CPU module" on page 37.
[Cerr]	Cache error.	These are cache errors. These errors indicate a bad CPU. If a power-cycle doesn't fix the problem, call your IBM service representative to replace the CPU module.
[Cer2]	Cache error.	
[EXC!]	Exception.	This indicates that the system took an exception while in firmware. If it is repeatable, this is likely a software bug in the firmware. Contact IBM technical support and provide a log of the error. If you can't get past this error, boot the system using the backup firmware image.
[RUN!]	CFE (common firmware environment) is jumping to executable code.	This is not an error, but rather a progress state indicator used to help troubleshoot the problem.
[HELO]	Very early Init code.	If the system stops on one of these error codes, there is likely a hardware problem. First, try Step 1 below. If this doesn't fix the problem, proceed to the subsequent steps until the problem is fixed. 1. Power off the system, then power it back on. 2. Try booting with the backup firmware image. See "Booting your N3700 storage system from a backup firmware image" on page 50. 3. Call your IBM service representative to replace the CPU module.
[L1CI]	L1 cache INIT.	
[L2CI]	L2 Cache INIT.	
[TST1]	Simple POST test: cache of both levels and tags.	
[CPU1]	CPU1 INIT.	
[cpu1]	CPU1 entering IDLE loop.	

Table 17. POST error message descriptions (continued)

Error message or code	Description	Corrective action
[DRAM]	Running on CPU0, on memory segment 0 (that is, program is now running in RAM rather than flash memory).	If the system stops on one of these error codes, the memory is bad or the NVLOG subsystem malfunctioned. To test this, reseat the DIMM and disconnect the battery. See Chapter 5, "Replacing N3700 storage system devices," on page 27. If that fails to clear the problem, replace the DIMM. See "Replacing the SDRAM DIMM on the CPU module" on page 37.
[Zero]	Zero memory...no NVMEM.	
[Keep]	Keep memory...preserve NVMEM.	
[ZBSS]	Zero the BSS segment.	
[CODE]	Zero and copy the code segment from flash to memory.	
[DATA]	Zero and copy the data segment from flash to memory.	
[RELO]	Jump to the new code segment.	
[L12F]	Flush and enable caches.	
[MAIN]	Jump to the main CFE memory.	
[KMEM]	Initialize CRDs heap.	
[NVCL]	Clear memory that isn't owned by NVMEM or CFE.	
[CONS]	Attach console device.	Check the connection between your N3700 storage system and the console device. Replace the cable if it is defective.
[CIOK]	Copy right etc.	A message of this type doesn't indicate a specific failure, but a general failure of some system component. 1. Try booting with the backup firmware image. See "Booting your N3700 storage system from a backup firmware image" on page 50. 2. Call your IBM service representative to replace your CPU module.
[AREN]	Physical memory map INIT.	
[DEVI]	Misc devices INIT.	
[ENVI]	Environmental variable subsystem INIT.	

Table 17. POST error message descriptions (continued)

Error message or code	Description	Corrective action
[PCIH]	PCI host bridge INIT.	If the system stops with one of these error codes, there is likely a problem with either the SB1250 chip or the ISP2312 FC-AL chip. 1. Try booting with the backup firmware image. See "Booting your N3700 storage system from a backup firmware image" on page 50. 2. Otherwise, call your IBM service representative to replace the CPU module.
[PCIB]	PCI try to init P2P bridges.	
[PCIS]	PCI device scan.	
[CFE]	This message is written when CFE jumps to the exception handler, for whatever reason. This is caused by either bad hardware or a bad flash memory.	1. Power-cycle the system. 2. Try booting with the backup firmware image. See "Booting your N3700 storage system from a backup firmware image" on page 50. 3. Otherwise, call your IBM service representative to replace the CPU module.

Environmental EMS messages

The following table describes the environmental EMS messages that might appear on the system console if your N3700 storage system encounters extremes in its operational environment.

Table 18. Environmental EMS messages

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.chassis Fan.ok NOTICE	fru_name STRING	This message is issued when the chassis fans are OK.	No corrective action needed.	LOG_NOTICE: Chassis FRU is ok	#366: Chassis FRU is ok
monitor.chassis Fan.slow ALERT	fru_name STRING	This is a warning message that is issued when a chassis fan is spinning too slowly.	The fan unit should be replaced.	LOG_ALERT: Chassis FRU contains at least one fan spinning slowly	#365: Chassis FRU contains at least one fan spinning slowly
monitor.chassis Fan.stop ALERT	fru_name STRING	This is a warning message that is issued when a chassis fan is stopped.	The fan unit should be replaced.	LOG_ALERT: Chassis FRU contains at least one stopped fan	#364: Chassis FRU contains at least one stopped fan

Table 18. Environmental EMS messages (continued)

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.chassis Fan.removed ALERT	fan_name STRING	This is a warning message that is issued when a chassis fan is removed.	The fan unit should be replaced.	LOG_ALERT: Chassis FRU is removed	#363: Chassis FRU is removed
monitor.chassis Temperature.ok NOTICE		This message is issued when the chassis temperature is normal.	No corrective action needed.	LOG_NOTICE: Chassis temperature is ok	#376: Chassis temperature is ok
monitor.chassis Temperature .warm ALERT	describe_ toowarm STRING	This is a warning message that is issued when the chassis temperature is too warm.	Check to see if air conditioning units are needed, or whether they are functioning properly.	LOG_ALERT: Chassis temperature is too warm	#372: Chassis temperature is too warm
monitor.chassis Temperature .cool ALERT	describe_ toocool STRING	This is a warning message that is issued when the chassis temperature is too cool.	Raise the ambient temperature around the N3700 storage system.	LOG_ALERT: Chassis temperature is too cool	#372: Chassis temperature is too cool
monitor.shut down.chassis OverTemp CRIT	describe_ toohot STRING	This message is issued just before shutdown, indicating the chassis temperature is too hot.	Check to see if air conditioning units are needed, or whether they are functioning properly.	LOG_CRIT: Chassis temperature is too hot	#371: Chassis temperature is too hot
monitor.shut down.chassis UnderTemp CRIT	describe_ toocold STRING	This message is issued just before shutdown when the chassis temperature becomes too cold.	Raise the ambient temperature around the N3700 storage system.	LOG_CRIT: Chassis temperature is too cold	#371: Chassis temperature is too cold
monitor.cpu Fan.ok INFO	cpu_number INT	This message indicates that a CPU fan is OK.	No corrective action needed.	LOG_INFO: CPU Fan OK	#386: CPU Fan OK
monitor.cpu Fan.degraded NOTICE	cpu_number INT	This message indicates that a CPU fan is degraded.	The CPU fan or the system motherboard might need to be replaced. See the hardware and service guide that came with your system.	LOG_NOTICE: CPU Fan is slow	#383: CPU Fan is slow

Table 18. Environmental EMS messages (continued)

Name	Parameters	Description	Corrective action	Syslog	SNMP
monitor.cpu Fan.failed NOTICE	cpu_number INT	This message indicates that a CPU fan is degraded.	The CPU fan or the system motherboard might need to be replaced. See the hardware and service guide that came with your system.	LOG_NOTICE: CPU Fan is stopped	#381: CPU Fan is stopped
monitor.chassis PowerSupplies .ok INFO		This message indicates that all power supplies are OK.	No corrective action needed.	LOG_INFO: Chassis power supplies OK	#396: Chassis power supplies OK
monitor.chassis PowerSupply .off NOTICE	ps_number INT	This message indicates that a power supply is turned off.	Turn the power supply on.	LOG_NOTICE: Chassis power supply off	#395: Chassis power supply is off
monitor.chassis PowerSupply . notPresent NOTICE	ps_number INT	This message indicates that a power supply is not present.	Add a power supply to the N3700 storage system.	LOG_NOTICE: Chassis power supply not present	#394: Chassis power supply is not present
monitor.chassis PowerSupply . degraded NOTICE	ps_number reasonText INT STRING	This message indicates that a power supply is degraded.	A replacement power supply might be required. Contact IBM technical support for further instruction.	LOG_NOTICE: Chassis power supply is degraded	#392: Chassis power supply is degraded
monitor.chassis Power.ok NOTICE		This messages indicates that the motherboard power is OK.	No corrective action needed.	LOG_NOTICE: Chassis power is OK	#406: Chassis power is OK
monitor.chassis Power.degraded NOTICE	reasonText STRING	This message indicates that a power supply is degraded.	Replace the power supplies. [1]	LOG_NOTICE: Chassis power is degraded	#403: Chassis power is degraded

[1] Degraded power might be caused by bad power supplies, bad wall power, or bad components on the motherboard. If spare power supplies are available, try replacing them to see whether that alleviates the problem. Otherwise, contact IBM technical support for further instruction.

Netboot process for the N3700 storage system

The netboot process enables you to boot your N3700 storage system from a remote server if your CompactFlash media becomes damaged or unusable.

Configuration requirements for netboot servers

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

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

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

Note: For more information about the netbooting process, see the *IBM System Storage N series System Administration Guide* for your version of Data ONTAP.

Performing the netboot process from a remote image

To perform the netboot process on an N3700 storage system from a remote image, complete the following steps:

1. Place a Data ONTAP boot image on a local HTTP server. You can copy the boot image from the N3700 storage system boot directory, /etc/boot/netapp-mips, or download it from the following Web site:

   www.ibm.com/storage/support/nas/
2. At the N3700 storage system CFE prompt, enter one of the following commands:

   Using DHCP:

   `ifconfig e0a -auto`

   Using manual configuration:

   `ifconfig e0a -addr=`*`filer_addr`* `-mask=`*`netmask`* `-gw=`*`gateway`* `-dns=`*`dns_addr`* `-domain=`*`dns_domain`*
3. At the CFE prompt, enter the following command:

   `netboot` *`URL`*

   Example:

   `netboot http://myserver/bootimages/netapp/netapp-mips`

   Result: You should then see normal boot messages during the netboot process.

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

Booting your N3700 storage system from a backup firmware image

This procedure boots your N3700 storage system using a stored backup firmware image and should only be used as a *last resort*.

Booting with a backup firmware image

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

1. With the system powered off, insert a paper clip into the tiny, unmarked hole between the console and Ethernet ports. Make sure that you can feel the button pushing in.

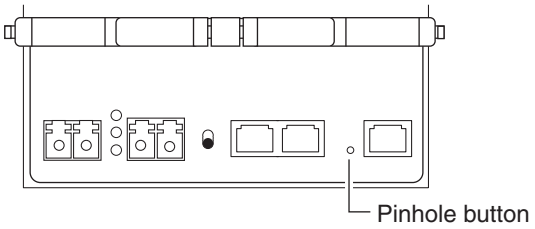


Figure 17. Pinhole reset button

2. While the button is pressed with the paper clip, turn on power to the N3700 storage system.
3. Remove the paper clip from the hole.

   The result is that the N3700 storage system begins booting, showing its progress on the console screen.

Troubleshooting the N3700 storage system

Use this table to troubleshoot specific problems with your system.

Problem	Possible cause	Solution
CFE (common firmware environment) won't boot. Last console status code might be [ZBSS], [L12F], or [CERR].	This indicates that something is wrong with the memory DIMM.	To fix this problem, begin with the first procedure in the following list. If that doesn't solve the problem, continue down to the next troubleshooting tip on the list until the problem is solved. • Unplug the battery in the CPU module for 5 seconds, plug the battery back in, and try booting the N3700 storage system. **Note:** Unplugging the battery might reset the clock. • Reseat the DIMM on the CPU module. • Replace the DIMM. • Call your IBM service representative to replace the CPU module.
CFE comes up but [CERR] is printed out when booting the kernel	This is a problem with NVMEM. NVMEM is mainly for power outages. Handling the CPU module outside the shelf while NVMEM is valid might corrupt memory.	• If the CPU module was not handled, contact IBM technical support. • Otherwise, unplug the battery in the CPU module for 5 seconds, plug the battery back in, and try booting the N3700 storage system. **Note:** Unplugging the battery might reset the clock.
CFE comes up but can't boot anything from the CompactFlash card.	Contents of the CompactFlash card are not correct.	Try entering this command at the CFE prompt, which is equivalent to `dir c:` from a PC: `test fatfs ide0.0` If no errors occur and nothing is shown on the console, the contents of the CompactFlash card are not valid or the CompactFlash card is blank. Reinstall Data ONTAP. Refer to "Netboot process for the N3700 storage system" on page 50 for more information. If there is an error, replace the CompactFlash card.

Problem	Possible cause	Solution
Real-Time Clock (RTC) loses its time.	The rechargeable battery for NVMEM also powers the real-time clock. If this battery is disconnected for more than a few seconds or the battery is discharged, the real-time clock might be reset.	Plug the battery back in to the motherboard and reset the clock to the correct time.
The N3700 storage system does not recognize any of the installed disk drives.	The 1 Gb/2 Gb switch is not set to the 1 Gb position.	1. Power off the N3700 storage system. 2. Move the switch to the 1 Gb position. See Step 6 of “Connecting your N3700 storage system to a network” on page 7. 3. Power on the N3700 storage system.
My IBM service representative replaced a CPU module and now the new module can’t see the disks	The disk ownership mechanism ties disks to CPU module system IDs. If your IBM service representative replaced a CPU module with a new one in, the disks are still stamped with the system ID of the old module.	Perform a **disk reassign** command. Use the **help** command to get the exact syntax.
I have unowned disks; why didn’t Data ONTAP use them to reconstruct a failed drive?	The disks need to be “SPARES,” not “unowned.”	Assign the disks as spares.
The battery is discharged and Data ONTAP won’t boot.	The battery voltage is too low to hold data for 3 days during a power-out condition. If you turn on the machine and let it sit at the firmware (CFE) prompt, it does not turn on the charger. You need to boot Data ONTAP to get the software to turn on the battery charger.	You have two main options at this point: 1. Leave the N3700 storage system alone for a few hours to let the battery charge. 2. Press Ctrl-C to override this check. Executing a **priv set advanced** command and an **nv** command shows you the current status of the battery (if you pressed Ctrl-C to override the stall condition). You can also try out the **environ chassis Battery** command (note that “Battery” is case-sensitive). In either case, the battery charger is turned on and recharges the battery over the next few hours.
CFE failed, creating a POST code.	CFE firmware runs a series of Power-On-Self-Tests (POST) before trying to load Data ONTAP. If any of the POSTs fail, a code is printed.	See “POST error messages” on page 44 for a description of the error.

Problem	Possible cause	Solution
Fibre Channel adapter B appears to be unattached or disconnected.	You have an open loop. Fibre Channel needs a closed/completed loop to communicate.	• Check the terminate switch on the CPU module. If an expansion shelf is attached to your system, the terminate switch should be OFF. If there's no expansion shelf, you must have the terminate switch set to ON. • If you have expansion shelves, the last shelf must have its terminate switch set to ON. All other shelves in the loop (including the CPU module) must have the terminate switches set to OFF. • If that doesn't fix it, you might have a faulty shelf, drive, or cable. Try removing items until the loop closes and then add them back until you see the failure. While removing/adding, be sure to set the terminate switches appropriately. • If that still doesn't fix it, you might have a bad adapter on the CPU module (rare case). Call your IBM service representative to replace the CPU module.
The N3700 storage system won't stop beeping.	It is the kernel's responsibility to "ping" the ops panel occasionally so the ops panel's watchdog timer doesn't start beeping.	Push the MUTE button on the back of the shelf to stop the beeping. If beeping continues, contact IBM technical support.

Appendix A. Recommended power line sizes

This appendix discusses how to determine the power line lengths running from your N3700 storage 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 N3700 storage system and disk shelves, 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 19. 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 20. 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 21. 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. 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
- *IBM System Storage EXN4000 Installation and Setup Instructions*, GC27-2079

Data ONTAP 7.2 filer library

- *IBM System Storage N series Data ONTAP 7.2 Release Notes*, GC26-7963

- *IBM System Storage N series Data ONTAP 7.2 Active-Active Configuration Guide*, GC26-7964
- *IBM System Storage N series Data ONTAP 7.2 File Access and Protocols Management Guide*, GC26-7965
- *IBM System Storage N series Data ONTAP 7.2 Storage Management Guide*, GC26-7966
- *IBM System Storage N series Data ONTAP 7.2 Data Protection Online Backup and Recovery Guide*, GC26-7967
- *IBM System Storage N series Data ONTAP 7.2 Data Protection Tape Backup and Recovery Guide*, GC26-7968
- *IBM System Storage N series Data ONTAP 7.2 MultiStore Management Guide*, GC26-7969
- *IBM System Storage N series Data ONTAP 7.2 Network Management Guide*, GC26-7970
- *IBM System Storage N series Data ONTAP 7.2 Commands: Manual Page Reference, Volume 1*, GC26-7971
- *IBM System Storage N series Data ONTAP 7.2 Commands: Manual Page Reference, Volume 2*, GC26-7972
- *IBM System Storage N series Data ONTAP 7.2 Upgrade Guide*, GC26-7976
- *IBM System Storage N series Data ONTAP 7.2 Block Access Management Guide for iSCSI & FCP*, GC26-7973
- *IBM System Storage N series Data ONTAP 7.2 System Administration Guide*, GC26-7974
- *IBM System Storage N series Data ONTAP 7.2 Software Setup Guide*, GC26-7975
- *IBM System Storage N series Data ONTAP 7.2 Core Commands Quick Reference*, GC26-7977

Data ONTAP 7.1 filer library

- *IBM System Storage N series Data ONTAP Release Notes*, GC26-7862
- *IBM System Storage N series Data ONTAP 7.1 Cluster Installation and Management Guide*, GC26-7790
- *IBM System Storage N series Data ONTAP 7.1 File Access and Protocols Management Guide*, GA32-0520
- *IBM System Storage N series Data ONTAP 7.1 Storage Management Guide*, GA32-0521
- *IBM System Storage N series Data ONTAP 7.1 Data Protection Online Backup and Recovery Guide*, GA32-0522
- *IBM System Storage N series Data ONTAP 7.1 Data Protection Tape Backup and Recovery Guide*, GA32-0523
- *IBM System Storage N series Data ONTAP 7.1 MultiStore Management Guide*, GA32-0524
- *IBM System Storage N series Data ONTAP 7.1 Network Management Guide*, GA32-0525
- *IBM System Storage N series Data ONTAP 7.1 Commands: Manual Page Reference, Volume 1*, GA32-0526
- *IBM System Storage N series Data ONTAP 7.1 Commands: Manual Page Reference, Volume 2*, GA32-0527
- *IBM System Storage N series Data ONTAP 7.1 Upgrade Guide*, GC26-7791

- *IBM System Storage N series Data ONTAP 7.1 Block Access Management Guide for iSCSI & FCP*, GA32-0528
- *IBM System Storage N series Data ONTAP 7.1 System Administration Guide*, GA32-0529
- *IBM System Storage N series Data ONTAP 7.1 Software Setup Guide*, GA32-0530
- *IBM System Storage N series Data ONTAP 7.1 Core Commands Quick Reference*, GA32-0531

Data ONTAP 7.2 gateway systems library

- *IBM System Storage N series Data ONTAP 7.2 Gateway Release Notes*, GC26-7955
- *IBM System Storage N series Data ONTAP 7.2 Gateway Software Setup, Installation, and Management Guide*, GC26-7962
- *IBM System Storage N series Data ONTAP 7.2 Gateway Connecting Your System*, GC26-7990
- *IBM System Storage N series Data ONTAP 7.2 Gateway Planning Guide*, GC26-7957
- *IBM System Storage N series Data ONTAP 7.2 Gateway Software Upgrade Guide*, GC26-7958
- *IBM System Storage N series Data ONTAP 7.2 Gateway Integration Guide for IBM Storage*, GC26-7959
- *IBM System Storage N series Data ONTAP 7.2 Gateway Integration Guide for Hitachi Storage*, GC26-7960
- *IBM System Storage N series Data ONTAP 7.2 Gateway Integration Guide for HP XP Storage*, GC26-7961
- *IBM System Storage N series Data ONTAP 7.2 Gateway Integration Guide for EMC CLARiiON Storage*, GC27-2081
- *IBM System Storage N series Data ONTAP 7.2 Gateway Integration Guide for Fujitsu ETERNUS Storage*, GC27-2082
- *IBM N series Gateway Data ONTAP 7.2 Integration Guide for IBM SAN Volume Controller Storage*, GC27-2061
- *IBM Gateway Data ONTAP 7.2 3PAR Implementation Guide*, GC27-2090
- *IBM Gateway Data ONTAP 7.2 MetroCluster Guide*, GC27-2091
- *IBM Gateway Data ONTAP 7.2 Installation Requirements, Quick Start, & Reference Guide*, GC27-2092

Data ONTAP 7.1 gateway systems library

- *IBM System Storage N series Gateway Planning Guide*, GC26-7839
- *IBM System Storage N series Gateway Integration Guide for IBM Storage*, GC26-7840
- *IBM System Storage N series Gateway Integration Guide for Hitachi Storage*, GC26-7841
- *IBM System Storage N series Gateway Integration Guide for HP Storage*, GC26-7858
- *IBM System Storage N series Gateway Software Upgrade Guide*, GC26-7859
- *IBM System Storage N series Gateway Software Setup, Installation, and Management Guide*, GC26-7886
- *IBM System Storage N series Gateway Release Notes*, GC26-7837

Other N series and N series-related documents

- *IBM System Storage N series Platform Monitoring Guide*, GC27-2088
- *IBM System Storage N series Diagnostics Guide*, GC26-7789
- *IBM System Storage N series Introduction and Planning Guide*, GA32-0543
- *IBM System Storage N series Autosupport Overview*, GC26-7854
- *IBM System Storage N series: Changing the cluster cfmode Setting in Fibre Channel SAN Configurations*, GC26-7876
- *IBM System Storage N series Fibre Channel Configuration Guide*, GC26-7835
- *IBM System Storage N series Metrocluster Redbook*, REDP-4243-00
- *IBM System Storage Systems Safety Notices*, G229-9054
- *IBM Storage Solution Rack 2101 Rack Installation and Service Guide: Models 200 and N00*, GC26-7993

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When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

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European Community contact:
IBM Technical Regulations

Pascalstr. 100, Stuttgart, Germany 70569
Tele: 0049 (0)711 7851176
Fax: 0049 (0)711 785 1283
e-mail: tjahn@de.ibm.com

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Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 18. September 1998 (bzw. der EMC EG Richtlinie 89/336)

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die: IBM Deutschland Informationssysteme GmbH 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

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Anmerkung: Um die Einhaltung des EMVG sicherzustellen, sind die Geräte wie in den IBM Handbüchern angegeben zu installieren und zu betreiben.

People’s Republic of China Class A Electronic Emission Statement

中华人民共和国“A类”警告声明

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Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

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