NETGEAR®

ReadyNAS OS 6
RR2312
Rack-Mount Hardware Manual

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Conformity

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Compliance

For regulatory compliance information, visit *http://www.netgear.com/about/regulatory*.

See the regulatory compliance document before connecting the power supply.

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Contents

Getting Started

1

Congratulations on your purchase of a NETGEAR ReadyNAS® storage system. This manual describes the physical features of the ReadyNAS OS 6 rack-mount storage system.

This chapter contains the following sections:

- *Additional Documentation*
- *Setup Location*
- *Supported Operating Systems*
- *Supported Browsers*
- *Diskless Storage System*

Note For more information about the topics that are covered in this manual, visit the support website at *http://support.netgear.com/product/ReadyNAS-OS6*.

Additional Documentation

For detailed information about configuring, managing, and using your ReadyNAS storage system, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6.*

For additional product support information, visit *http://support.netgear.com/product/ReadyNAS-OS6.*

Setup Location

Your ReadyNAS storage system is intended for installation in a restricted access location (dedicated equipment rooms, service closets, and the like) only.

Keep the following considerations in mind as you install your system:

- **Ambient operating temperature**. If the system is installed in a closed or multiunit rack assembly, the ambient operating temperature of the rack environment might be greater than the ambient temperature of the room. Therefore, consider installing the equipment in an environment compatible with the maximum rated ambient temperature. See *Defaults and Technical Specifications* on page 29.

- **Reduced airflow**. Mount the equipment into a rack so that the amount of airflow required for safe operation is not compromised.

- **Mechanical loading**. Mount the equipment into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

- **Circuit overloading**. Consider the equipment's connection to the power supply circuitry and the effect that any possible overloading of circuits might create on overcurrent protection and power supply wiring. Consider equipment nameplate ratings when addressing this concern.

- **Reliable grounding**. This product requires reliable grounding to be maintained at all times. To ensure this, ground the rack itself. Pay particular attention to power supply connections other than the direct connections to the branch circuit (for example, the use of power strips).

- **Clearance**. Leave enough clearance in front of the rack (about 25 inches) to enable you to open the front door completely and in the back of the rack (about 30 inches) to allow for sufficient airflow and ease in servicing.

Supported Operating Systems

The ReadyNAS storage system is supported on the following systems:

- Microsoft Windows 10 (32 and 64 bit)
- Microsoft Windows 8.1 (32 and 64 bit)
- Microsoft Windows 8 (32 and 64 bit)
- Microsoft Windows 7 (32 and 64 bit)
- Microsoft Server 2012 (64 bit)
- Microsoft Server 2008 R2 (64 bit)
- Apple OS X 10.7 or later
- Linux, UNIX, Solaris

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- Apple iOS

- Google Android

Supported Browsers

The ReadyNAS local admin page supports the following browsers:

- Microsoft Edge

- Microsoft Internet Explorer 9.0 and later

- Apple Safari, 5.0 and later

- Google Chrome 20 and later

- Mozilla Firefox 14 and later

If you experience difficulty accessing the local admin page or if you notice unexpected behavior, try using another browser. For more information about the ReadyNAS local admin page, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6*.

Diskless Storage System

If you purchased a ReadyNAS storage system without a preinstalled disk drive or drives, you must add at least one disk to your system before you use the system. You can add a 3.5-inch hard disk drive to an empty disk bay. For information about how to install a disk, see *Add a Disk* on page 21.

Use only supported SATA hard disk drives (HDDs) in your ReadyNAS storage system. If you use disks that are not supported, NETGEAR technical support will not provide assistance. For a list of supported disks, see the NETGEAR Hardware Compatibility List at *http://www.netgear.com/readynas-hcl.*

If you are adding a previously formatted disk to your storage system, see the instructions in *Previously Formatted Disks* on page 20.

Installation

2

Use the rack-mount hardware included with your ReadyNAS storage system to install it in a rack. Read *Rack-Mount Precautions* on page 33.

Note A system with installed drives can weigh more than 80 pounds. To avoid injury or damage to the equipment, perform the rack-mount installation with appropriate assistance.


Read these instructions in their entirety before you begin. Locate the shipping carton, remove the rack-mounting kit, and prepare to work with it.

The rack-mounting kit contains two rail assemblies. Each assembly consists of two sections:

- An inner fixed chassis rail that secures directly to the system's chassis
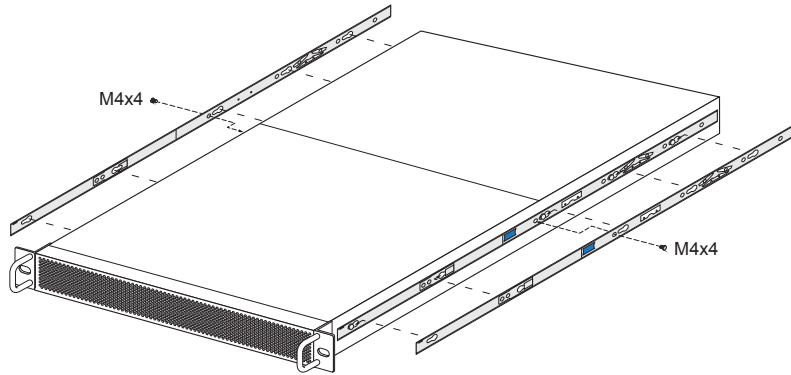- An outer fixed rack rail that secures directly to the rack itself

▶**To install the system into a rack:**

1. Extend the rail assembly by pulling it outward.
2. Press the release tab and separate the inner rail from the outer assembly.
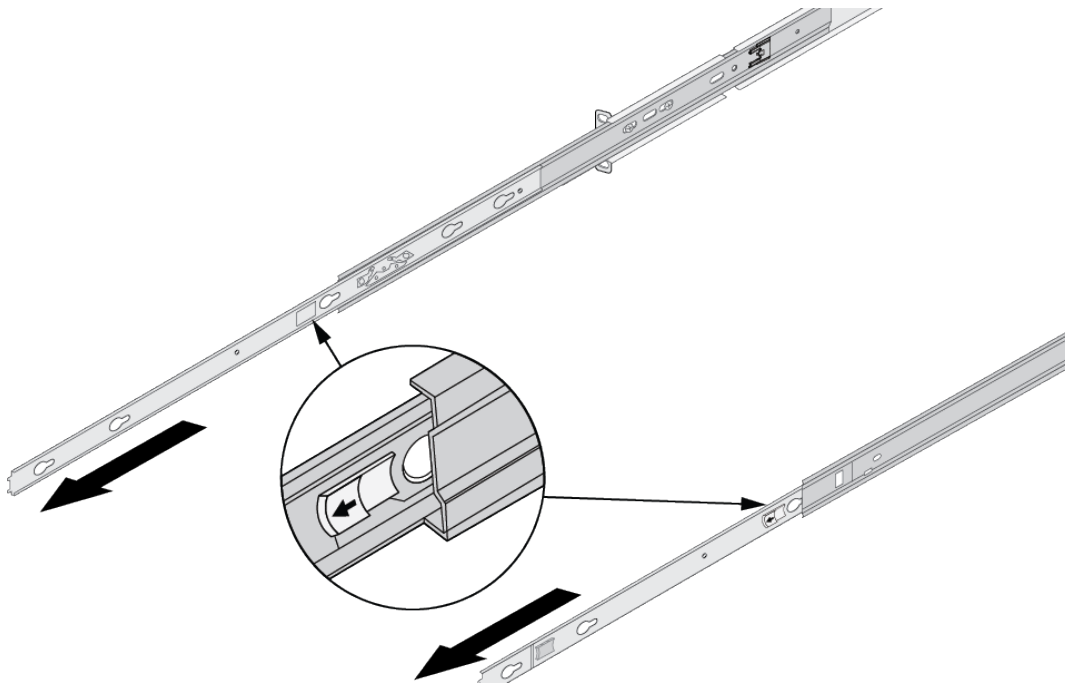
3. Align the inner rails with the mounting post on the chassis and slide the rails to lock them.
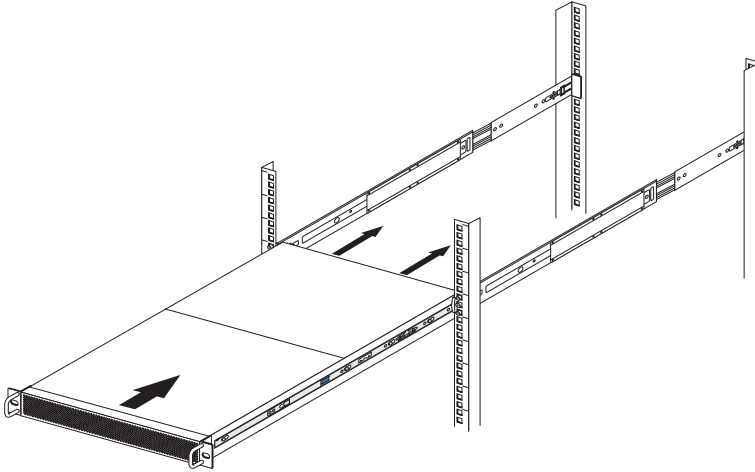

4. Secure the rails to the chassis with two M4x4 screws.

5. Align both the front and back of the outer rails with rack-mounting holes and extend the outer rails until the rail mounting posts snap into the rack.
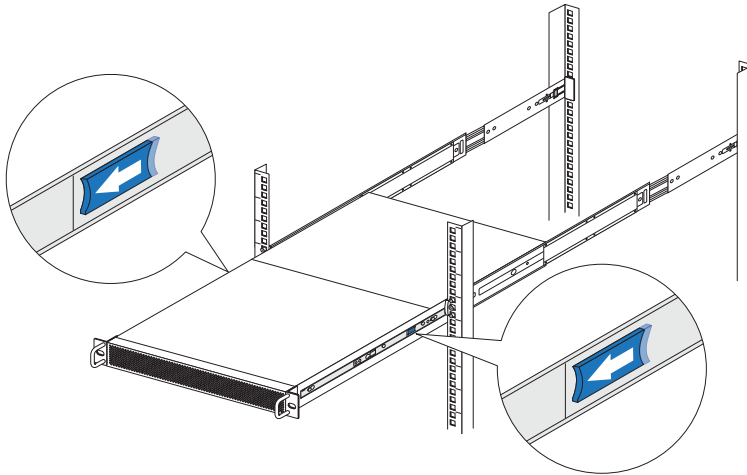
Note that the rails are marked FRONT on the ends of the rails that go into the front of the rack.
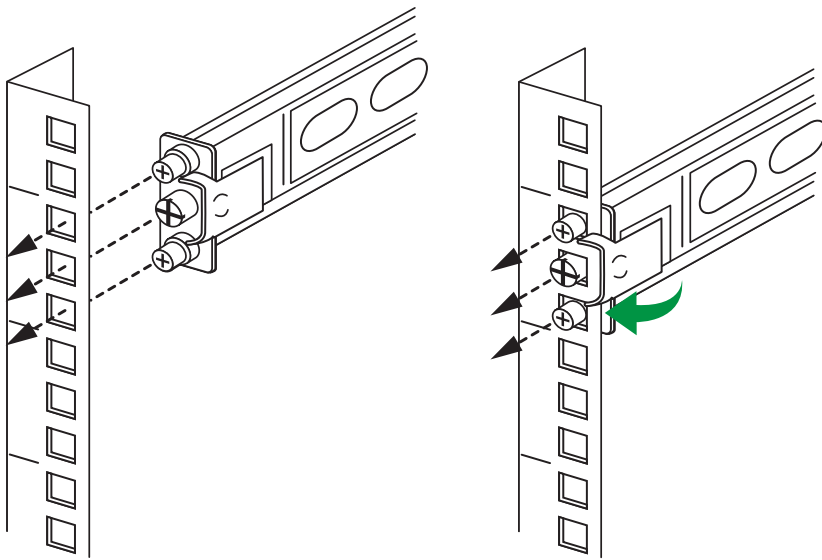
6. Align the rails and push the chassis in until it stops.

7. Pull the rail release forward and finish pushing the chassis into the rack.

8. Screw two M5 bolts through the chassis tabs into the center of the rails.
The rack-mount installation is complete.

Physical Features

3

This chapter describes the physical features of the ReadyNAS RR2312. It includes the following sections:

- *Front Panel*
- *Rear Panel*

Front Panel

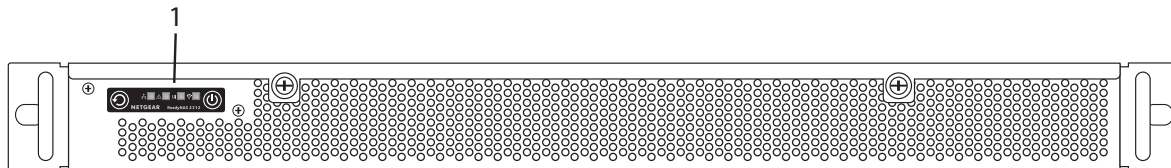The following figure shows the front panel of the ReadyNAS 2312 storage system.

Figure 1. Front panel

1. Control panel

The following figure shows the control panel in more detail.
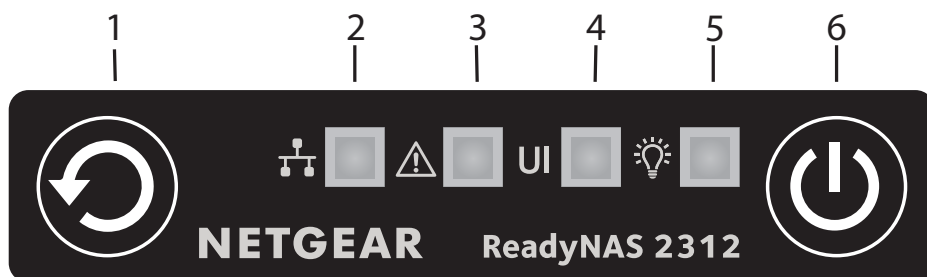

Figure 2. Control panel

1. Reset button

2. LAN LED

3. Health LED

4. UID LED

5. Power LED

6. Power button

You can obtain information about the status of your system by reviewing the front panel indicators that are listed in the following table.

Table 1. Front panel functions

Indicator or Function	Description
Reset button	Multiple uses in addition to system reset.
LAN LED	Shows port activity.

Table 1. Front panel functions (Continued)

Indicator or Function	Description
Health LED	The Health LED indicates these states: • **Solid red**. The system needs attention. Use the local admin page to determine the problem. For more information, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6*. • **Off**. The system is healthy. • **Blinking red**. The system is entering boot mode.
UID LED	The UID LED indicates these states: • **Solid blue**. The system is identified. • **Blinking blue**. The system is entering boot mode. • **Off**. The system is not identified.
Power LED	The Power LED indicates these states: • **Solid green**. The system is powered on. • **Off**. The system is powered off. • **Blinking green**. The system is entering boot mode.
Power button	Use the **Power** button to turn power to the system on or off.

Rear Panel

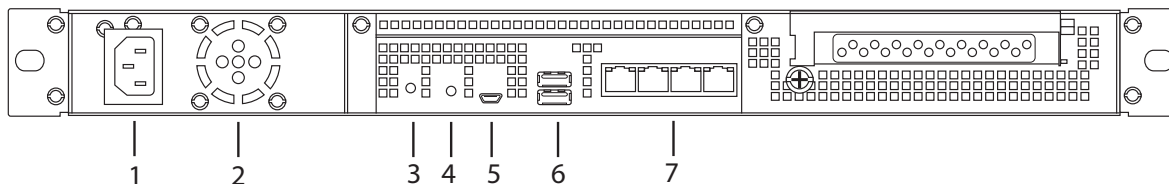The following figure shows the rear panel of the storage system.

Figure 3. Rear panel

1. Power recepticle
2. PSU fan
3. UID switch
4. UID LED
5. Debug port (use only when directed by NETGEAR Technical Support)

6. USB 3.0 ports

7. LAN ports and LEDs

You can obtain information about the status of your system by reviewing the rear panel indicators that are listed in the following table.

Table 2. Rear panel functions

Indicator or Switch	Description
UID switch	Change the position (toggle) to change whether the UID LED is lit.
UID LED	The Unit Identifier (UID) LED indicates these states: • **Solid blue**. The system is identified. • **Off**. The system is not identified. This LED is under both manual and software control.
LAN LED	Indicates activity on any port.

Power On and Shut Down

4

This chapter describes how to power on and shut down your system. If you must shut down the system, use one of the preferred shutdown methods whenever possible. The chapter contains the following sections:

- *Power On*
- *Preferred Shutdown*
- *Forced Shutdown*
- *Power State*
- *Boot Menu*

Power On

▶**To power on the system:**

1.   Connect the system to a power supply.

> **Note**   Depending on the system's last power state, the system might power on automatically. For more information, see *Power State* on page ?.

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2.   If necessary, press the **Power** button on the front panel of the system.
     The system powers on.

Preferred Shutdown

You can gracefully shut down your system by using the **Power** button or the ReadyNAS local admin page.

For information about how to gracefully shut down your system using the ReadyNAS local admin page, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6*.

▶**To gracefully shut down your system using the Power button:**

1.   Press the **Power** button on the front panel of the system.
     The Power LED blinks, prompting you to confirm the shutdown.

2.   Press the **Power** button again.
     The system shuts down gracefully.

Forced Shutdown

Perform a forced shutdown only if the storage system is not responding.

▶**To perform a forced shutdown:**

Press and hold the **Power** button on the front panel for more than four seconds.
The system shuts down.

Power State

If the power supply is interrupted due to a power failure, the system powers on when the power supply is restored.

Boot Menu

Use the boot menu to restart or troubleshoot your ReadyNAS storage system. Your storage system provides the following boot modes:

- **Normal**. Initiates a normal boot process, just like booting using the **Power** button.

- **Factory default**. Initiates a short disk test that takes approximately 5 minutes. After the disk test, a 10-minute time-out period begins. During the 10-minute time-out period, you can choose to power off the storage system without causing any data loss, and the factory default process is canceled. If you choose not to power off the storage system, after the 10-minute time-out period, the factory default process begins.

> **WARNING:**
> **The factory default reboot process resets the storage system to factory settings, erases all data, resets all defaults, and reformats the disk to X-RAID.**

> **Note** To start the factory default process immediately, press the **Reset** button during the 10-minute time-out period.

- **OS reinstall**. Reinstalls the firmware from the internal flash to the disks. Use the OS reinstall boot mode when the system crashes and corrupts some configuration files. OS reinstall boot mode also resets some settings on your storage system, such as Internet protocol settings and the administrator password, to defaults.

- **Tech support**. Boots into a low-level diagnostic mode. Use the tech support boot mode only when a NETGEAR Technical Support representative instructs you to do so.

- **Volume read only**. Mounts a volume as read-only. Use this option when you are attempting to rescue data off a disk during a disaster recovery.

- **Memory test**. Performs a memory test. The pass or fail result is reported using the storage system's LEDs. Contact a NETGEAR Technical Support representative to interpret memory test results.

- **Test disk**. Performs an offline full disk test. This process can take four hours or more, depending on the size of your disks. Any problems are reported in the system logs, which you can view using the local admin page. For more information about viewing the system logs, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6*.

▶**To access the boot menu:**

1. Power off your system.

2. Press and hold the **Reset** button.

3. Press the **Power** button on the front panel of the system.
   The system powers on.

4. Continue to press the **Reset** button until the Power, Health, and UID LEDs are blinking.

> **Note** It takes approximately one minute for the system to enter boot mode.

5. Press and release the **Reset** button to scroll through the boot menu modes.

   The storage system shows the boot mode options using the Power LED, Health LED, and the UID LEDs on the front panel (for information about LEDs, see *Front Panel* on page 12), as described in the following table:

Boot Mode	Status Indicators			
	Description	Power LED	Health LED	UID LED
Boot menu	Power, Health, and UID LEDs blink.	✳ (green)	✳ (red)	✳ (blue)
Normal	Health LED is solid red.	● (off)	● (red)	● (off)
Factory default	UID LED is solid blue.	● (off)	● (off)	● (blue)
OS reinstall	UID LED is solid blue and Health LED is solid red.	● (off)	● (red)	● (blue)
Tech support	Power LED is solid green.	● (green)	● (off)	● (off)
Volume read only	Power LED is solid green and Health LED is solid red.	● (green)	● (red)	● (off)
Memory test	Power LED is solid green and UID LED is solid blue.	● (green)	● (off)	● (blue)
Test disk	Power LED is solid green, Health LED is solid red, and UID LED is solid blue.	● (green)	● (red)	● (blue)

Legend:

- Solid: ●

- Blinking: ✳

- Off: ●

6. Press and hold the **Reset** button to confirm your boot menu selection.

   The system boots in the selected boot mode.

Disks

5

This chapter describes how to reformat, add, and replace disks in your ReadyNAS OS 6 storage system.

For information about configuring disks on your storage system, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6*.

This chapter includes the following topics:

- *Supported Disks*
- *Previously Formatted Disks*
- *Add a Disk*
- *Replace a Disk*

Note Most ReadyNAS systems use disk trays. The RR2312 does not.

Supported Disks

Use only supported SATA hard disk drives (HDDs) or solid-state drives (SSDs) in your ReadyNAS storage system. If you use disks that are not supported, NETGEAR Technical Support will not provide assistance. For a list of supported disks, see the NETGEAR Hardware Compatibility List at *http://www.netgear.com/readynas-hcl.*

Previously Formatted Disks

You can use previously formatted disks with your ReadyNAS OS 6 storage system, but you might need to reformat them or migrate a volume to the new system first.

Previously formatted disks must appear on the NETGEAR Hardware Compatibility List, which is available at *http://www.netgear.com/readynas-hcl.*

Reformat Previously Formatted Disks

If you want to use disks that were previously formatted for an operating system other than ReadyNAS OS 6 (for example, Windows or RAIDiator), you must reformat the disks.

If you want to use disks from another ReadyNAS OS 6 storage system, see *Migrate a Volume* on page 21.

Note If you try to use previously formatted disks in a system that does not contain any other disks, the system does not boot and ReadyCLOUD does not discover your device. If you use RAIDar to discover your device, RAIDar displays a Corrupt Root error message.
If you try to use previously formatted disks in a system that already contains usable disks, the system does not reformat or use the previously formatted disks. Any data on the previously formatted disks remains intact.

The following instructions describe how to reformat previously formatted disks in a ReadyNAS OS 6 system. This procedure assumes that the system does not contain any other disks.

▶ **To reformat previously formatted disks with a diskless ReadyNAS OS 6 system:**

1. Gracefully shut down the storage system.

   For information about how to gracefully shut down your system, see *Preferred Shutdown* on page 16.

2. Install the disk.

   For more information, see *Add a Disk* on page 21.

3. Reset the system to its factory default settings.

   WARNING:
   This process erases all data and reformats all disks into a single X-RAID volume. If you want to preserve the data on the disks, you must back up the data to an external drive before using the disks in your ReadyNAS storage system.

For information about how to reset the system to its factory default settings, see *Boot Menu* on page 17.

The disk is reformatted and becomes available for use with your ReadyNAS OS 6 storage system.

Migrate a Volume

You can migrate a volume from one ReadyNAS OS 6 storage system to another, as long as you migrate every disk in the volume. For example, if you want to migrate a volume that contains two disks, you must add both disks to the new system. If you add only part of a volume to the new system, the system recognizes the disk as a degraded volume.

If your ReadyNAS storage system is operating with one or more disks, you can add disks while the system is running. The new system recognizes the migrated volume and its data. For more information about adding a disk while the system is running, see *Add a Disk* on page 21.

If no disks are installed on your ReadyNAS, perform the following procedure.

▶**To migrate a volume to a diskless ReadyNAS OS 6 system:**

1.   Gracefully shut down the new (diskless) storage system.
     For information about how to gracefully shut down your system, see *Preferred Shutdown* on page 16.

2.   Remove each disk in the volume from the old system.

3.   Install each disk in the volume into the new storage system.
     For more information, see *Add a Disk* on page 21.

4.   Turn on the new system by pressing the **Power** button.
     The new system recognizes the migrated volume and its data.

Add a Disk

You can add 3.5-inch disks.

If you want to add a previously formatted disk to your storage system, see the instructions in *Previously Formatted Disks* on page 20.

▶ **To add a disk:**
1.   Determine whether you must shut down your system:
     - If you are adding disks to a diskless system, gracefully shut down the system.
       For information about how to gracefully shut down your system, see *Preferred Shutdown* on page 16.
     - If your system is operating with one or more disks, you can add disks while the system is running. You do not need to shut down the system.

2.   Remove the screws securing the chassis to the rack and rails.

3.   Pull the system forward from the rack until the rails lock partially extended.
     Use care when pulling the system forward to keep from stressing the cables attached to the back.

4.   Unscrew the two thumb screws on the front of the chassis.

Disks

5. Lift the top cover to access the disk tray array.

6. Set the top cover aside.

7. Align the front two mounting holes on the bottom of the drive with the pins in the drive area.
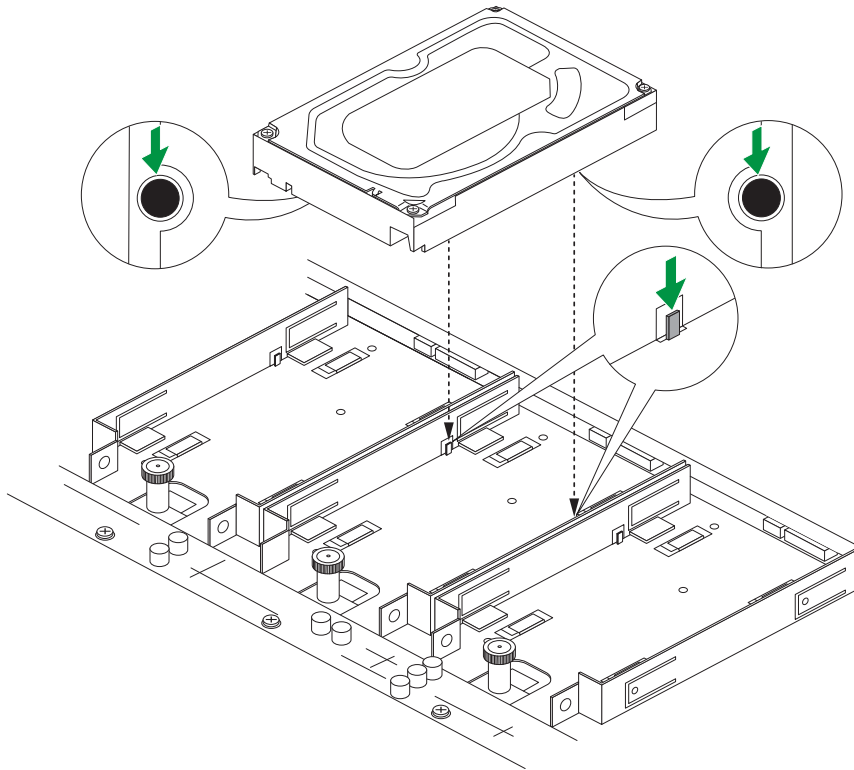
8. Gently push the drive down into the tray, pushing on the corners.
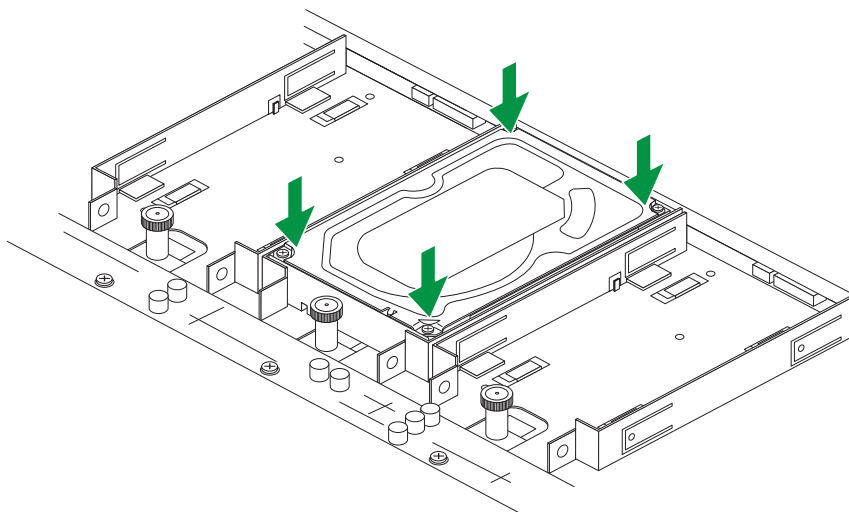
9. Push the drive into the rear connector until the thumb knob locks.
The thumb knob clicks when it locks.

Disks

Note Do not push on the lock post.
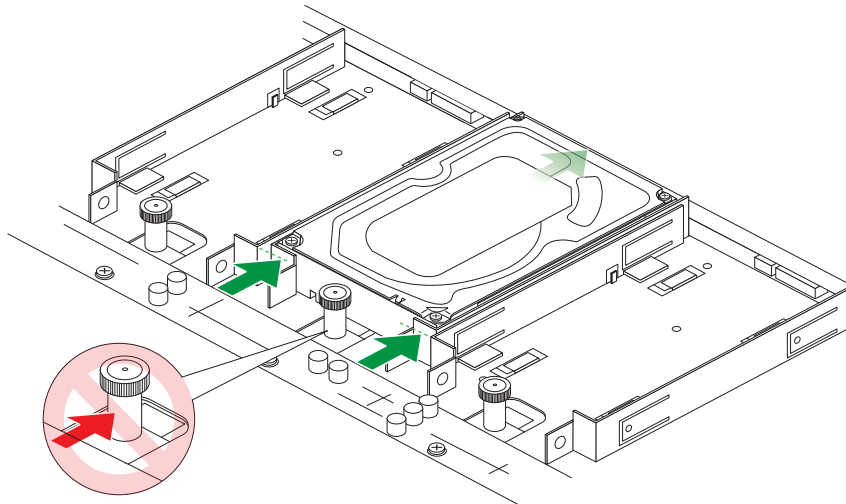
10. Repeat for any additional drives.

11. Replace the chassis cover.

12. Tighten the front thumb screws.

13. Slide the chassis back into the rack.

14. Replace the two M5 bolts through the chassis tabs into the center of the rails.

15. If necessary, turn on your system by pressing the **Power** button.

    If the disk that you added was not previously formatted, the system uses the disk in one of the following ways:

    - If you are adding the disk to a system that uses X-RAID, the system automatically determines whether the disk is used for protection or storage. The new disk is incorporated in the background while you continue to use your system.

    - If you are adding the disk to a system that uses Flex-RAID, the disk becomes available for use. You use the local admin page to manually configure the new disk.

    For more information about X-RAID, Flex-RAID, and using the local admin page, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6.*

Replace a Disk

If your volumes use a protected RAID configuration, your system can recover from the failure of a disk. When you replace the failed disk, the system rebuilds the volume using the new disk and no data from the volume is lost.

Each disk tray includes a Fault LED that lights solid red when its disk fails. You can also use the local admin page to set up email alerts that notify you when a disk fails. In addition, the local admin page provides information about the failed disk.

For information about RAID configurations, setting up email alerts, and using the local admin page, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6*.

ReadyNAS supports hot-swap drive bays, so you do not need to power down your storage system when replacing a disk.

If you are replacing a disk with a previously formatted disk, see the instructions in *Previously Formatted Disks* on page 20.

> **WARNING:**
> **Replace one disk at a time. Wait for the volume to resynchronize your data before replacing another disk. If you attempt to replace more than one disk at a time, the system crashes.**

▶ **To replace a disk:**

1. Remove the screws securing the chassis to the rack and rails.

2. Pull the system forward from the rack until the rails lock partially extended.
   Use care when pulling the system forward to keep from stressing the cables attached to the back.

3. Unscrew the two thumb screws on the front of the chassis.

4. Lift the top cover to access the disk tray array.

5. Set the top cover aside.

6. Gently pull up the locking post and pull the drive towards you.
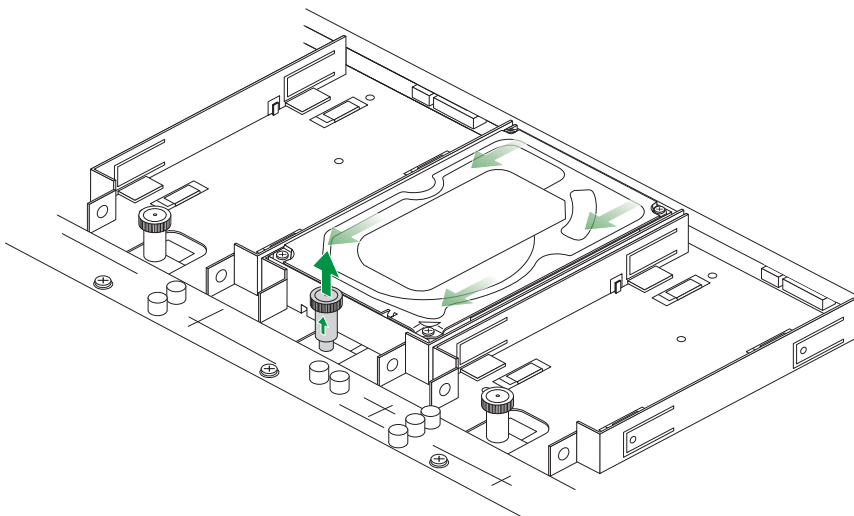
7. Lift the drive out of the tray.
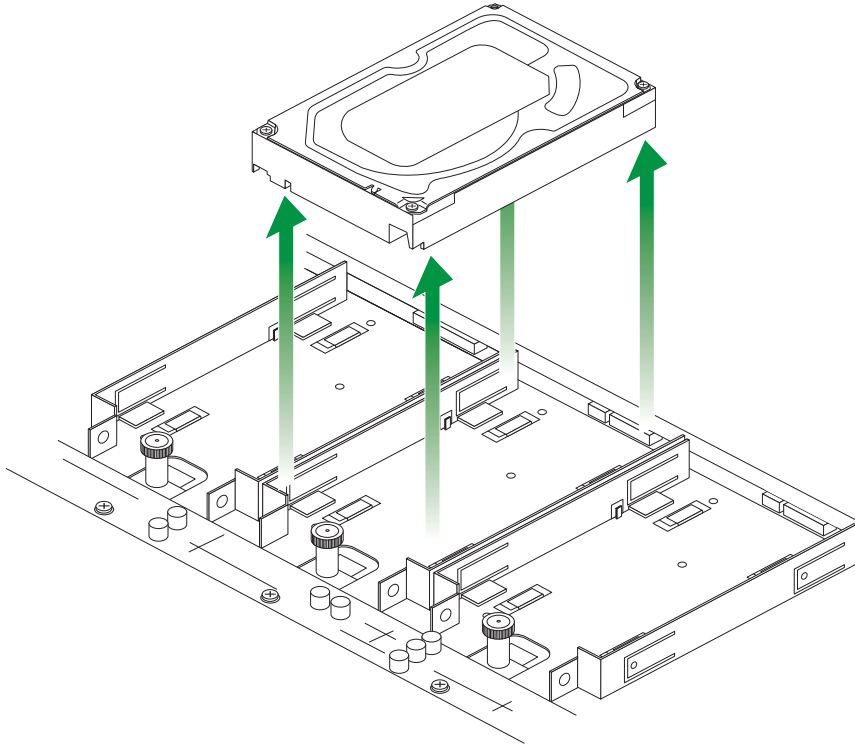
8. Align the front two mounting holes on the botton of the replacement drive with the pins in the drive area.
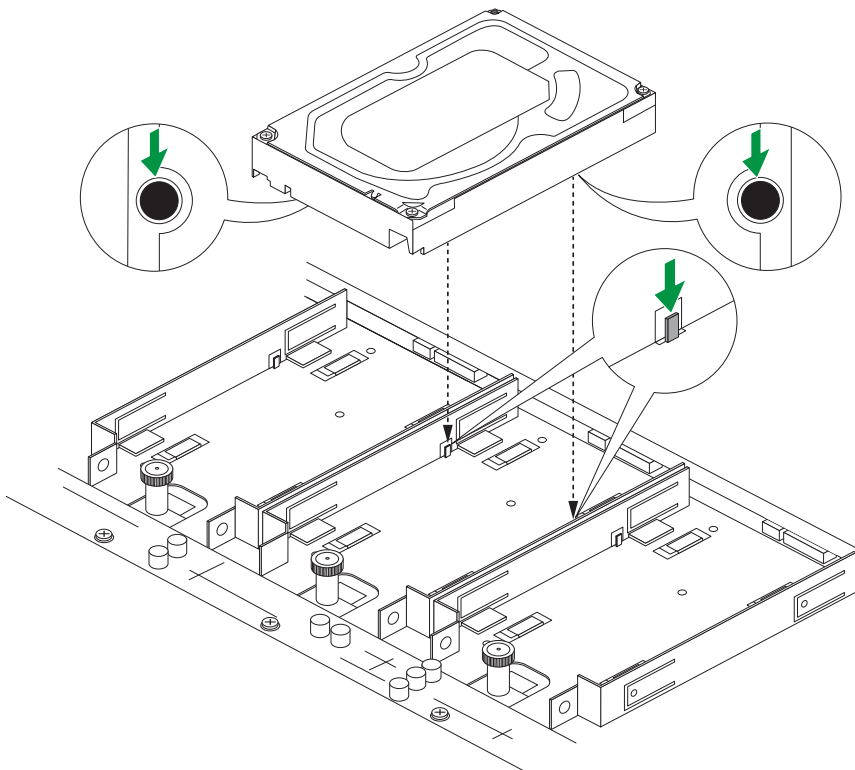
9. Gently push the drive down into the tray, pushing on the corners.
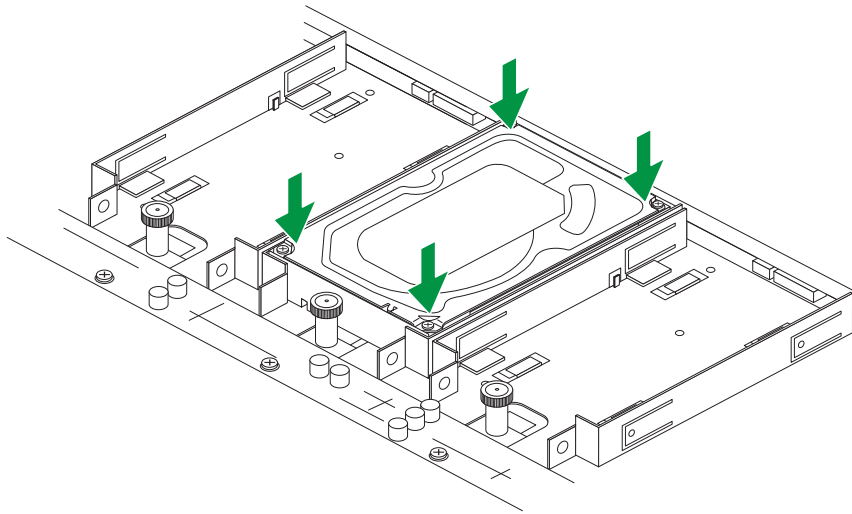
10. Push the drive into the rear connector until the thumb knob locks.

The thumb knob clicks when it locks.

Note Do not push on the lock post.

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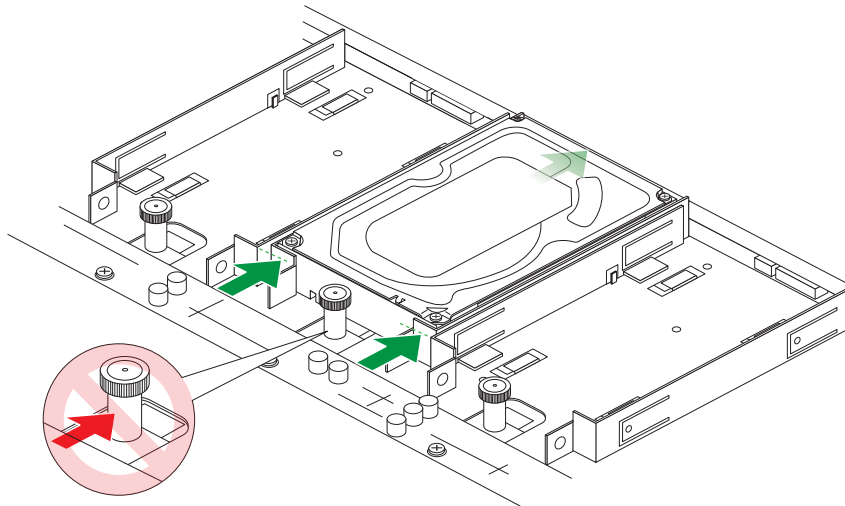
11. Repeat for any additional drives.

12. Replace the chassis cover.

13. Tighten the front thumb screws.

14. Slide the chassis back into the rack.

15. Screw two M5 bolts through the chassis tabs into the center of the rails.

16. If necessary, turn on your system by pressing the **Power** button.

For more information about X-RAID, Flex-RAID, and using the local admin page, see the *ReadyNAS OS 6 Software Manual*, which is available at *http://support.netgear.com/product/ReadyNAS-OS6.*

Disks

Maintenance 6

This chapter describes how to perform maintenance activities like replacing a fan or on-board battery. It includes the following topics:

- *Replace the On-Board Battery*
- *Replace a Fan*
- *Replace a Power Supply*

Replace the On-Board Battery

▶ **To replace the battery:**

1. Open the system and locate the battery holder.

   The following figure shows the location of the battery holder for the ReadyNAS 3302 and 4220 systems. The battery holder in the ReadyNAS 2312 system is located toward the front left corner of the enclosure.

2. Remove the old battery.

3. Install the new battery.
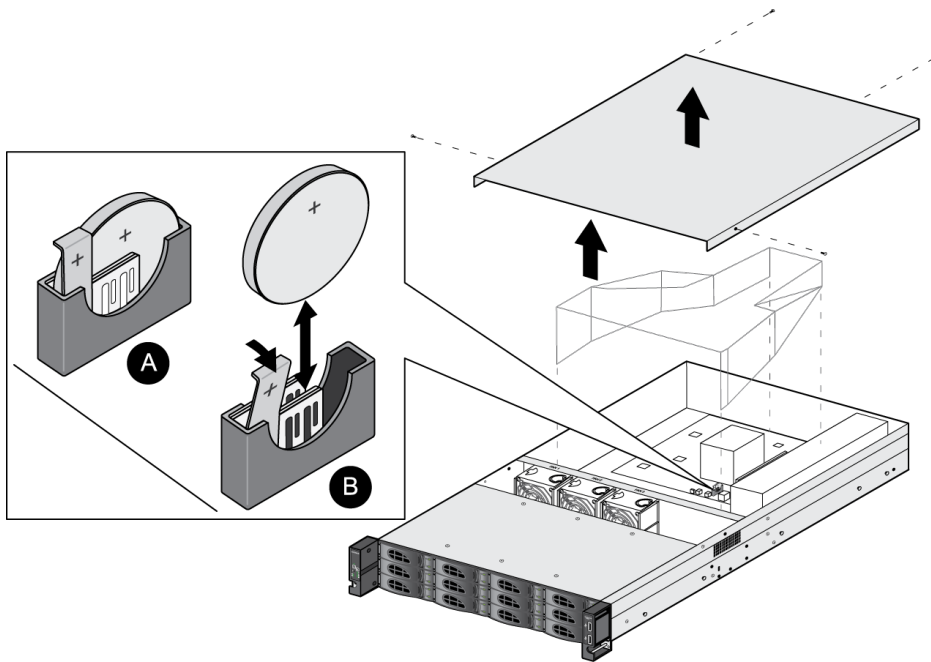
Take care to install the new battery with the correct side up.

Replace a Fan

You cannot replace the fans on the RR2312. Contact NETGEAR Technical Support for assistance.

Replace a Power Supply

You cannot replace the power supply on the RR2312. Contact NETGEAR Technical Support for assistance.

Defaults and Technical Specifications

A

This appendix includes the following sections:

- *Factory Default Settings*
- *Safety Warnings*
- *Electrical Safety Precautions*
- *General Safety Precautions*
- *Rack-Mount Precautions*

Factory Default Settings

The following table lists factory default settings for ReadyNAS OS 6 rack-mount storage systems.

Table 3. ReadyNAS OS 6 factory default settings

Feature		Default
Login		
	Default IP address	The default IP address for the ReadyNAS is assigned by the local router (DHCP server).
		If a router does not assign an IP address, the ReadyNAS defaults to the IP address https://169.254.x.x, where the last two octets are randomly generated based on the system's MAC address.
	Admin user name (case-sensitive)	admin
	Admin login password (case-sensitive)	password
Management		
	System configuration	ReadyNAS local admin page web-based configuration and status monitoring
	Discovery and multistorage system status monitoring utility	Web-accessed ReadyCLOUD
LAN connections		
	MAC address	See product label
	MTU size	1500
	Ethernet port	AutoSense 10/100/1000BASE-T, RJ-45
	LAN IP address	DHCP acquired

General

- Intel Atom Quad Core C3538, 2.1 GHz with QuickAssist
- 2 GB DDR4 memory
- Twelve-bay storage
- Two USB 3.0 ports
- Four Gigabit LAN ports

Physical Dimensions (h x w x d)

44 x 486 x 924 mm (1.73 x 19.13 x 36.38 in.)

Physical Weight

14.9 kg (32.78 lb) without disks

Power Consumption

- Power consumption during operation: 121W
- Power off (Wake On LAN): 1.98W

Electrical

- Internal 350W server-rated AC power supply
- Input: 100–240 VAC, 50/60 Hz

Environmental Requirements

- Operating temperature: 0 to 45°C (32° to 104°F)
- Operating humidity: 20 to 80% relative humidity (noncondensing)
- Storage temperature: –20 to 70°C (–4 to 158°F)
- Storage humidity: 5 to 95% relative humidity (noncondensing)
- Three software-controlled 80 x 80 mm chassis cooling fans

Certifications

FCC Class A, CE Class A, RoHS, VCCI Class A, CCC, MIC, BIS

Safety Warnings

1. The equipment contains no operator access areas and is certified for installation only by trained personnel, according to the installation instructions provided with each storage system.

2. Install the socket-outlet near the equipment in an easily accessible location.

3. Observe the on-board battery precautions. Follow the battery replacement instructions explained in *Replace the On-Board Battery* on page 28.

Note Replacing the battery with an incorrect type creates a danger of explosion. Replace the battery the same or an equivalent type recommended by NETGEAR only. Dispose of used batteries according to the manufacturer's instructions.
Installing the on-board battery upside down, which reverses its polarities, creates a risk of explosion. Take care to install the battery correctly.

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4. Connect the storage systems and their associated LAN connections only to equipment within the same building.

5. Slide-mounted or rail-mounted equipment is not to be used as a shelf or a work space.

Electrical Safety Precautions

Follow basic electrical safety precautions to protect yourself from harm and the ReadyNAS from damage:

*   Be aware of the locations of the **Power** switch on the chassis and the room's emergency power-off switch, disconnection switch, or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

*   Do not work alone when working with high-voltage components.

*   Always disconnect power from the system when removing or installing main system components, such as the main board or memory modules. When disconnecting power, first power down the system with the operating system and then unplug the power cords of all the power supply storage systems in the system.

*   When working around exposed electrical circuits, make sure that another person who is familiar with the power-off controls is nearby to switch off the power if necessary.

*   Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards that they come into contact with.

*   Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that were specifically designed as electrical insulators.

*   Use only power supply cords that include a grounding plug and plug them into grounded electrical outlets.

General Safety Precautions

Follow these rules to ensure general safety:

*   Keep the area around the ReadyNAS clean and free of clutter.

*   See the technical specifications in this manual for details about your specific ReadyNAS storage systems.

Defaults and Technical Specifications

- The ReadyNAS weighs approximately 82 pounds when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that were removed away from the system or on a table so that they will not accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- Replace the on-board battery only with the same battery or an equivalent type of battery recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

> **Note** Installing the on-board battery upside down, which reverses its polarities, creates a risk of explosion. Take care to install the battery correctly.

- Only trained service technicians can replace the self-resetting PTC (positive temperature coefficient) fuses on the main board, using only new fuses that are the same as or equivalent to the ones being replaced. Contact Technical Support for details and support.

Rack-Mount Precautions

Follow these rack-mount precautions:

- Make sure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.

- In single-rack installations, make sure that stabilizers are attached to the rack. In multiple-rack installations, make sure that the racks are coupled together.

- Always make sure that the rack is stable before extending a component from the rack.

- Extend only one component at a time. Extending two or more simultaneously might cause the rack to become unstable.

- Determine the placement of each component in the rack before you install the rails.

- Install the heaviest components on the bottom of the rack first, and then work up.

- Use a regulating uninterruptible power supply (UPS) to protect the ReadyNAS from power surges and voltage spikes and to keep your system operating in case of a power failure.

- Allow any hot-plug drives and power supply modules to cool before touching them.

- Always keep the rack's front door and all panels and components on the servers closed when not servicing them to maintain proper cooling.