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SATABEAST®/ SASBEAST™/ SATABEAST® Xi

Installation and Maintenance Manual

Version 2.6

NEXSAN 1445 Lawrence Drive, Thousand Oaks, CA 91320 | p. 866.4.NEXSAN | www.nexsan.com

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About This Manual

This Installation and Maintenance Manual covers all variants of the Beast format, including SATABeast (Fibre Channel host), SATABeast Xi, SASBeast, etc. The term “SATABeast/SASBeast” is used throughout for all versions.

This document describes the parts, functions, and installation procedures for the SATABeast/SASBeast. It covers the SATABeast/SASBeast only. For information about other Nexsan units, see the Installation and Maintenance Manuals that come with each product.

Conventions

Text

- Cross-references, both internal and to the titles of other documents, are in *italic*.
- Text that refers to labels on the unit itself is in **boldface**.

Notes, Cautions, and Warnings

NOTE: Notes contain important information, present alternative procedures, call attention to certain items, or provide handy tips.



CAUTION: Cautions alert the user to items or situations which may cause damage to the unit or result in mild injury to the user, or both.



WARNING: Warnings alert the user to items or situations which may result in severe injury or death to the user.

Safety Information



WARNING: Risk of EXPLOSION if the battery is replaced with an incorrect type. Always dispose of used batteries according to their printed instructions or in accordance with local regulations.



WARNING: Risk of ELECTRIC SHOCK if components are removed or tampered with when unit power is on. ONLY a TRAINED OPERATOR may remove and replace the following modules while power is on:

- **Power supply modules**
- **Controller modules**
- **Disk drives**



CAUTION: The SATABeast/SASBeast unit is heavy and requires two people to lift it out of the packaging or slide it onto the mounting rails. Do NOT attempt to lift or mount the SATABeast/SASBeast by yourself!



CAUTION: When removing the SATABeast/SASBeast from the packaging, DO NOT lift the unit by any plastic parts or module handles on the chassis. Doing so may cause damage to the chassis or to internal components, or both. Lift the unit ONLY by the front handles and the bottom edges of the chassis, using safe lifting practices.



CAUTION: Computer components and disk drives are sensitive to electrostatic discharge (ESD). Be sure to ground any electrostatic charge from your person before touching components with your hands or with any tools. While installing the unit, use the anti-static wrist-strap shipped with the SATABeast/SASBeast.



CAUTION: Always fully stabilize racks with wall anchors or stabilizing legs, or both, before mounting the SATABeast/SASBeast or any other components on the rack.



CAUTION: Ensure that the floor beneath the mounting rack has enough load-bearing capacity to support the rack and all mounted components.



CAUTION: Always fully secure all rack-mounting hardware when installing the SATABeast/SASBeast in a rack. Insufficient rack-mount support may allow the unit to fall onto other rack-mounted hardware or onto the floor, potentially damaging equipment or causing injury to nearby personnel.



CAUTION: When applying power to the SATABeast/SASBeast, use ONLY the IEC power cords originally supplied with the unit. Do NOT use other power cords, even if they appear identical to the supplied cords.

Revision History

This section lists updates and new material added to the SATABeast/SASBeast Installation and Maintenance Manual.

Version 2.6, January 2012: Changed name of document from “Hardware Manual” to “Installation and Maintenance Manual” throughout; added unpacking instructions to page 7; added required tools and equipment section to page 9.

Version 2.5, August 2011: Complete reorganization of Hardware Manual contents.

Version 2.4, March 2011: Images replaced on pages 24–25.

Version 2.3, March 2010: New format applied throughout; new note regarding multiple SATABeast/SASBeast units added under *Before you begin* on page 5, under *Disk Drives* on page 15, and under *Tiered Storage & SAS Drive installation guide* on page 29.

Chapter 1

Overview of the SATABeast/SASBeast

Front Panel



LEDs:
1. Fan 0/1
2. Power Supply Unit (PSU) 0/1
3. Front fans
4. Auxiliary blower unit
5. Controller 0/1
6. Battery
7. Environment
8. RAIDs
9. Spare disk drives

Switch:
10. Alarm reset

Figure 1.1: SATABeast/SASBeast front panel

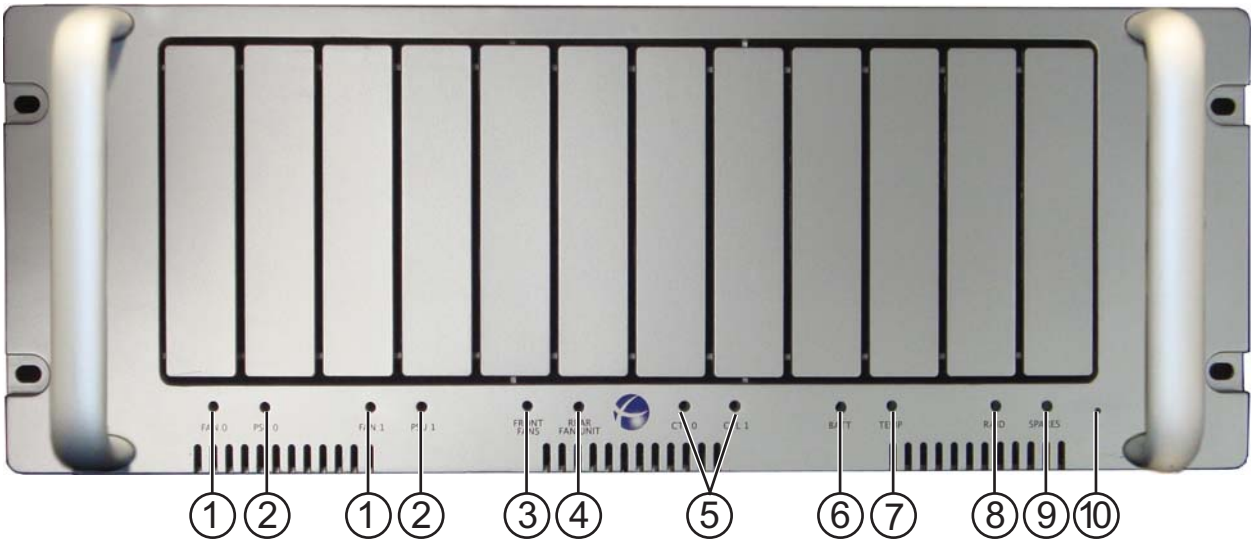


Figure 1.2: SATABeast Xi front panel

LEDs

1. Power Supply Unit (PSU) Fan LEDs (**FAN 0** and **FAN 1**): Indicate the status of the PSU fans. Green indicates that the fan is operating within specifications. Red indicates that the fan is either running too slowly or has failed. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).
2. PSU status LEDs (**PSU 0** and **PSU 1**): Indicate the status of power. Green indicates that the PSU is operating properly. Red indicates that the PSU is not operating properly. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).
3. **FRONT FANS** LED: Indicates the status of the front fans. Green indicates that the fans are operating properly. Red indicates that the fans are either running too slowly or have failed. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).
4. **REAR FAN UNIT** LED: Indicates the status of the fans in the auxiliary blower unit. Green indicates that the fans are operating properly. Red indicates that the fans are either running too slowly or have failed. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).
5. RAID Controller status LEDs (**CTL 0** and **CTL 1**): Indicate the status of the RAID Controllers. Green indicates that the RAID Controller is operating within specification. Red indicates that there is a fault in the RAID Controller. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).

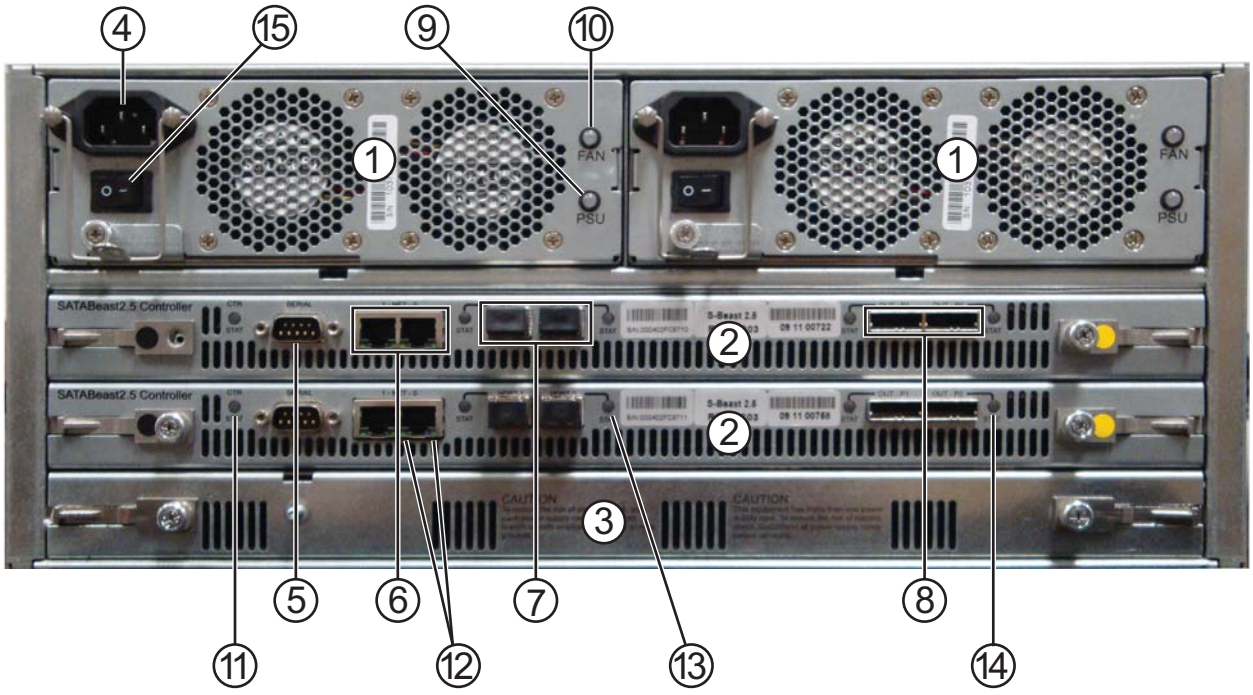
   NOTE: In single-controller units, **CTL 1** does not illuminate at all.
6. Battery status LED (**BATT**): Indicates the status of the RAID Controller batteries. Green indicates that both batteries are charged and functioning properly. Red indicates that one or both batteries are not functioning properly. Alternating red and green indicates that one or both batteries are charging. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).
7. Environmental status LED (**ENV**): This LED is green if internal temperature and controller voltage are within specification. It is red if either temperature or controller voltage are outside of specifications. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).
8. **RAID** status LED: Indicates the status of the RAIDs. Green indicates that all RAIDs are functioning properly. Red indicates that at least one RAID is in critical condition. Alternating red and green indicates that at least one RAID is rebuilding itself. The **RAID Information** page in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).
9. Spare disk drive status LED (**SPARES**): Indicates whether or not any disks in the unit are being used as spares. It is green when spares are present and off when no spares are present. The **Disk Information** page (under RAID Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).

Switches

10. Silence alarm button (**ALARM RESET**): Silences the audible alarm. Insert a thin object, such as an unfolded paper clip, into the slot to press this button. The alarm will sound again if any additional errors occur.

    The **Problems** page (under System Information) in the graphical user interface (GUI) displays information about the event which triggered the alarm (see the *Nexsan User Manual*).

Rear Panel



Field Replaceable Modules:
1. Power Supply Units (PSUs)
2. RAID Controllers

Other Modules:
3. Auxiliary Blower Unit

Connectors:
4. Power
5. Serial
6. iSCSI/Ethernet
7. Fibre Channel
8. Expansion

LEDs:
9. PSU
10. PSU fan
11. Controller battery/cache status
12. iSCSI/Ethernet status/activity
13. Fibre Channel status
14. Expansion status

Switches:
15. Power

Figure 1.3: SATABeast/SASBeast rear panel

Field-Replaceable Modules

1. Power Supply Units (PSUs) (2). Each unit can be field-replaced in the event of a PSU or PSU fan failure (see *Power Supply Units (PSUs)* on page 21).
2. RAID Controller(s) (1 or 2). Each unit can be field-replaced in the event of failure (see *RAID Controllers* on page 23).

   NOTE: In single-controller units, the second slot contains a back plate which helps regulate air flow.

Other Modules

3. Auxiliary Blower Unit. Can only be replaced by a fully-trained Service Engineer.

Connectors

4. Power (2): 110–240VAC, 47–63Hz
5. One **SERIAL** port per RAID Controller: RS232 DB9 serial port for low-level reporting.
6. Two Ethernet/iSCSI ports (**NET 0** and **1**) per RAID Controller: 1Gb/s Ethernet ports (RJ45s) for iSCSI. **NET 0** can be connected to a local area network (LAN) in order to configure the unit through the browser-based graphical user interface (GUI).
7. Two Fibre Channel (FC) ports (**HOST 0** and **1**) per RAID Controller: 2Gb/s, 4Gb/s, or 8Gb/s Fibre Channel optical SFPs.

8. Two expansion ports (**OUT P0** and **OUT P1**) per RAID Controller: Mini-SAS 26 pin I-Pass (8088) expansion connectors, each with four 3GB/s SAS links, used to connect Nexsan expansion units to the SATABeast/SASBeast.

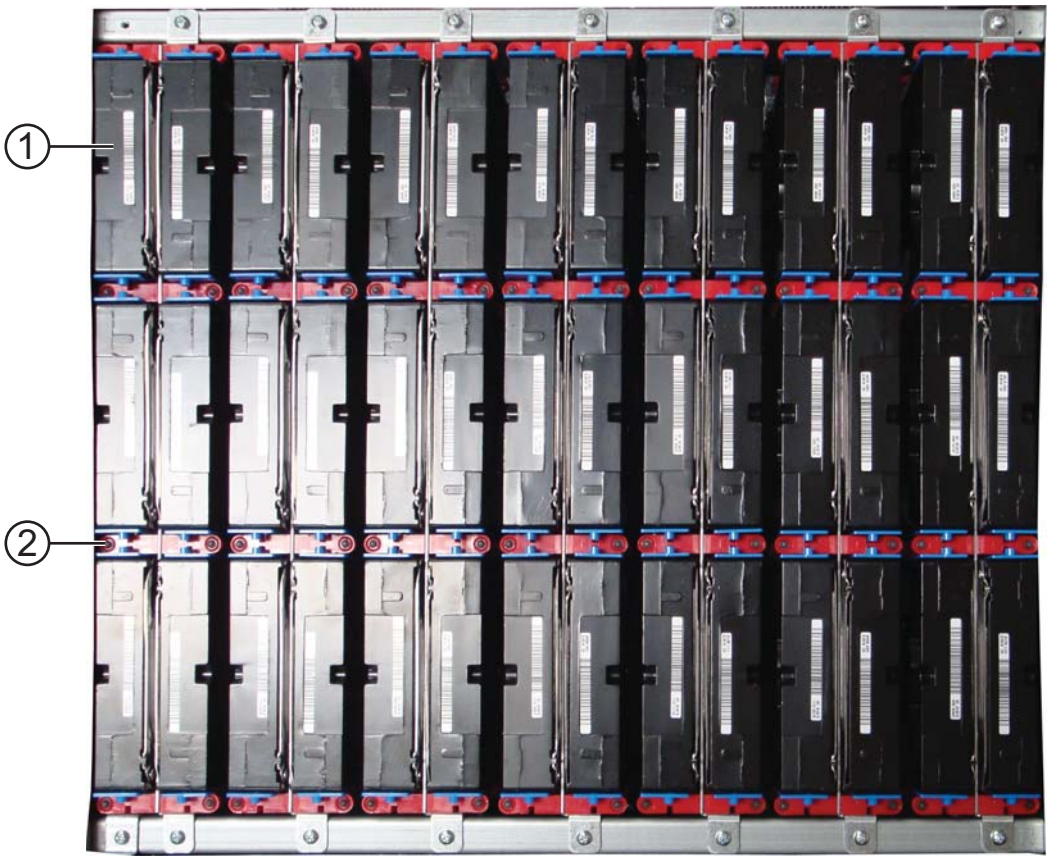
LEDs

9. PSU status LEDs (2): Indicates the power status of each PSU. Green indicates that the PSU is operating properly. Red indicates that the PSU is not operating properly. The Environmental Information page (under System Information) in the GUI displays details. See the *Nexsan User Manual*.
10. PSU Fan LEDs (2): Indicates the status of the PSU fan. Green indicates that the fan is operating within specifications. Red indicates that the fan is either running too slowly or has failed. The Environmental Information page (under System Information) in the GUI displays details. See the *Nexsan User Manual*.
11. Cache/Battery status LED (**CTR STAT**) (1 per RAID Controller): Indicates the presence of data in the RAID Controller's cache memory. Green indicates that there is data in the cache that has not yet been written to the disk array. Flashing green indicates a) that the unit is powered off with data in the cache, and b) the battery voltage is 7.2V or above. Flashing amber indicates a) that the unit is powered off with data in the cache, and b) that the battery voltage is below 7.2V.
12. iSCSI/Ethernet activity and status (1 pair per port): The left LED indicates activity; it flashes green when data is being transferred. The right LED indicates link status; it is green when a full-duplex connection of any speed is present.
13. Fibre Channel status (**STAT**) (1 per FC port): Indicates the status of the Fibre Channel connection. It changes color based on the status:
    - Green: Indicates that the Fibre Channel port is connected.
    - Flashing green: Indicates that the FC port is connected and communicating with another device or host.
    - Flashing red: Indicates that the FC port is on, but there is no link.
    - Amber: Indicates that the FC connection is only 2Gb/s.
14. Expansion port status (**STAT**) (1 per expansion port): Indicates the connection status for each expansion port. Green indicates that the SAS cable is properly connected. Flashing amber indicates that the cable is improperly connected. If no cable is connected, this LED is off.

Switches

15. Power (2): Two-position power switch (off: **O**, on: **|**). Switch each PSU's power switch to the on (**|**) position to turn on the unit.

Drive Bay Interior



1. Disk drives
2. Disk status LEDs

Figure 1.4: SATABeast/SASBeast drive bay interior

Field Replaceable Modules

1. Disk Drives: Up to 42 3.5" disk drives. Disk drives can be field-replaced in the event of failure (see *Disk Drives* on page 25).

LEDs

2. Drive status: One for each disk drive slot. Solid green indicates that the disk is operating within specifications and is not currently being accessed. Flashing green indicates disk activity. Red indicates that a disk fault has been detected and that the disk is not currently being used by the system. For disk drive slots where no disk drive is installed, this LED is off.

Dimensions

Height	4U	177mm (6.97")
Length	Overall	807mm (31.77")
	Chassis ear mounting face to end of unit	750mm (29.53")
Width	Overall	482.6mm (19")
	Of chassis body	430mm (16.9")
Weight	Single-controller	69 kg (152.1 lbs.)
	Dual-controller	76 kg (167.6 lbs.)
Rack mounting kit	Weight	approx. 4.8 kg (10.58 lbs.)

Power

- Two 1100 W load-sharing, hot-pluggable, redundant PSUs.

Cooling

- Front panel: Three (3) 120cfm 12V axial fans (life 40,000 hrs). (SASBeast has uprated fans)
- PSUs: Two (2) 60cfm 12V axial fans per PSU (life 40,000 hrs), for a total of four.
- Auxiliary blower module: Four (4) 10cfm 12V radial blowers (life 40,000 hrs).

Materials

- Chassis, external: Pre-coated galvanized steel
- Chassis, internal: Aluminium (Platen)
- Fascia: ABS (blend) Thermoplastic UL 94 V.0

Environment

- Ambient operating temperature: 5°C–30°C (41°F–86°F)

Chapter 2

Getting Started

This manual is designed to enable the user to install and configure the SATABeast/SASBeast quickly and safely. Please read this document carefully and review all of the information in this section before installing the SATABeast/SASBeast.

Taking Delivery of the SATABeast/SASBeast

Upon receipt of your SATABeast/SASBeast, inspect the packaging for damage that may have been sustained in transit. If there is visible damage on the packaging, contact your shipper before proceeding.

Unpack the SATABeast/SASBeast

Carefully unpack your SATABeast/SASBeast and inspect each item before installation:

1. Carefully cut the straps holding the box closed, then remove the lid.

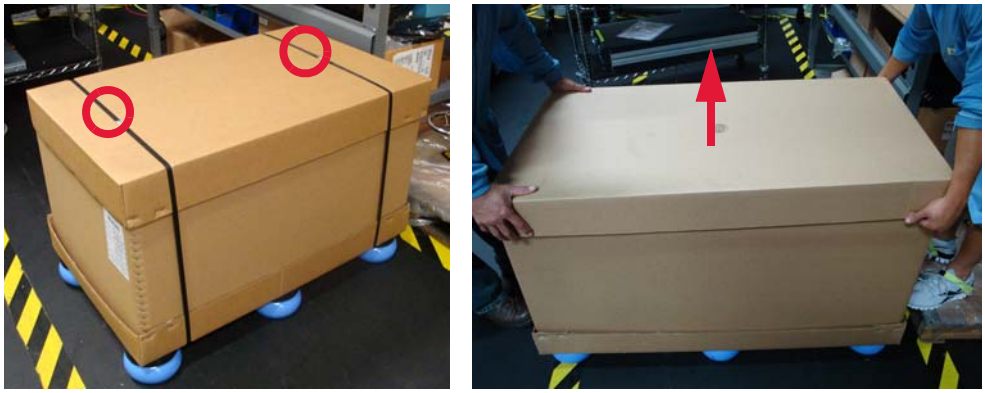


Figure 2.1: Opening the outer box

2. Remove the two large and two small disk boxes from the outer box.



Figure 2.2: Removing disk boxes

3. Inspect the items in the foam spacer, accessory box, and padded envelope. These items should include:

   - rack-mounting hardware:

     four side rail assemblies, two left and two right (in the foam spacer)
     two front mounting brackets, one left and one right (in the padded envelope)
     two adjustable rear mounting brackets, one left and one right (in the padded envelope)
     twenty (20) mounting rail assembly screws
     sixteen (16) screws for securing the assemblies to the rack
     twenty (20) screws for securing the side rails to the chassis
     four (4) rack bolts and four (4) cage nuts for securing the SATABeast/SASBeast to the rack

   - two (2) power cables
   - disposable ESD strap
   - null-modem cable
   - disk extraction handle
   - any additional items that may have been ordered, such as SAS cables or Fibre Channel cables



Figure 2.3: Contents of foam spacer and accessory box (left) and padded envelope (right)

4. Open the disk boxes and make sure that the proper number of disk drives is included.



Figure 2.4: Disk box contents, large (left) and small (right)

5. Remove the rails, accessory box, and padded envelope from the top foam insert.
6. Remove the top foam insert from the package.

7. Remove the outer packging sleeve.

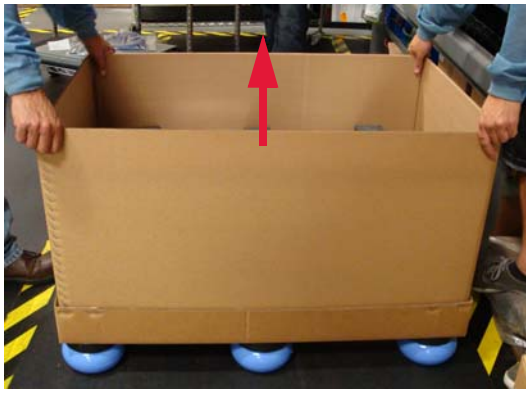


Figure 2.5: Removing the outer packaging sleeve

8. With the help of a second person, carefully lift the SATABeast/SASBeast unit out of the packaging.



Figure 2.6: Removing the unit from the box

CAUTION: When removing the SATABeast/SASBeast from the packaging, DO NOT lift the unit by any plastic parts or module handles on the chassis. Doing so may cause damage to the chassis or to internal components, or both. Lift the unit ONLY by the bottom edges of the chassis, using safe lifting practices.

The packaging that the SATABeast/SASBeast ships in is reusable and should be retained for future re-shipment. Be sure to keep all packaging components.

Before Installation

Required Tools and Equipment

To perform the installation, you will need the following tools and equipment:

- a suitable equipment rack with sufficient load capacity to hold the SATABeast/SASBeast
- a size P1 Phillips-head screwdriver
- enough CAT6 Ethernet cable to connect the SATABeast/SASBeast to the local area network (LAN)
- enough CAT6 Ethernet cable, fibre-optic cable, or twisted-pair copper cable to connect the SATABeast/SASBeast to the storage area network (SAN) (see *Attach Communication Cables* on page 16)

Prepare the Site

Before installing the SATABeast/SASBeast, prepare the installation site and rack as follows:

CAUTION: Always fully stabilize racks with wall anchors or stabilizing legs, or both, before mounting the SATABeast/SASBeast or any other components on the rack.

CAUTION: Ensure that the floor beneath the mounting rack has enough load-bearing capacity to support the rack and all mounted components.

- Ensure that the ambient temperature at the installation site is between 5°C (41°F) and 30°C (86°F). If the temperature at the site is not actively regulated, ensure that daily and seasonal temperature changes will not result in the ambient temperature going outside these limits.
- Situate the rack so that full air flow at both the front and the rear of the SATABeast/SASBeast is possible.
- Ensure that the rack is properly grounded per the manufacturer's instructions and that proper ESD safeguards are in place.
- Ensure that the power drawn by the SATABeast/SASBeast does not overload the available electrical supply (see *Power* on page 6).

Prepare the Unit

Before installation, prepare the unit as follows:

CAUTION: Computer components and disk drives are sensitive to electrostatic discharge (ESD). Be sure to ground any electrostatic charge from your person before touching components with your hands or with any tools. While installing the unit, use the anti-static wrist-strap shipped with the SATABeast/SASBeast.

1. Remove the two PSUs and the one or two RAID Controllers from the SATABeast/SASBeast unit:
   - PSU: Unscrew the locking handle, extend it outward from the unit to unseat the PSU from its internal connectors, then carefully pull to remove the PSU from the unit. Support the weight of the PSU with your free hand while doing so.

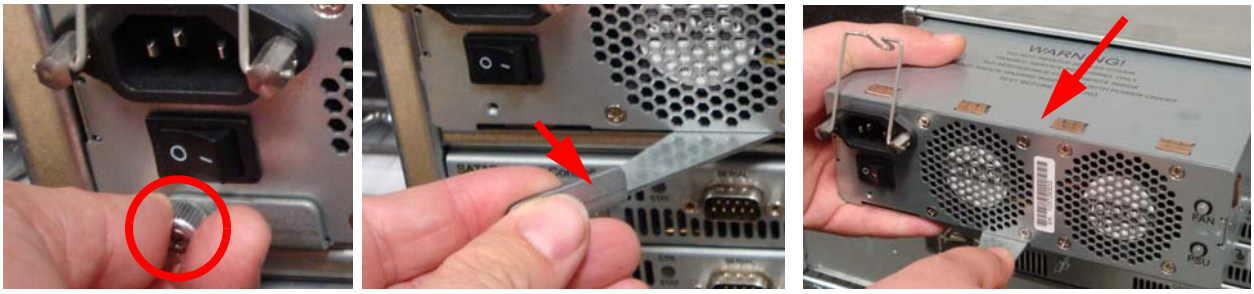


Figure 2.7: Removing the PSU

- RAID Controller: Unscrew the locking tabs, extend them outward from the unit to unseat the RAID Controller from its internal connectors, then carefully pull the controller from the center to remove it from the unit. Support the weight of the controller with your free hand while removing it.

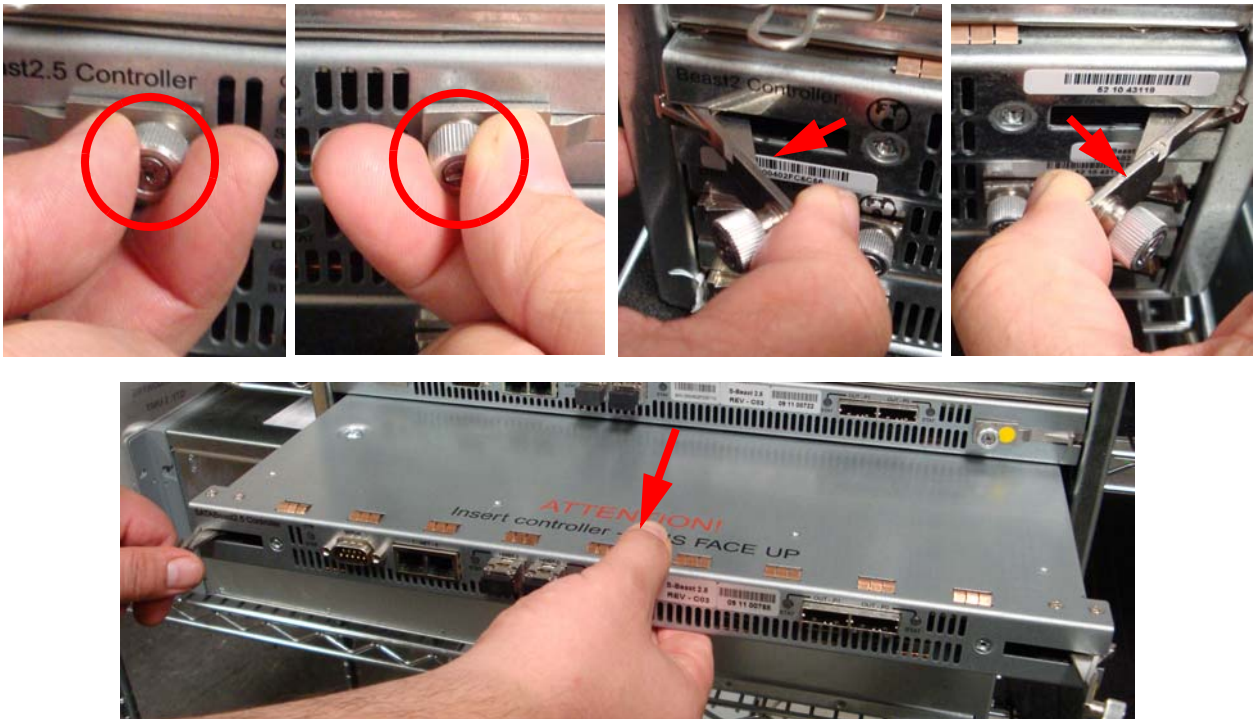


Figure 2.8: Removing the RAID Controller

NOTE: For dual-controller units, remember to put each controller back into the same bay from which you removed it. It may be helpful to label them “Top” and “Bottom” before removing them.

Set the PSUs and RAID Controller(s) aside.

2. Attach the inner side rails to the sides of the SATABeast/SASBeast unit:

   a. Separate the inner and outer side rails.

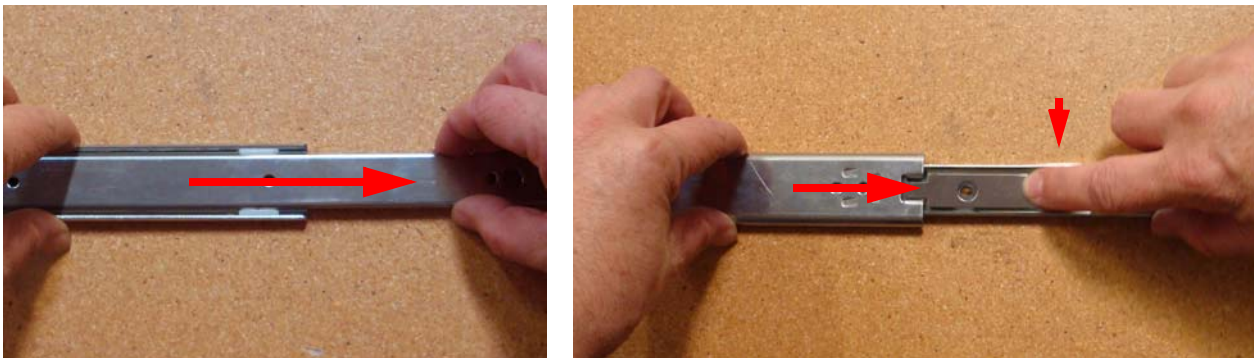


Figure 2.9: Separating the inner and outer side rails

   b. Set the outer side rails aside.

c. Attach the inner side rails to each side of the chassis. The latch should be closer to the rear of the unit.

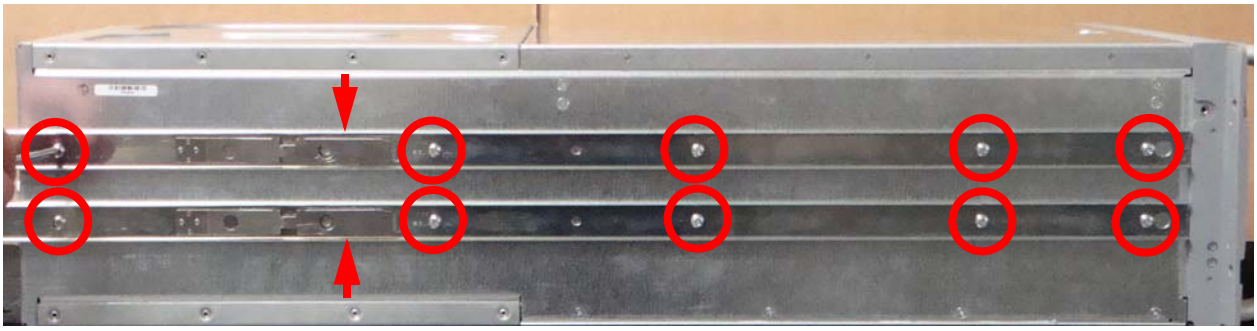


Figure 2.10: Attaching the inner side rails to the chassis, left side

NOTE: If you are installing more than one SATABeast/SASBeast unit, keep each unit's disk drives with the unit they shipped with so as to avoid installing them into the wrong unit.

Chapter 3

Installing the SATABeast/SASBeast

The SATABeast/SASBeast comes in single-controller and dual-controller configurations. These instructions assume a dual-controller unit installation, but where the steps differ, additional instructions for single-controller units are provided.

Preparing the Mounting Rails

1. Attach the outer side rails to the front mounting brackets.

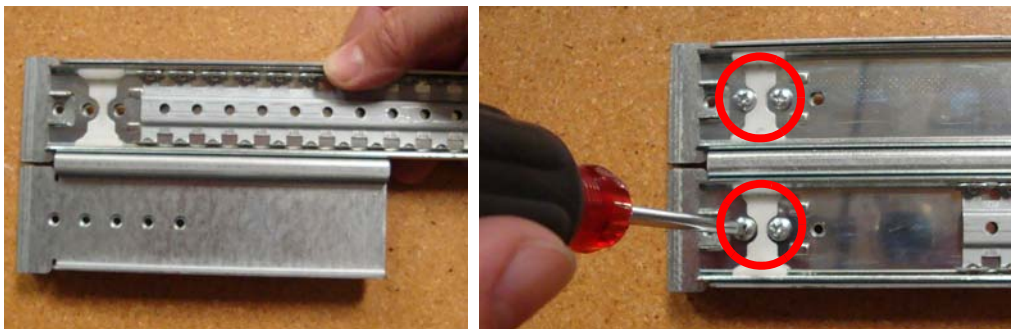


Figure 3.1: Attaching the outer side rails to the front mounting bracket

2. Loosely attach the rear mounting brackets to the rail assemblies, making sure that the rear bracket can still move freely.

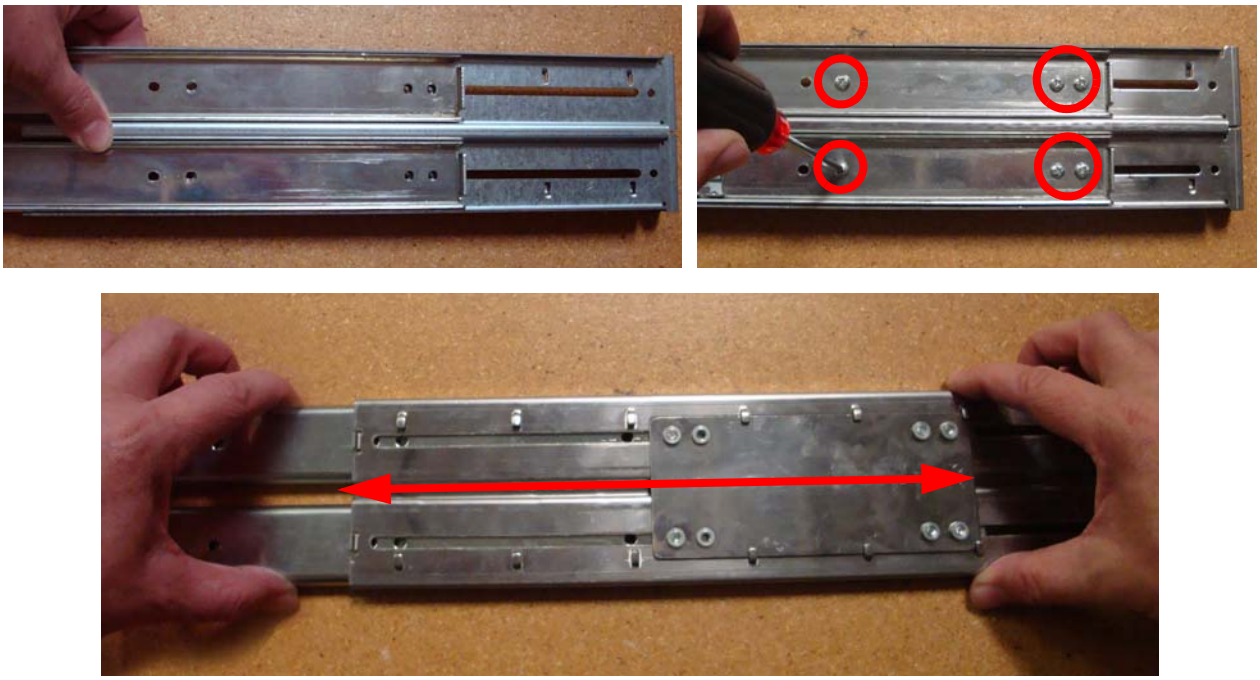


Figure 3.2: Attaching the outer side rails to the rear mounting bracket

3. Loosely attach each rail to the rack, front and rear, using the supplied screws.

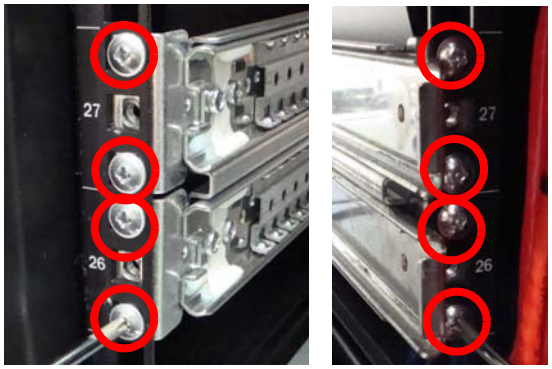


Figure 3.3: Front and rear rail mounting screws

4. Fully tighten the screws that you inserted in step 2 which are holding the rear brackets to the rail assemblies.

CAUTION: Be sure to fully tighten the screws holding each rail together. Failure to do so may result in the rail coming apart during the mounting procedure, which may damage the unit or cause injury to personnel.

5. Insert the cage nuts above and below each rail.

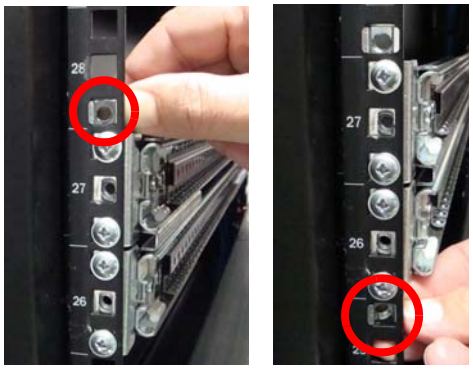


Figure 3.4: Inserting the cage nuts

The mounting rails are now ready to receive the SATABeast/SASBeast unit.

Mount the SATABeast/SASBeast

CAUTION: Computer components and disk drives are sensitive to electrostatic discharge (ESD). Be sure to ground any electrostatic charge from your person before touching components with your hands or with any tools. While installing the unit, use the anti-static wrist-strap shipped with the SATABeast/SASBeast.

CAUTION: The SATABeast/SASBeast unit is heavy and requires two people to lift it and slide it onto the mounting rails. Do NOT attempt to mount the SATABeast/SASBeast onto the mounting rails by yourself.

1. Ground any electrostatic charge from your person by touching a metal part of the rack.
2. Attach one end of the disposable anti-static wrist-strap to a metal part of the rack. Wrap the other end around your wrist. Both people lifting the unit should do this.



Figure 3.5: Putting on and attaching the anti-static wrist-strap.

CAUTION: Only support the unit by the front handles or by placing hands under the metal chassis. Do NOT attempt to lift the unit by any plastic parts or module handles.

3. With the help of a second person, lift the SATABeast/SASBeast unit, carefully line up the inner rails with the rack rails, and slide the chassis into the rack, leaving a few inches between the front of the unit and the front of the rack.

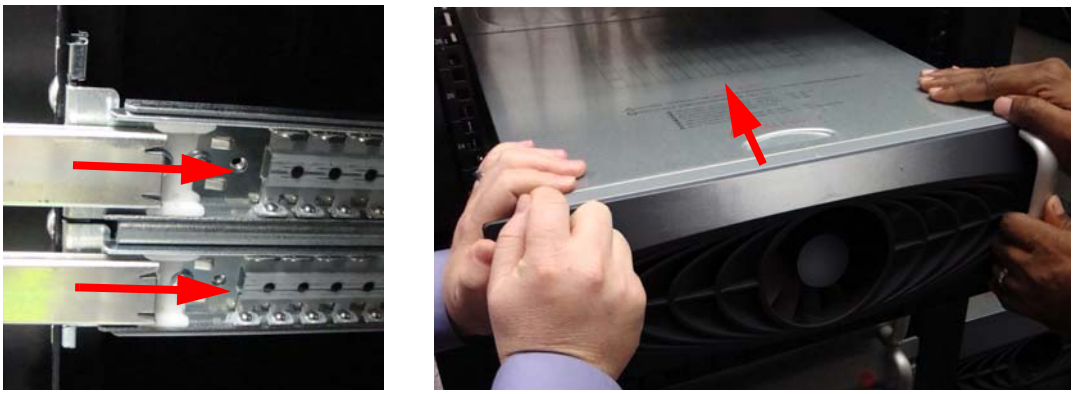


Figure 3.6: Mounting the SATABeast/SASBeast onto the mounting rails

4. While still supporting the unit from below, tighten the mounting rail screws at the front of each rail.

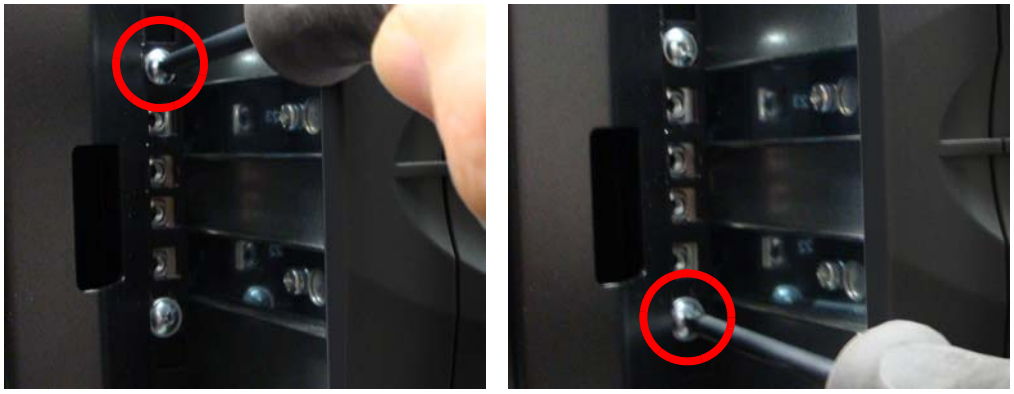


Figure 3.7: Tightening the front rack mount screws

5. Slide the unit the rest of the way into the rack so that the mounting ears sit against the rack.
6. Tighten the mounting rail screws at the back of each rail.

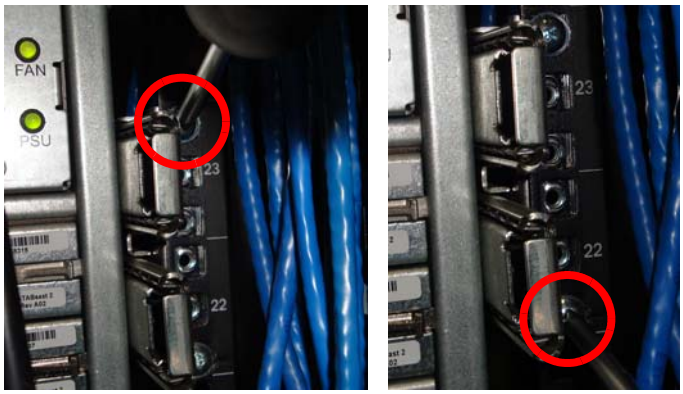


Figure 3.8: Tightening the rear rack mount screws

Restore the Rear Modules

PSUs

Insert the two PSUs into the back of the unit:

1. Make sure that the PSU is right side up. The power cable socket should be on the upper left. See *Rear Panel* on page 3.
2. Insert the PSU into the slot and carefully slide it into the slot until it stops moving.



Figure 3.9: Sliding the PSU into place

3. Swivel the latching handle to the left so that it is flush with the PSU, then tighten the retaining bolt to lock the handle in place.



Figure 3.10: Seating and locking the PSU in place

4. Repeat steps 1 through 3 for the second PSU.

   NOTE: Do not connect the power cords to the PSUs at this time.

RAID Controllers

Insert the one or two RAID Controllers into the back of the unit:

1. Make sure that the RAID Controller is right side up. There is a notice in red on the top of the controller to guide you.
2. Insert the RAID Controller into the slot and carefully slide it back until it stops moving.

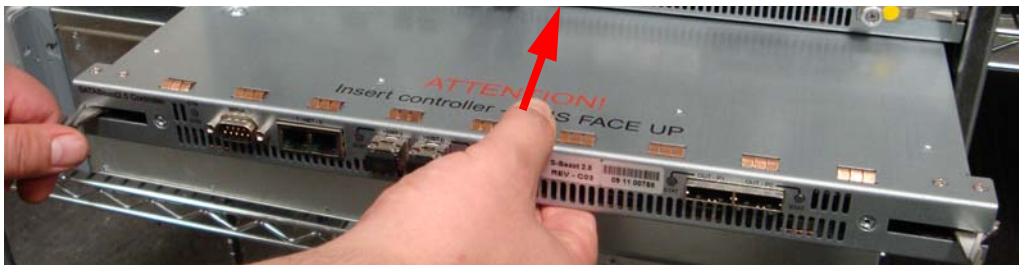


Figure 3.11: Sliding the RAID Controller into place

3. Swivel the latching tabs inward to seat the RAID Controller.

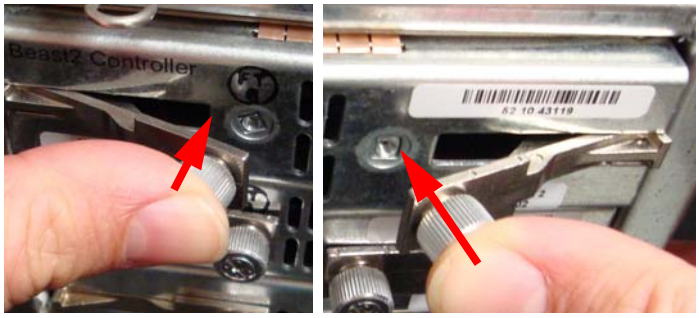


Figure 3.12: Seating the RAID Controller with the latch tabs

4. Tighten the retaining bolts to lock the RAID Controller in place.

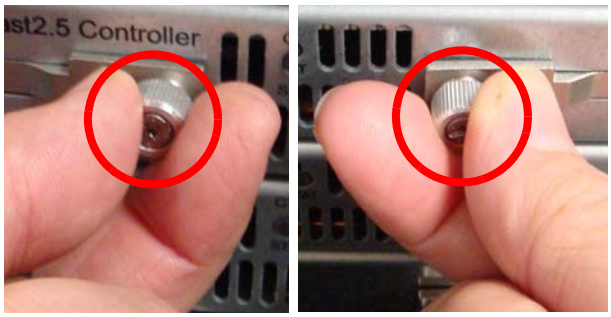


Figure 3.13: Locking the RAID Controller in place

5. Repeat steps 1 through 4 for the second RAID Controller (if present).

Load the Disk Drives

CAUTION: Do not lean on or place any heavy object on the unit while inserting or replacing disk drives. Doing so may damage the unit or overbalance the rack.

1. Pull the unit forward until there is enough room to remove the top cover.



Figure 3.14: Sliding the unit forward in the rack

2. Unscrew the retaining screws for the front panel (one on each side), then pull the front panel down.



Figure 3.15: Opening the front panel

3. Remove the top cover by pulling it forward, then lifting up.



Figure 3.16: Opening the drive bay lid

CAUTION: Disk drives are shock sensitive. Perform all actions involving disk drives carefully to avoid damage and data loss.

4. Starting at the front of the drawer, and using the drive guides to help you orient the disks, carefully load each disk drive into a drive slot. Make sure that each disk is fully seated.

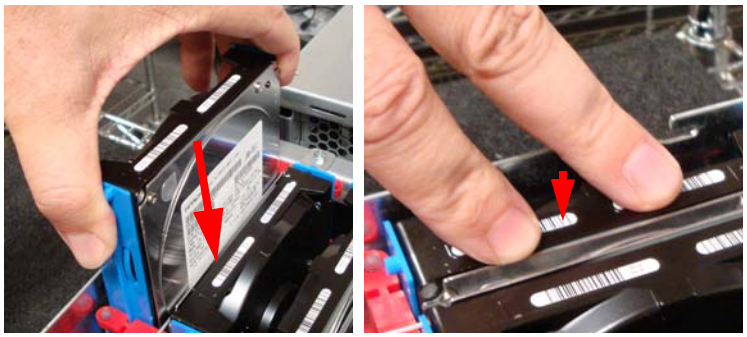


Figure 3.17: Inserting the disk drives

CAUTION: Always load disk drives in rows of fourteen across the width of the drive drawer. Leaving large gaps between disk drives decreases cooling efficiency and may result in some disk drives overheating.

5. Replace the top cover, close the front face, and replace the front panel retaining screws.
6. Slide the unit back into the rack.

7. Using the supplied bolts, bolt the face of the SATABeast/SASBeast unit to the rack.



Figure 3.18: Bolting the SATABeast/SASBeast to the rack

Attach Communication Cables

Connect all necessary communication cables to the RAID Controller (or Controllers) on the rear of the unit (see *Rear Panel* on page 3):

- If you have a 1Gb iSCSI network, attach CAT6 Ethernet cables to the iSCSI ports (**Net 0** and **1**).
- If you have a Fibre Channel network, attach fiber-optic cables or twisted-pair copper cables to the Fibre Channel ports (**Host 0** or **Host 1**).

Power Up the SATABeast/SASBeast

CAUTION: When applying power to the SATABeast/SASBeast, use ONLY the IEC power cords originally supplied with the unit. Do NOT use other power cords, even if they appear identical to the supplied cords.

- Using the two supplied power cords, connect each PSU to main power, making sure to fold down the retaining clip over each one. Then turn the unit on by switching each PSU's power switch to the on (**|**) position.

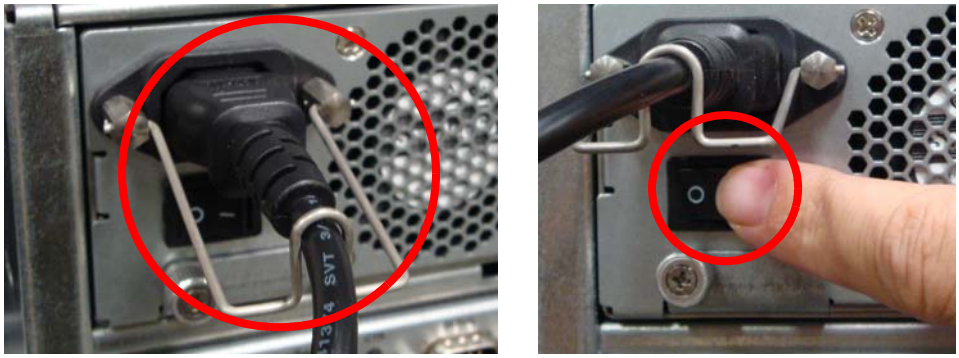


Figure 3.19:

Once the unit has finished booting up, you can configure it using the graphical user interface (GUI). For detailed instructions, see the *Nexsan User Manual*.

Chapter 4

Field Replacement of Modules

The SATABeast/SASBeast is designed so that some of its components can be replaced without turning off the unit or interrupting its functioning. The field-replaceable modules are:

- the two PSUs
- the one or two RAID Controllers
- the disk drives

This chapter describes how to replace each of these modules in the field while the unit is running.

WARNING: Risk of ELECTRIC SHOCK if components are removed or tampered with when unit power is on. ONLY a TRAINED OPERATOR may remove and replace the field-replaceable modules while power is on.

Power Supply Units (PSUs)

In the event of a power supply or PSU fan failure, replace the PSU using the following procedure. Do NOT remove a failed PSU without a replacement unit immediately available.

1. Determine which PSU or PSU fan has failed by examining the PSU status LEDs on each module (see *Rear Panel* on page 3). A red LED indicates the failed module. The **Home** page of the graphical user interface (GUI) also tells you which unit has failed (see the *Nexsan User Manual*).
2. Switch the PSU's power switch to the off (**O**) position and remove the power cable from the power cable socket on the PSU where the failure has occurred.
3. Unscrew the locking handle, extend it outward from the unit to unseat the PSU from its internal connectors, then carefully pull to remove the PSU from the unit. Support the weight of the PSU with your free hand while doing so.

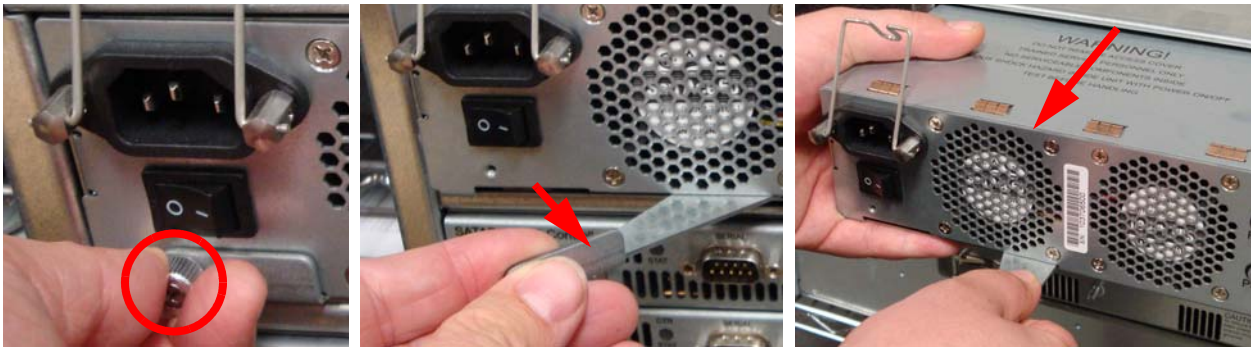


Figure 4.1: Removing the PSU

4. Make sure that the replacement PSU is right side up. The power cable socket should be on the upper left. See *Rear Panel* on page 3.

5. Insert the PSU into the slot and carefully slide it into the slot until it stops moving.

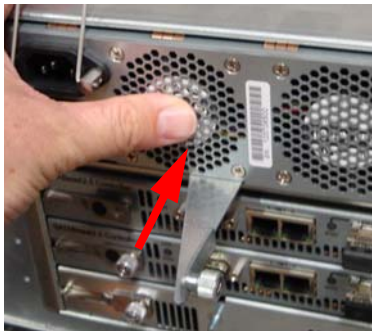


Figure 4.2: Sliding the PSU into place

6. Swivel the latching handle to the left so that it is flush with the PSU, then tighten the retaining bolt to lock the handle in place.



Figure 4.3: Seating and locking the PSU in place

7. Plug the power cable into the power cable socket on the replacement PSU and switch the PSU's power switch to the on (**|**) position.

   The two PSU status LEDs light up green to indicate that the unit is functioning properly and supplying power to the SATABeast/SASBeast unit.

8. In the graphical user interface (GUI), go to the **Home** page and verify that the status bar for the new Power Supply Unit is green. See the *Nexsan User Manual* for more information.

RAID Controllers

In the event of a RAID Controller failure, replace the controller using the following procedure:

1. Determine which RAID Controller has failed by examining the **CTL 0** and **1** LEDs on the front of the unit (see *Front Panel* on page 1). A red **CTL 0** LED indicates that the top controller has failed. A red **CTL 1** LED indicates that the bottom controller has failed. The **Home** page of the graphical user interface (GUI) also tells you which unit has failed (see the *Nexsan User Manual*).

   NOTE: In some cases, a RAID Controller needs to be replaced even if it has not failed outright. In this case, you must determine which RAID Controller to replace by following the troubleshooting procedures in the *Nexsan User Manual*.

2. Do one of the following:

   - If you have a dual-controller unit, navigate to **System Admin > Reboot** in the graphical user interface (GUI). Under Controller Maintenance, select the controller that has failed, select the confirmation check box, then click **Execute NOW**.
   - If you have a single-controller unit, navigate to **System Admin > Reboot** in the graphical user interface (GUI), select **System Shutdown**, select the confirmation check box, then click **Execute NOW**. Then switch the power switches on both PSUs to the off (**O**) position.

3. Remove all cables from the failed RAID Controller.
4. Unscrew the locking tabs, extend them outward from the unit to unseat the RAID Controller from its internal connectors, then carefully pull the controller from the center to remove it from the unit. Support the weight of the controller with your free hand while removing it.

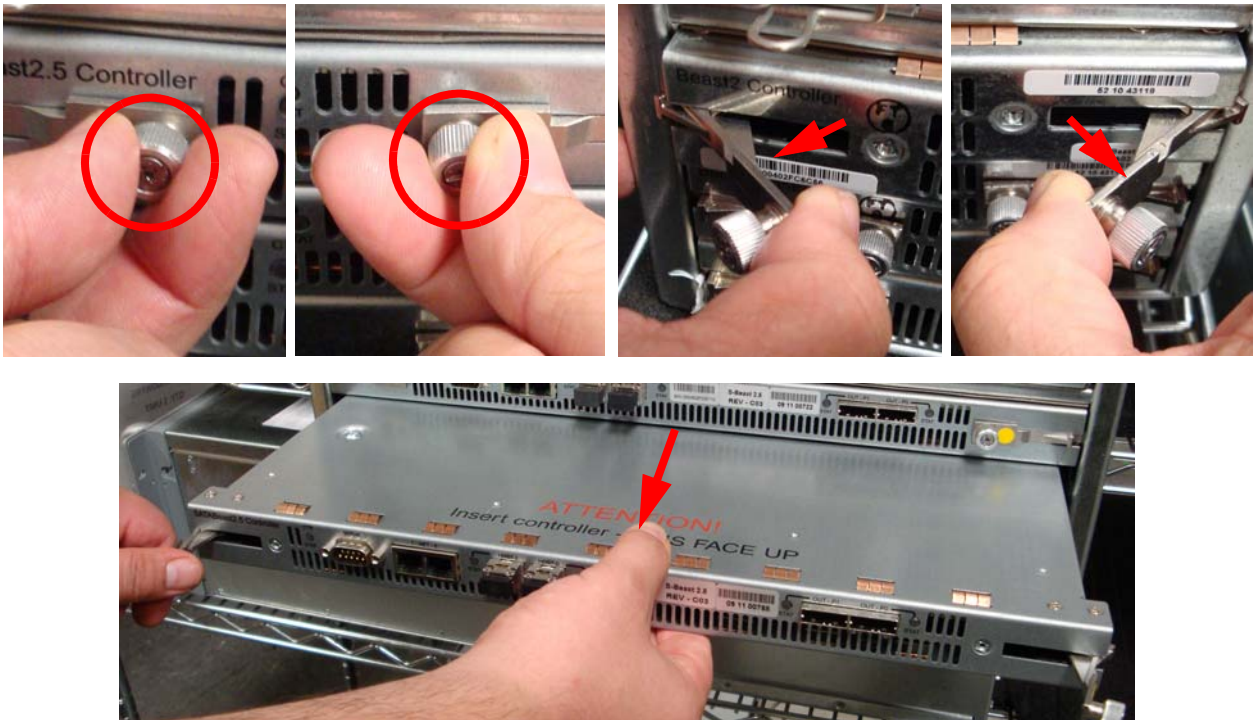


Figure 4.4: Removing the RAID Controller

5. Make sure that the replacement RAID Controller is right side up. There is a notice in red on the top of the controller to guide you.

   NOTE: If you have a Nexsan expansion unit attached to your SATABeast/SASBeast storage unit, plug the expansion cables from the expansion unit into the expansion ports on the replacement RAID Controller BEFORE you insert the RAID Controller into its slot.

6. Insert the RAID Controller into the slot and carefully slide it back until it stops moving.

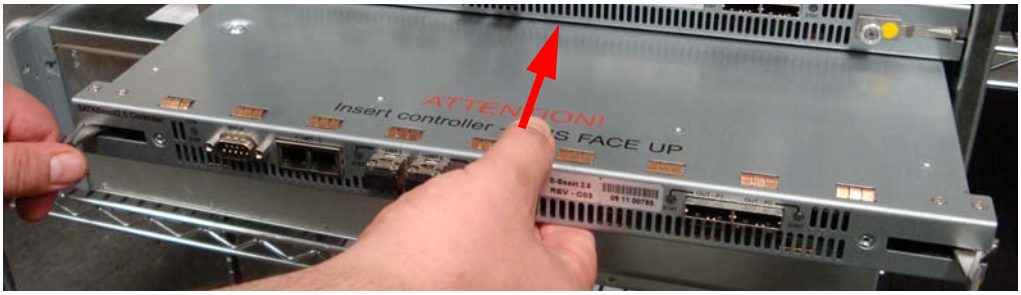


Figure 4.5: Sliding the RAID Controller into place

7. Swivel the latching tabs inward to seat the RAID Controller.

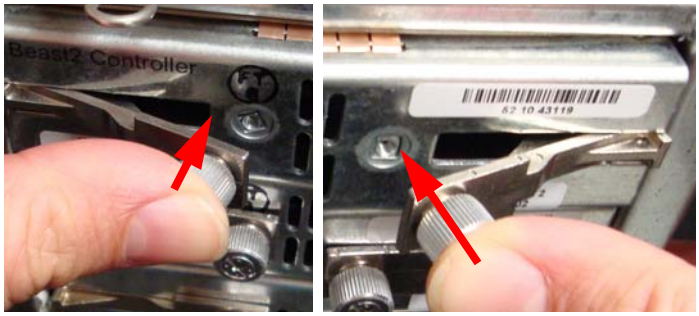


Figure 4.6: Seating the RAID Controller with the latch tabs

8. Tighten the retaining bolts to lock the RAID Controller in place.

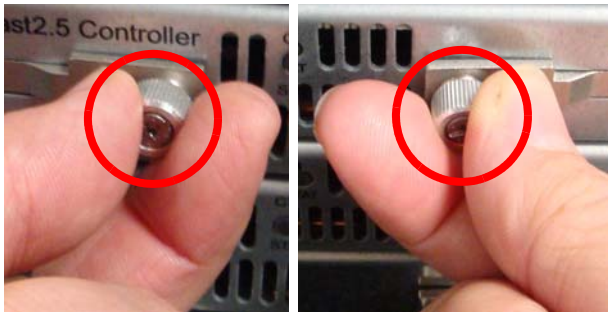


Figure 4.7: Locking the RAID Controller in place

   NOTE: If you have a single-controller unit, switch the power switches on both PSU's to the on (**|**) position.

   The **CTL 0** or **CTL 1** LED lights up green to let you know that the new controller is functioning properly.

9. Attach all other cables (Fibre Channel, iSCSI, serial) to the appropriate connectors on the replaced RAID Controller.

10. In the graphical user interface (GUI), go to the **Home** page and verify that the status bar for the new RAID Controller is green. See the *Nexsan User Manual* for more information.

Disk Drives

In the event of a disk drive failure, replace the drive using the following procedure.

CAUTION: Do not lean on or place any heavy object on the unit while inserting or replacing disk drives. Doing so may damage the unit or overbalance the rack.

1. Unbolt the face of the SATABeast/SASBeast unit from the rack.



Figure 4.8: Unbolting the SATABeast/SASBeast from the rack

2. Pull the unit forward until there is enough room to remove the top cover.



Figure 4.9: Sliding the unit forward in the rack

3. Unscrew the retaining screws for the front panel (one on each side), then pull the front panel down.



Figure 4.10: Opening the front panel

4. Remove the top cover by pulling it forward, then lifting up.



Figure 4.11: Opening the drive bay lid

CAUTION: Disk drives are shock sensitive. Perform all actions involving disk drives carefully to avoid damage and data loss.

5. Determine which drive has failed by examining the LEDs for each disk (see *Drive Bay Interior* on page 5). A red LED indicates the failed drive. The **Disk Drives** page (under RAID Information) of the graphical user interface (GUI) also tells you which drive has failed (see the *Nexsan User Manual*).
6. Disengage the disk by slipping the hooks on the supplied disk-extraction handle underneath the studs on the side of the disk and swiveling the handle upright.

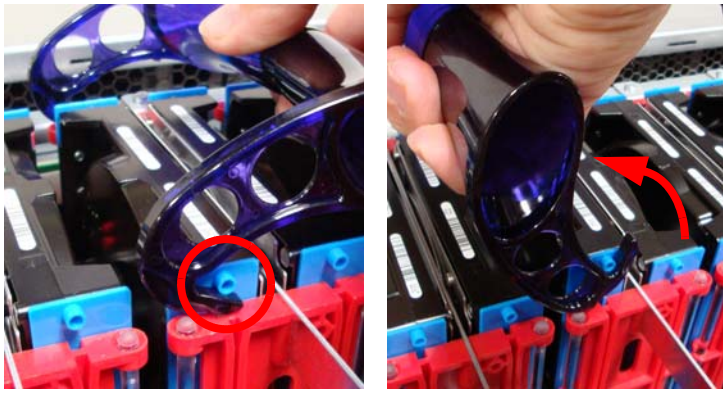


Figure 4.12: Disengaging the disk drive

7. Carefully lift the handle to remove the disk.

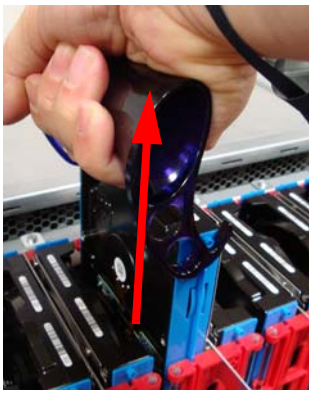


Figure 4.13: Removing the disk drive

8. Using the drive guide to help you orient the disk, carefully load the replacement disk drive into the drive slot. Make sure that the disk is fully seated.

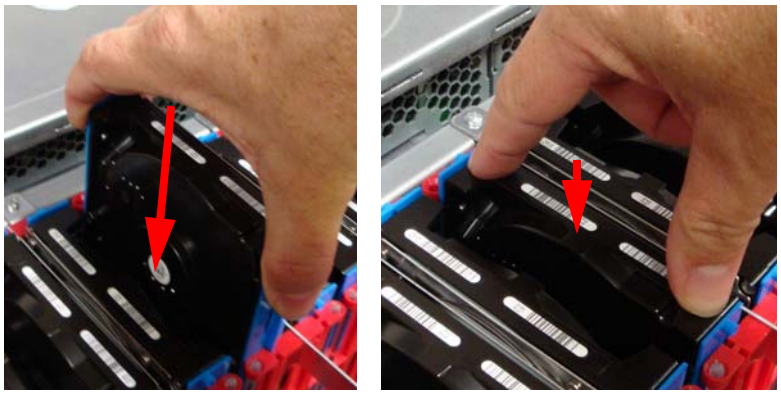


Figure 4.14: Replacing the disk drive

The drive status LED lights up green to let you know that the disk is connected and functioning properly.

9. Replace the top cover, close the front face, and replace the front panel retaining screws.
10. Slide the unit back into the rack and bolt it back in place.
11. In the graphical user interface (GUI), go to the **Home** page and verify that the status bar for the new drive is blue, meaning that it has been automatically detected and assigned as a pool spare. See the *Nexsan User Manual* for more information.

    NOTE: If the status bar for the new drive is gray, you must manually assign the drive. See the *Nexsan User Manual* for instructions.

Common Terms and Abbreviations

anti-static wrist-strap

An antistatic device used to prevent *electrostatic discharge* (ESD) by safely grounding a person working on electronic equipment. Also called an ESD strap or a grounding bracelet.

Auxiliary Blower Unit

A module of the SATABeast/SASBeast that provides cooling for the unit's *RAID Controller*s and disk drives.

bit

The smallest unit of digital data, representing a 0 or a 1. Abbreviated "b".

byte

A unit of data that is 8 *bit*s long. Often used for alphanumeric characters. Abbreviated "B".

cache

Reserved areas of memory that are used to speed up instruction execution, data retrieval, and data updating. In Nexsan storage units, a flash memory unit in the *RAID Controller* that temporarily holds user data.

duplex

A communication system where data flows in both directions between two devices. There are two configurations. "Half duplex" provides communication in both directions, but not at the same time; when one device transmits, the other device can only receive, and vice versa. For example, walkie-talkies, police radios, and other two-way radio systems use half duplex communication. "Full duplex" allows both devices to send information simultaneously. For example, telephones and videoconferencing systems use full-duplex communication.

electrostatic discharge

The sudden and momentary electric current that flows between two objects at different electrical potentials caused by direct contact or induced by an electrostatic field. Potentially harmful to electronic components.

ESD

See *electrostatic discharge*.

ESD strap

See *anti-static wrist-strap*.

Ethernet

A system for connecting a number of computer systems to form a *local area network* (LAN), with protocols to control the passing of information and to avoid simultaneous transmission by two or more systems. Supports data transfer rates of 10, 100, 1,000, and 10,000 megabits per second (*Mb/s*). 10, 100, and 1,000Mb/s networks are often referred to as 10BASE-T, 100BASE-T, and 1000BASE-T, respectively. 10,000Mb/s networks are usually referred to as 10Gb Ethernet or 10GbE.

FC port

See *Fibre Channel port*.

FCC

The Federal Communications Commission. The federal agency that regulates electromagnetic emissions.

Fibre Channel

A gigabit (*Gb*) speed network technology primarily used for storage networking and the current standard connection type for *storage area network*s (SANs). Despite its name, Fibre Channel signaling can run on both twisted-pair copper wire and fiber-optic cables.

Fibre Channel port

Any entity that actively communicates over a *Fibre Channel* network. Usually implemented in a device such as disk storage or a *Fibre Channel switch*. In Nexsan storage units, the Fibre Channel ports support 2*Gb/s*, 4Gb/s, or 8Gb/s connections.

Fibre Channel switch

A network switch compatible with the *Fibre Channel* protocol. Allows the creation of a Fibre Channel network, which is currently the core component of most *storage area network*s (SANs).

full duplex

See *duplex*.

Gb

Gigabit. Approximately one billion (1,000,000,000) *bit*s.

GB

Gigabyte. Approximately one billion (1,000,000,000) *byte*s. Used to describe the storage capacity of hard disk drives. A gigabyte is usually computed as 10^9 (1,000,000,000) bytes, but can also be computed as 2^{30} (1,073,741,824) bytes (often called a “binary gigabyte” and abbreviated GiB).

GBIC

See *gigabit interface converter*.

Gb/s

Gigabits (*Gb*) per second. Used to describe the speed of network data transmission.

gigabit interface converter

A standard for transceivers, commonly used with Gigabit (*Gb*) *Ethernet* and *Fibre Channel*, with a hot-swappable electrical interface. Gigabit interface converter ports can support a wide range of physical media, from copper to optical fiber, at lengths of hundreds of kilometers.

graphical user interface

A type of user interface that allows users to interact with electronic devices using images rather than text commands. Nexsan storage units use a graphical user interface for system configuration.

grounding bracelet

See *anti-static wrist-strap*.

GUI

See *graphical user interface*.

IEC

The International Electrotechnical Commission. Prepares and publishes international standards for all electrical, electronic, and related technologies.

I/O

Input/Output. The communication between an information processing system (such as a computer or a SATABeast/SASBeast storage system’s *RAID Controller*), and the outside world (either an operator

or another information processing system). Inputs are the signals or data received by the system, and outputs are the signals or data sent from it.

IP address

Internet Protocol address. A numerical label assigned to each device (such as a computer, printer, or Nexsan storage unit) on a computer network that uses *TCP/IP* for communication.

iSCSI

Internet Small Computer System Interface. A transport protocol that provides for the *SCSI* protocol to be carried over a *TCP/IP* network.

LAN

See *local area network*.

LED

Light Emitting Diode. LEDs are used for indicator lights on the front and back of Nexsan storage units.

local area network

A computer network that links devices within a small geographic area, such as a building or group of adjacent buildings.

Mb

Megabit. Approximately one million (1,000,000) *bit*s.

Mb/s

Megabits (*Mb*) per second. Used to describe the speed of network data transmission.

Power Supply Unit

A module that regulates electrical power to the components of Nexsan storage units.

PSU

See *Power Supply Unit*.

rack

A metal frame designed to hold hardware devices.

rack mount

Hardware for attaching devices to a *rack*.

rack-mounted

Attached to a *rack*.

RAID

Redundant Array of Independent Disks. A system using multiple hard drives organized into a single logical unit for the sharing or replication of data in order to increase data integrity, fault-tolerance, and throughput.

RAID Controller

A hardware device, software program, or combination of the two which manages the physical disk drives in a *RAID* and presents them as a single logical unit to attached devices. The RAID controllers in Nexsan storage units are hardware modules. Nexsan RAID controllers also provide connections for system administration and configuration.

rail

A type of *rack mount* that allows a device to be easily slid into and back out of a *rack*.

SAN

See *storage area network*.

SAS

Serial Attached SCSI. A serial version of the *SCSI* interface. A point-to-point architecture that uses a disk controller with four or more channels that operate simultaneously. Each full-duplex channel, known as a SAS port, transfers data at 1.5*Gb/s*, 3Gb/s, or 6Gb/s in each direction. SAS also supports Serial ATA (*SATA*) drives, which can be mixed with SAS drives in a variety of configurations.

SATA

Serial Advanced Technology Attachment. A connection standard for fixed and removable hard disk drives.

SCSI

Small Computer System Interface. A collection of standards and proposed standards for input/output (*I/O*) communication, primarily intended for connecting storage subsystems or devices to hosts.

SFP

Small Form-factor Pluggable. A type of *gigabit interface converter* (GBIC) in a compact form factor. The *Fibre Channel port*s on Nexsan storage devices are SFPs.

spare disk

A blank disk drive that is available to a *RAID* array in case any of the disks assigned to the array should fail. If an array disk fails, the *RAID Controller* rebuilds the data from the failed disk onto the spare disk, which then becomes part of the array. In Nexsan storage systems, there are two kinds of spare disk: “pool spares”, which can be used by any RAID array in the unit; and “dedicated spares”, which are assigned to a specific array.

storage area network

An architecture that provides for attachment of remote computer storage devices to servers in such a way that the devices appear as locally attached to the operating system.

TB

Terabyte. Approximately one trillion (1,000,000,000,000) *byte*s. Used to describe the storage capacity of hard disk drives. A terabyte is usually computed as 10^{12} (1,000,000,000,000) bytes, but can also be computed as 2^{40} (1,099,511,627,776) bytes (often called a “binary terabyte” and abbreviated TiB).

TCP/IP

Transmission Control Protocol/Internet Protocol. The set of communications protocols used for the Internet and other similar networks. TCP provides reliable delivery of messages between networked computers. IP uses numeric *IP address*es to join network segments.

U

Unit. The standard unit of measure for designating the vertical usable space, or height, of *rack*s. 1U is equal to 1.75 inches. A device that is described as being 1U in height may be shorter than 1.75 inches, but, due to the design of most racks, will still take up 1.75 inches of rack space.

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Version 2.6
Release Date: January 2012

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