SATABOY®/SASBOY™

Installation and Maintenance Manual

Version 2.6

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United States Statement for FCC: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24 (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material—special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate"

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Preface

About This Manual

This document describes the parts, functions, and installation procedures for the SATABoy/SASBoy. It covers the SATABoy/SASBoy 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 SATABoy/SASBoy unit is heavy and requires two people to lift it and slide it onto the mounting rails. Do NOT attempt to mount the SATABoy/SASBoy onto the mounting rails by yourself.

CAUTION: When removing the SATABoy/SASBoy 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.

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 SATABoy/SASBoy.

CAUTION: Always fully stabilize racks with wall anchors or stabilizing legs, or both, before mounting the SATABoy/SASBoy 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 SATABoy/SASBoy 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 SATABoy/SASBoy, 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 SATABoy/SASBoy 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 on page 5; added required tools and equipment section on page 7.

Version 2.5, August 2011: Complete reorganization of Installation and Maintenance Manual contents.

Version 2.4, March 2011: Updated illustration of PSU on page 16.

Version 2.3, March 2010: New format applied throughout; new note regarding multiple SATABoy/SASBoy units added under *Before you begin* on page 5, under *Disk Drives* on page 12, and under *Tiered Storage & SAS Drive installation guide* on page 27.
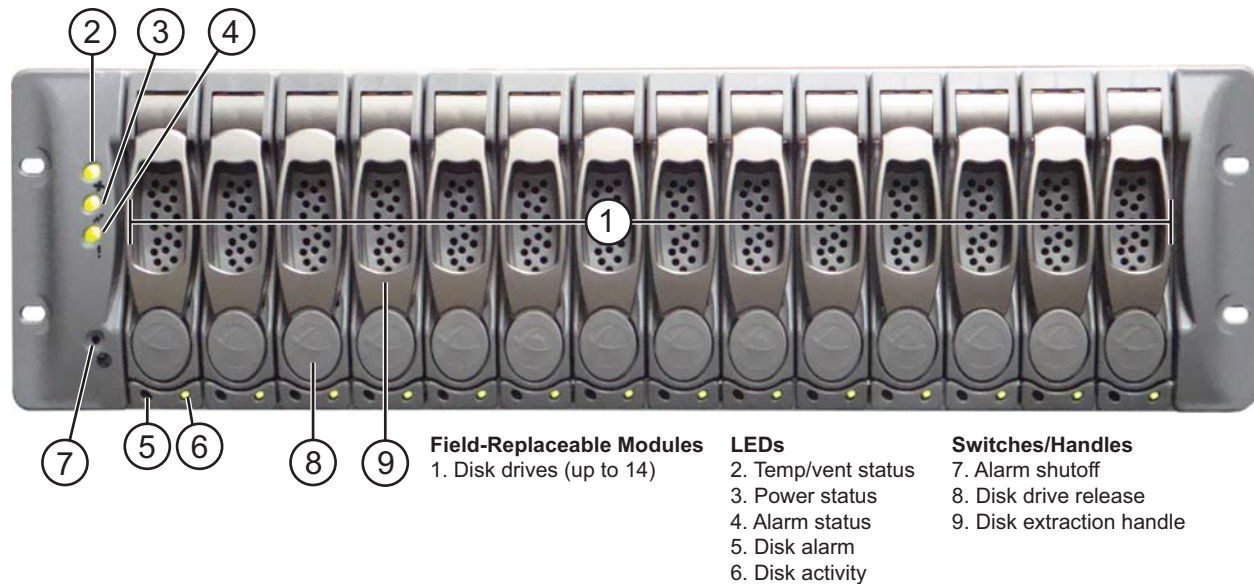
SATABoy/SASBoy Overview

Front Panel

Figure 1.1: SATABoy/SASBoy front panel

Field-Replaceable Modules
1. Disk drives (up to 14)

LEDs
2. Temp/vent status
3. Power status
4. Alarm status
5. Disk alarm
6. Disk activity

Switches/Handles
7. Alarm shutoff
8. Disk drive release
9. Disk extraction handle

Field Replaceable Modules

1. Disk drives: Up to 14 3.5" disk drives. Disk drives can be field-replaced in the event of failure (see *Disk Drives* on page 21).

LEDs

2. Temperature and ventilation status LED: Indicates the status of the fans and the unit's internal temperature. This LED is green when both fans are operating at an acceptable RPM and the internal temperature is within acceptable limits. It alternates between green and red if a fan is operating too slowly or if there is a rapid increase in internal temperature. It is red if a fan has failed or if the internal temperature is too high. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).

3. Power supply status LED: Indicates the status of the unit's two Power Supply Units (PSUs). It is green if both PSUs are operating within specification. It is red if either PSU is operating outside of specification or has failed. The **Environmental Information** page (under System Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).

> ⚠ **CAUTION:** In the event of a PSU or fan failure, replace the failed unit IMMEDIATELY (see *Power Supply Units (PSUs)* on page 17). If a replacement is not available, turn off the SATABoy/SASBoy unit until a replacement arrives. Failure to do so may result in irreversible data loss or unit failure, or both.

4. Alarm status LED: Indicates the presence or absense of problems with the unit. Green indicates that the unit is operating within specifications. Red indicates that one or more errors have been detected in

the RAID Controllers or some other system (but not the PSUs or fans—see items 2 and 3). 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*).

5. Disk drive alarm LEDs (one per drive): This LED flashes amber to warn you of a potentially unreliable disk drive. It is solid amber when the drive fails. The **Disk Information** page (under RAID Information) in the graphical user interface (GUI) displays details (see the *Nexsan User Manual*).

6. Disk drive activity LEDs (one per drive): This LED is green when a drive is installed in the drive slot. It blinks green during disk access activity.

Switches and Handles

7. Alarm shutoff switch: 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.

8. Disk release button (one per drive): Releases the disk extraction handle.

9. Disk extraction handle (one per drive): Allows removal of the disk drive from the chassis.
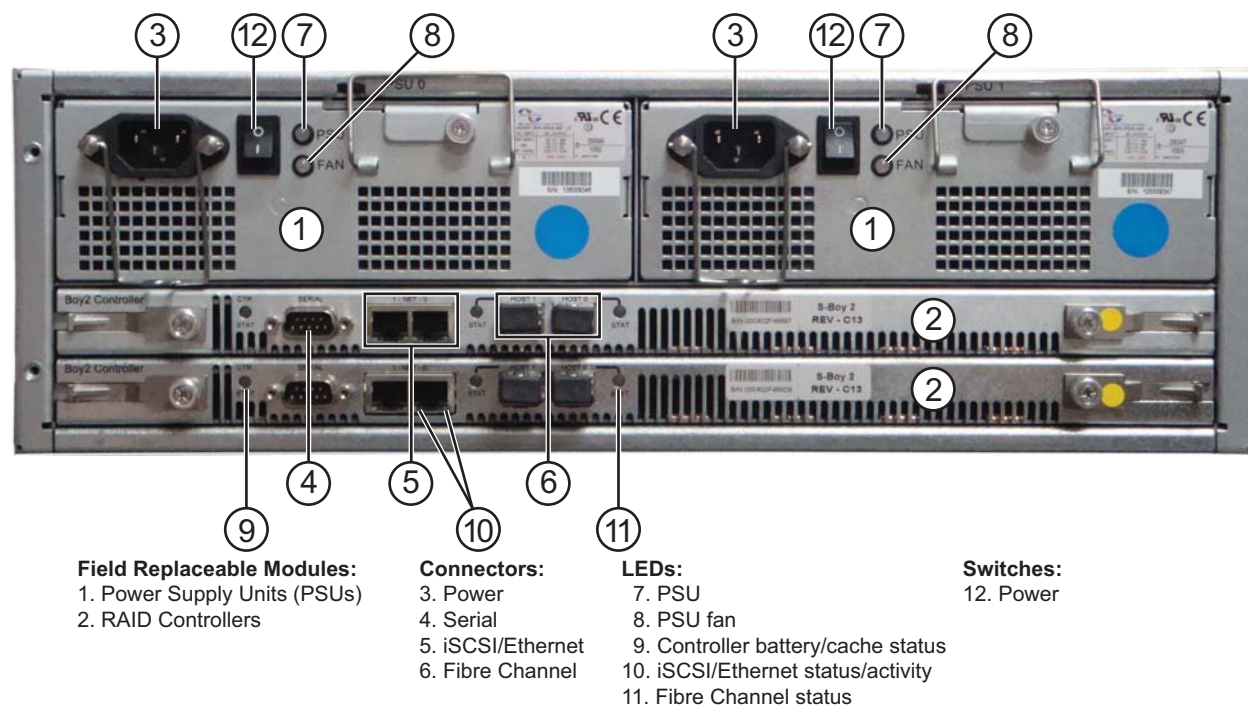
Rear Panel

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

Connectors:
3. Power
4. Serial
5. iSCSI/Ethernet
6. Fibre Channel

LEDs:
7. PSU
8. PSU fan
9. Controller battery/cache status
10. iSCSI/Ethernet status/activity
11. Fibre Channel status

Switches:
12. Power

Figure 1.2: SATABoy/SASBoy 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 17).

2. RAID Controller(s) (1 or 2). Each unit can be field-replaced in the event of failure (see *RAID Controllers* on page 19).

Connectors

3. Power (2): 110–240VAC, 47–63Hz

4. One **SERIAL** port per RAID Controller: RS232 DB9 serial port for low-level reporting.

5. 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).

6. Two Fibre Channel (FC) ports (**HOST 0** and **1**) per RAID Controller: 2Gb/s, 4Gb/s, or 8Gb/s Fibre Channel optical SFPs.

LEDs

7. 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) displays details. See *Nexsan User Manual*.

8. 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) displays details. See *Nexsan User Manual*.

9. 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.

10. 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.

11. 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.

Switches

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

Dimensions

Height	3U	132.5mm (5.22")
Length	Overall	550mm (21.65")
	Chassis mounting bracket face to end of unit	502mm (19.76")
Width	Overall	482.6mm (19")
	Of chassis body	429mm (16.89")
Weight	With 250GB Drives* (Rack mounting kit NOT included)	38 kg (83.78 lbs.)
*Larger capacity drives may increase weight slightly		

Power

- Two (2) 500W load-sharing PSUs (12V/5.1V/3.3V/1.8V)

Cooling

- Two (2) radio blowers per PSU (4,500 max rpm); software speed controlled

Materials

- Chassis: Pre-plated, galvanized sheet steel
- Drive frames: Plastic injection-molded assembly, various materials

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 SATABoy/SASBoy quickly and safely. Please read this document carefully and review all of the information in this section before installing the SATABoy/SASBoy.

Taking Delivery of the SATABoy/SASBoy

Upon receipt of your SATABoy/SASBoy, 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 SATABoy/SASBoy

Carefully unpack your SATABoy/SASBoy and inspect each item before installation:

1. Carefully cut the tape holding the box closed.

Figure 2.1: Opening the outer box

2. Remove the cardboard spacers and the disk box from the outer box.

Figure 2.2: Removing spacers and disk box

3. Inspect the items in the foam spacer. The accessories should include:

   • rack-mounting hardware:

     two rail assemblies, one left and one right
     eight (8) large screws for securing the rails to the rack
     two (2) bolts for securing the SATABoy/SASBoy to the rack

   • two (2) power cables

   • disposable ESD strap

   • serial cable

   • any additional items that may have been ordered, such as Fibre Channel cables

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

Figure 2.3: Disk box contents (example)

5. Remove the accessories from the top foam insert.

6. Remove the top foam insert from the package.

7. With the help of a second person, carefully lift the SATABoy/SASBoy unit out of the packaging.

Figure 2.4: Removing the unit from the box

> ⚠ **CAUTION:** When removing the SATABoy/SASBoy 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 SATABoy/SASBoy 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 SATABoy/SASBoy

- a size P1 Phillips-head screwdriver

- enough CAT6 Ethernet cable to connect the SATABoy/SASBoy to the local area network (LAN)

- enough CAT6 Ethernet cable, fibre-optic cable, or twisted-pair copper cable to connect the SATABoy/ SASBoy to the storage area network (SAN) (see *Attach Communication Cables* on page 16)

Prepare the Site

Before installing the SATABoy/SASBoy, prepare the installation site and rack as follows:

> ⚠️ **CAUTION:** Always fully stabilize racks with wall anchors or stabilizing legs, or both, before mounting the SATABoy/SASBoy 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 SATABoy/SASBoy 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 SATABoy/SASBoy does not overload the available electrical supply (see *Power* on page 4).

Attach Rack Mounting Hardware

1. At a suitable location in the front of the rack, insert the cage nuts.

Figure 2.5: Attaching the cage nuts

2. Loosely attach the rear mounting brackets to the rear of the rack, then screw two flanged-head screws into the sides of each bracket. Be sure to leave approximately 1mm of thread showing.
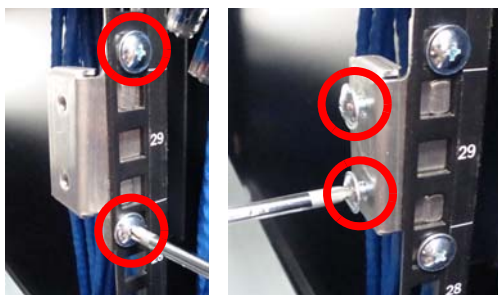

Figure 2.6: Attaching rear mounting brackets and screws

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 SATABoy/SASBoy.

1. Remove the two PSUs and the one or two RAID Controllers from the SATABoy/SASBoy 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.
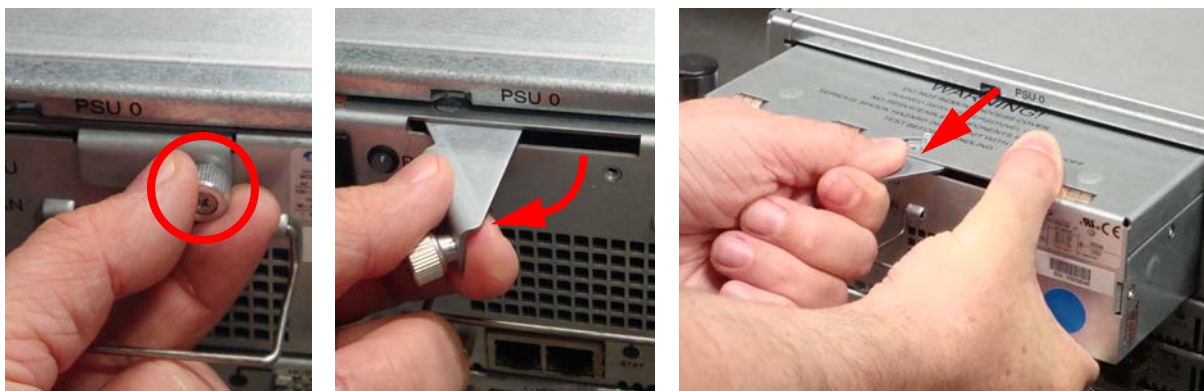

Figure 2.7: Removing the PSU

- 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.
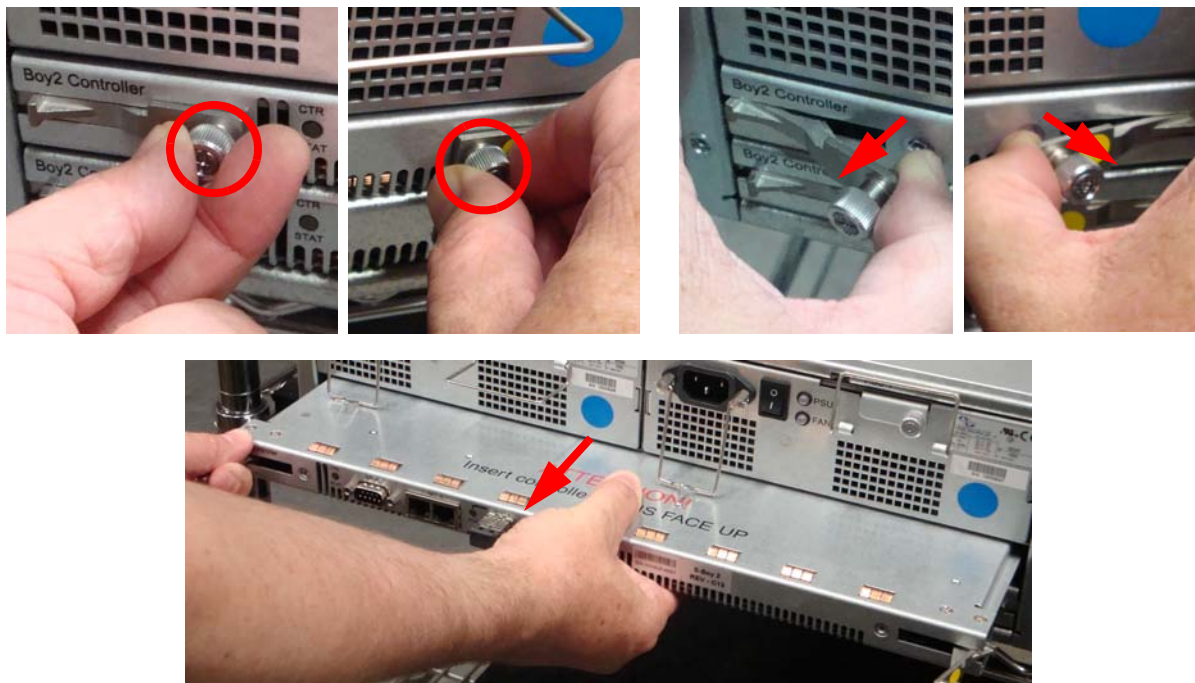

Figure 2.8: Removing the RAID Controller

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 mounting rails to the sides of the SATABoy/SASBoy unit:

   a. Measure the distance between the front and rear of the rack.

   b. Using the labels on the insides of the rails, position the rails on the chassis so that the distance measured in step a is flush with the rear of the SATABoy/SASBoy unit:

Figure 2.9: Positioning the mounting rails

c.   Using the supplied screws and washers, attach the mounting rails to the chassis.

⚠ CAUTION: There MUST be at least two points of attachment for each rail.
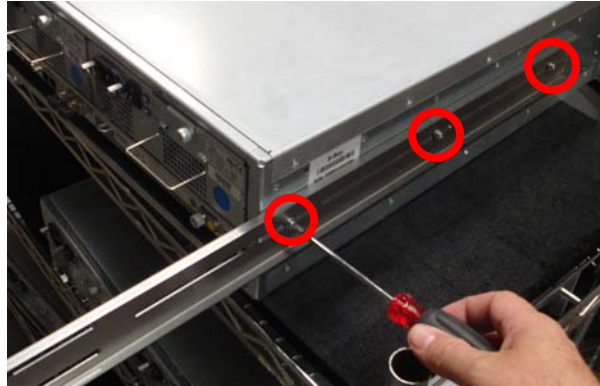

Figure 2.10: Attaching the mounting rails to the chassis

NOTE: If you are installing more than one SATABoy/SASBoy 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 SATABoy/SASBoy

The SATABoy/SASBoy 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.

Mount the SATABoy/SASBoy

⚠ **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 SATABoy/SASBoy.

⚠ **CAUTION:** The SATABoy/SASBoy unit is heavy and requires two people to lift it and slide it onto the mounting rails. Do NOT attempt to mount the SATABoy/SASBoy 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 3.1: Putting on and attaching the anti-static wrist-strap.

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

⚠ **CAUTION:** Before mounting the unit, be sure that it is oriented properly. The unit is right side up when the LEDs on the front panel are on the left, as shown in the illustration under *Front Panel* on page 1.

3. With the help of a second person, lift the SATABoy/SASBoy unit and insert it between the left and right rack sections.

4. Slide the flanges on the rear of the mounting rail onto the screws on the sides of the rear mounting brackets.
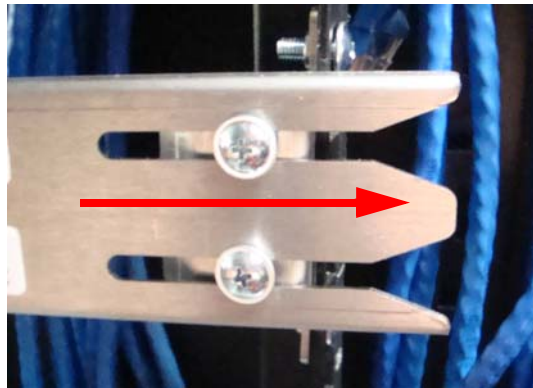

Figure 3.2: Sliding the mounting rails onto the rear mounting brackets

5. While still supporting the unit, insert the four front mounting bolts through the holes in the chassis ears and secure them into the cage nuts.
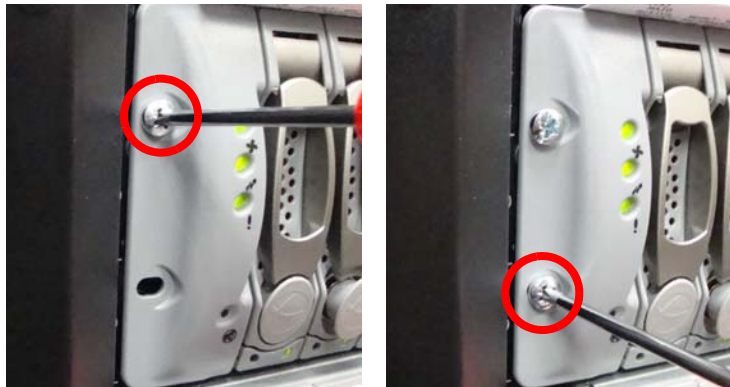

Figure 3.3: Bolting the front of the unit in place

6. Tighten the screws holding the rear mounting brackets to the rack, then tighten the screws on the sides of the mounting brackets to secure the mounting rails.
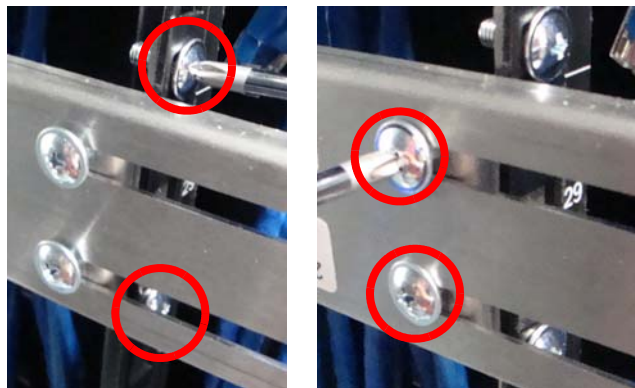

Figure 3.4: Securing rear mounting screws

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 latching handle should be on top. See *Rear Panel* on page 2.

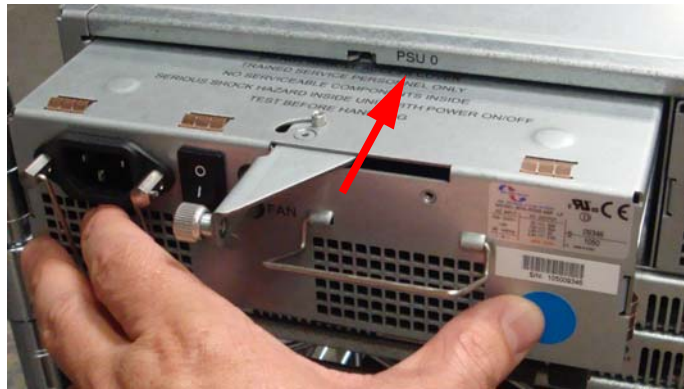2. Insert the PSU into the slot and carefully slide it into the slot until it stops moving.

Figure 3.5: Sliding the PSU into place

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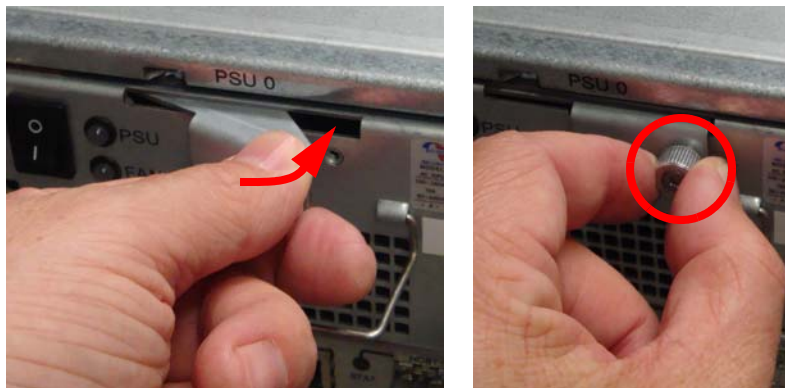

Figure 3.6: Seating and locking the PSU into place

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 3.7: Sliding the RAID Controller into place

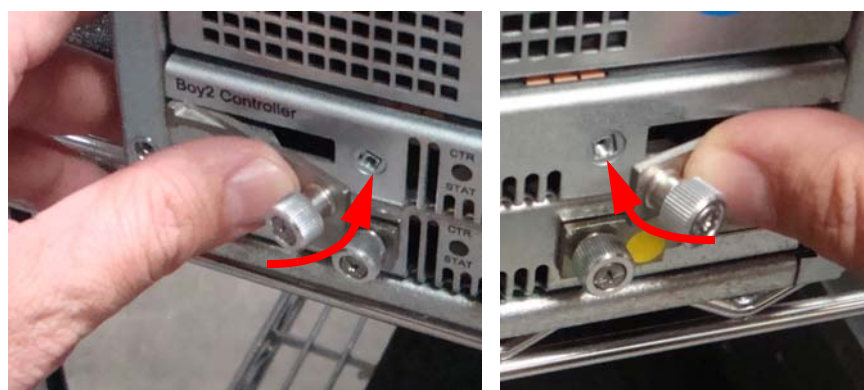3. Swivel the latching tabs inward to seat the RAID Controller.

Figure 3.8: Seating the RAID Controllers with the latch tabs

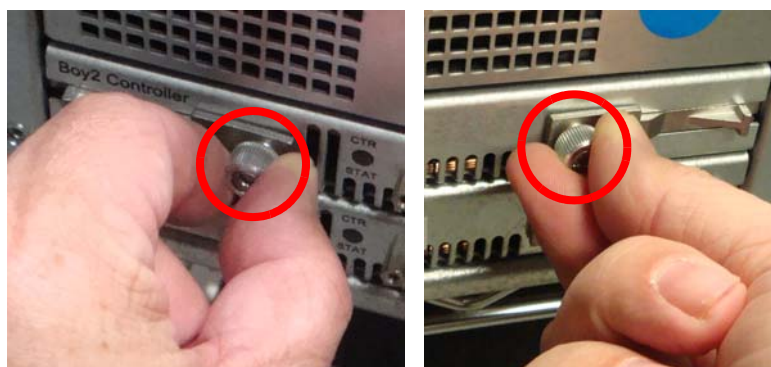4. Tighten the retaining bolts to lock the RAID Controller in place.

Figure 3.9: Locking the RAID Controller in place

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

Load Disk Drives

1. Using the drive guides to help you orient the disks, carefully load each disk drive into a drive slot, push down on the extraction handle to seat it, and lock the handle in place with the drive release button:
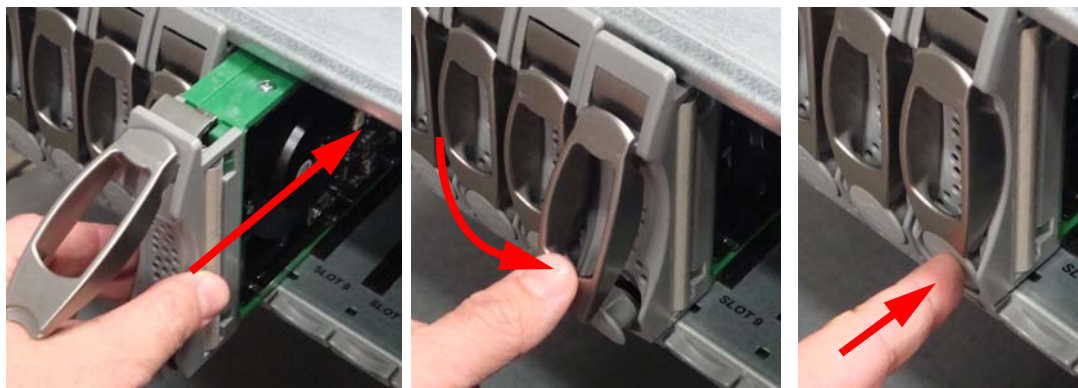

Figure 3.10: Inserting disk drives

2. For any slots where a disk drive is not present, insert a blank drive slot plate into the drive slot:

   NOTE: You may have to press the latch at the top to seat the plate fully.
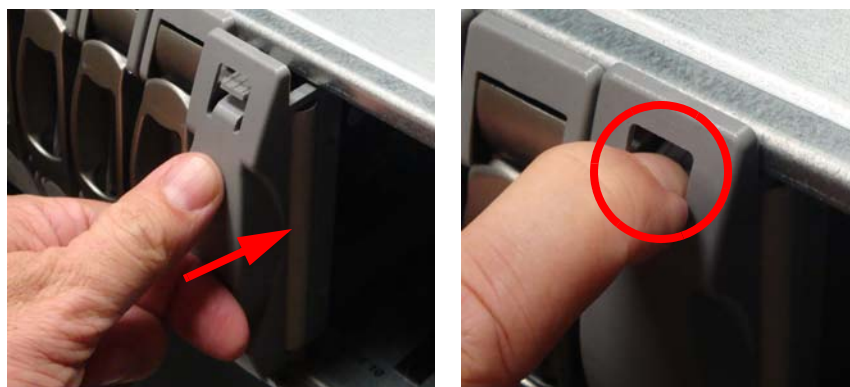

Figure 3.11: Inserting blank drive slot plates

⚠️ **CAUTION:** Always fill all drive slots across the front of the unit. Leaving open gaps decreases cooling efficiency and may result in some disk drives overheating.

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 2):

- 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 SATABoy/SASBoy

CAUTION: When applying power to the SATABoy/SASBoy, 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:
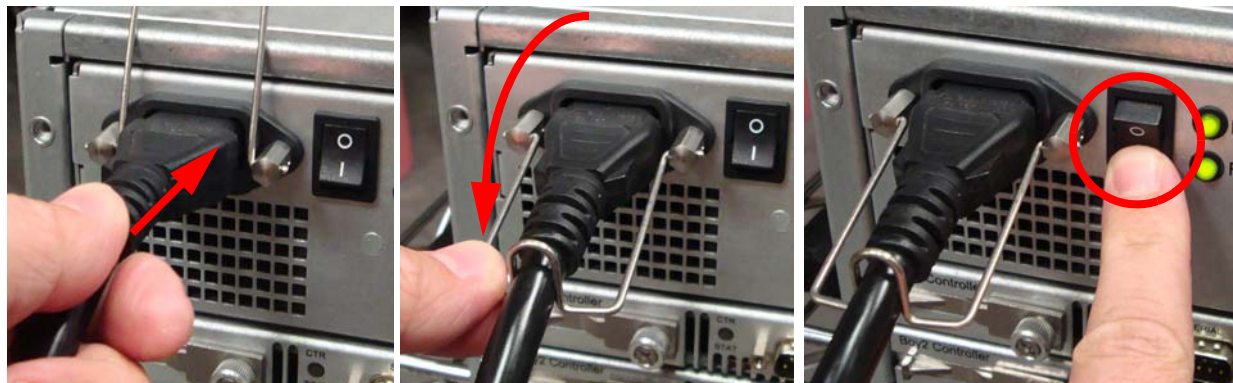

Figure 3.12: Powering up the SATABoy/SASBoy

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*.

Field Replacement of Modules

The SATABoy/SASBoy 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.

> **CAUTION:** In the event of a PSU or fan failure, replace the failed unit IMMEDIATELY. If a replacement is not available, turn off the SATABoy/SASBoy storage unit until a replacement arrives. Failure to do so may result in irreversible data loss or unit failure, or both.

1. Determine which PSU or PSU fan has failed by examining the PSU status LEDs on each module (see *Rear Panel* on page 2). 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. On the PSU where the failure has occurred, switch the PSU's power switch to the off (**O**) position, then remove the power cable from the power cable socket.

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.
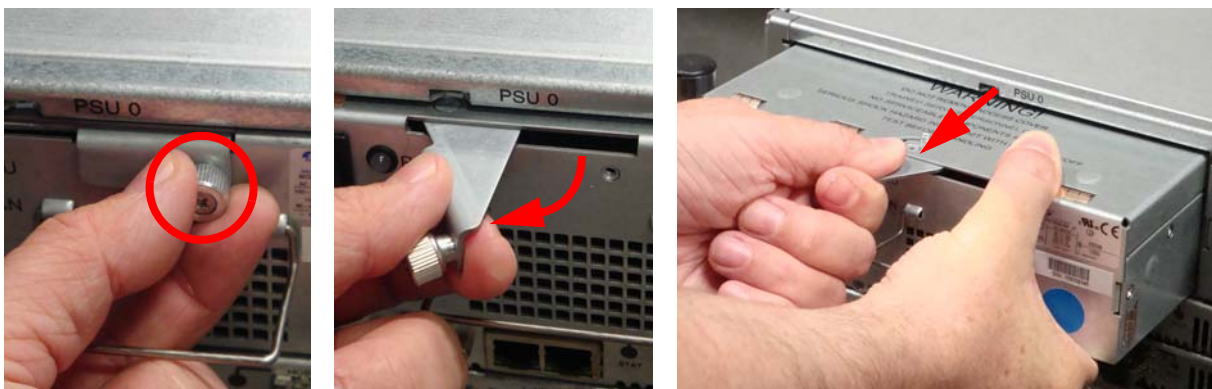

Figure 4.1: Removing the PSU

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 2.

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.
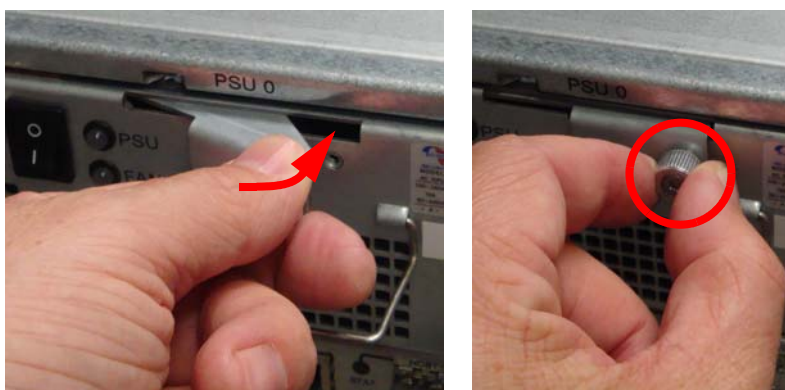

Figure 4.3: Seating and locking the PSU into place

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 SATABoy/SASBoy 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 checking the **Home** page of the graphical user interface (GUI) (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.
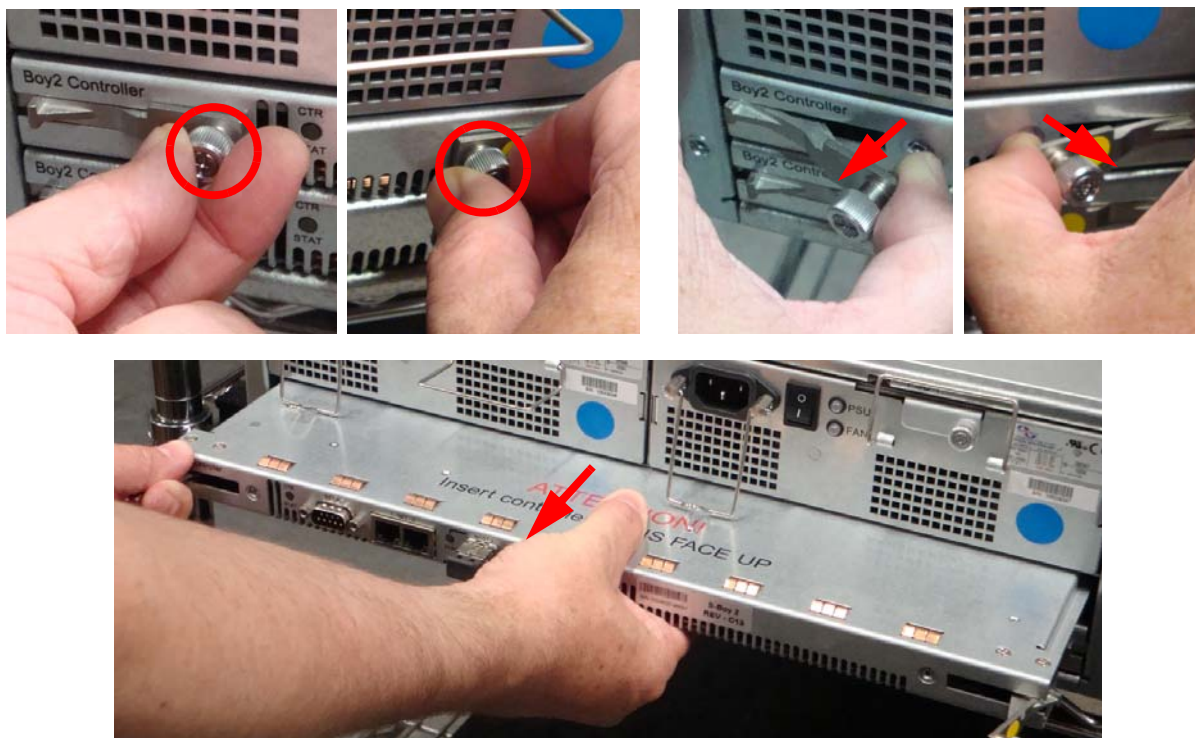

Figure 4.4: Removing the RAID Controller

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.

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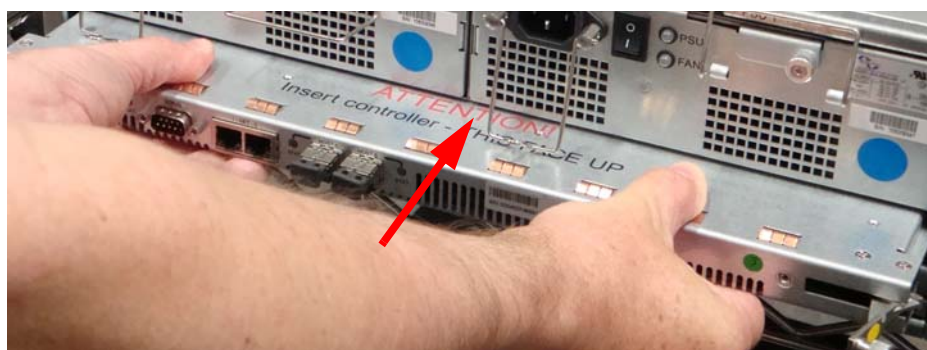

Figure 4.5: Sliding the RAID Controller into place

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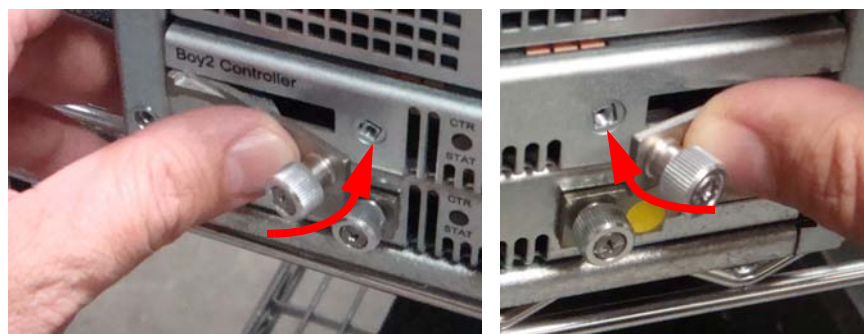

Figure 4.6: Seating the RAID Controller with the latch tabs

8. Tighten the retaining bolts to lock the RAID Controller in place.
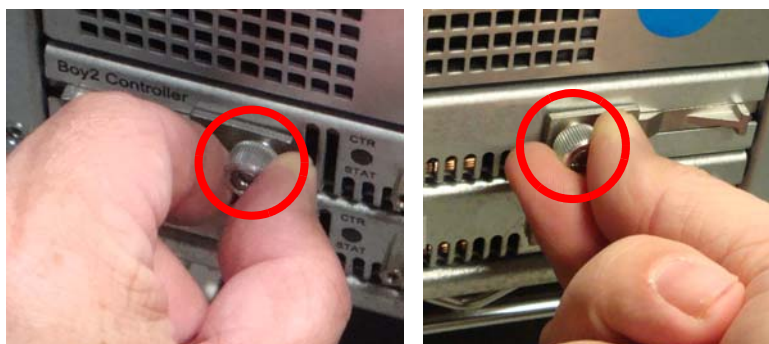
Figure 4.7: Locking the RAID Controller in place

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

The alarm status LED lights up green to let you know that the new controller is functioning properly.

9. Attach all 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. Determine which drive has failed by examining the LEDs for each disk (see *Front Panel* on page 1). 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*).

2. Press the disk release button for the failed drive, then remove the drive by carefully pulling on the extraction handle. Support the disk with your free hand while removing it.
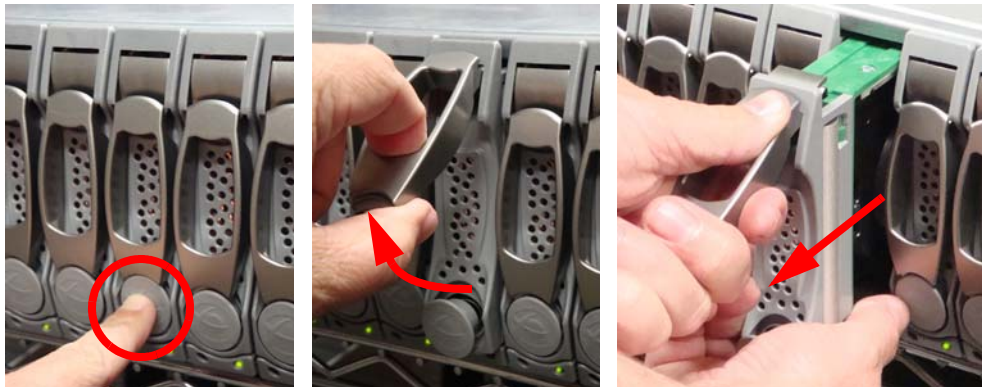

Figure 4.8: Removing a disk drive

3. Using the drive guides to help you orient the disk, carefully load the replacement disk drive into the drive slot, push down on the extraction handle, then lock it into place with the disk release button.

Figure 4.9: Replacing a disk drive

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

4. 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 red, 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.

array

A linked group of one or more physical, independent hard disk drives. On Nexsan storage systems, synonymous with *RAID*.

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 SATABoy/SASBoy 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. RAIDs are organized into RAID levels, which describe their architecture and configuration.

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 mounted onto 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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