

# Nexsan BEAST and E-Series User Guide

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# Contents

About this manual	ix
Conventions	ix
Notes, tips, cautions, and warnings	ix
Contacting Nexsan	x
Service and support	x
Related documents	x
Safety notices	xi
Revision history	xi
P04050147, Rev D, April 2022	xi
P04050147, Rev C, March 2022	xi
P04050147, Rev B, March 2017	xi
P04050147, Rev A, July 2016	xii
NXS-BBES-UG, Rev. 05, November 2015	xii
NXS-BBES-UG, Rev. 04, September 2015	xii
NXS-BBES-UG, Rev. 03, May 2015	xii
NXS-BBES-UG, Rev. 02, July 2014	xiii
NXS-BBES-UG, Rev. 01, April 2014	xiii
Chapter 1: Basic Setup	
Chapter 1: Basic Setup	<b>15</b> 16
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools	
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux	<b>15</b> 
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address	15 
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA)	<b>15</b> 16 16 16 18 20
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist	15 
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration	15 16 16 16 18 20 22 23
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings	15 16 16 16 18 20 22 23 23 23
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings System name	15 16 16 16 16 18 20 22 23 23 23 23 24
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings System name Network and E-Alert settings	15 16 16 16 18 20 22 23 23 23 23 24 25
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings System name Network and E-Alert settings Configure Network Settings	<b>15</b> 16 16 16 18 20 22 23 23 23 23 24 25 25
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings System name Network and E-Alert settings Configure Network Settings Configure E-Alert Settings	15 16 16 16 18 20 22 23 23 23 23 23 24 25 25 25 27
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings System name Network and E-Alert settings Configure Network Settings Configure E-Alert Settings Set time and date	15 16 16 16 18 20 22 23 23 23 23 23 24 25 25 25 27 30
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings System name Network and E-Alert settings Configure Network Settings Configure E-Alert Settings Set time and date Set time and date manually	15 16 16 16 18 20 22 23 23 23 23 24 25 25 25 25 27 30 31
Chapter 1: Basic Setup Initial network address setup Install the Nexsan Storage Tools Installing on Mac or Linux Configure the Nexsan Storage System IP address Accept the End User License Agreement (EULA) Set up the system: Quick Start Configuration Checklist Product Registration Security settings System name Network and E-Alert settings Configure Network Settings Configure E-Alert Settings Set time and date Set time and date manually Set time and date manually	15 16 16 16 18 20 22 23 23 23 24 25 25 25 25 25 27 30 31 32

Basic Quick Start	
Disk considerations	
Expert Quick Start	
Disk considerations	
Volume Configuration and Access	
When the Quick Start Configuration Check List is complete	
Chapter 2: Common Tasks	
l og in	48
Create a new RAID array	49
Configure volumes on a RAID array	53
Working with the Event Log	
Filtering and formatting the Event Log	
Viewing Only Errors	
Downloading Event Log Files	
Update Firmware	
Log off	
Chapter 3: The Graphical User Interface	
Navigation and Status	62
Navigation Menus	62
Status indicator	63
Home page	
Single Nexsan Storage System	
Nexsan Storage System with Nexsan Storage Expansions	
Alarms and warnings	
Problem Summary and Silence Alarm buttons	
Acknowledge Array Reconstruction button	69
Acknowledge Lost Data Warning button	70
RAID Information	71
For SAS and Fibre-Channel Storage Systems	
RAID Array Information	
RAID Array Utility Progress	
Configured Logical Volumes	
Volume Access Summary	
Detailed Volume Layout	
Disk Information Datail Page	
Disk Information Detail Fage	
Fibre Channel Information	
SAS Information	90
10Ge iSCSI Information	
1Ge iSCSI Information	
Host Statistics	
Replication Information	
System Information	
Summary Information	
Environmental Information	
Network Information	
Port Statistics	
Network Services	

E-Alerts	
SNMP Traps	
Time Server	
Security	
SSL	
GUI Settings	
Summary of System Problems	111
Event Log	112
Error Log	
General Configuration	114
Volumes and Host Access	
Disk Configuration	
Replication Configuration	117
Download Event Log Files	
Multiple System View	118
System Hierarchal View	
Icon Key	120
Configure RAID	
Create a new RAID array	
Rename RAID Arrays	
Configure Array Encryption	
Back Up or Change an Encryption Key	131
Delete a RAID Array	
RAID Array Ownership	133
Add Hot Spare	
Delete Hot Spare	136
Retire Disk	
Configure Hot Spare Mode	
Verify RAID Array	141
Schedule Default RAID Array Verification	142
Start or stop RAID array verification immediately	143
Schedule verification for specific arrays	144
Lost Data/Bad Blocks	145
Recommended follow-up actions	145
Acknowledge Rebuild	
Configure Volumes	
Create a Logical Volume	
Expand a Logical Volume	154
Delete a Logical Volume	
Rename Logical Volumes	
Map Logical Volumes	
Configure Volume Snapshots	
Replicate Logical Volumes	
Outbound replication	
Inbound replication	
Migrate Logical Volumes	
Configure Host Access	
For SAS and 10Ge Storage Systems	172
Configure Fibre	
Configure SAS	174
Configure 10Ge iSCSI	175
Configure 1Ge iSCSI	

Host authentication settings	
Manage Host Groups	
Manage Hosts	
Host Access	
Power Settings	
AutoMAID	
AutoMAID Statistics	190
Configure AutoMAID Settings	192
Default RAID Array AutoMAID Settings	193
Default Pool Spares/Unassigned AutoMAID Settings	194
RAID Array Specific settings	195
AutoMAID 5 Settings	195
System Administration	197
Configure Cache	198
Audible Alarm	201
Configure Enclosures	202
Rehoot System	203
Reboot BAID System	200
Power Restoration Policy	204 205
Controller Maintenance	205
Configure Rebuild Priority	206
System Mode	207
Download & Unload System Settings	210
Restore Encryption Keys	212
Lindate Firmware	213
Reset to Factory Defaults	215
Configure Network	217
Configure Network Settings	218
F-Alert Settings	220
SNMP/SYSI OG Settings	223
Configure Time and Date	225
Set time and date manually	226
Set time and date automatically	226
Security	228
Administrator and User access	228
Connected Host access	229
SSI Configuration	230
GUI Settings	232
Technical Support	235
Contact Information	236
Technical Support Email Form	237
End User License Aareement	238
Application and Feature Licenses	239
Log Off	
5	
Chapter 4: Troubleshooting	
Web interface problems	
Can't connect using my IP address.	
Menus ask for a user name and password.	
Can't access configuration pages even as admin.	
Start up problems	242
My Nexsan Storage System beeps on startup.	

Other problems	
A disk has failed.	
A power supply unit (PSU) has failed, but my Nexsan Storage System is still funct	ioning. What
should I do?	
A RAID Controller has falled, what should I do?	
Disks are locked and data is inaccessible	
Appendix A: Alternate IP configuration	
Add a route to access the desired IP address	246
Use the serial port to change the IP address	247
Appendix B: Nexsan Storage Tools	
Nexsan Storage Tools Overview	
Nexsan Storage Tools Server Features	
Nexsan Storage Manager	
Shell Extensions	
IP Configuration tool	
Host Identification tool	
PowerShell	
Multipathing	
Provisioning (VDS)	
Snapshots (VSS)	
Management (SMP)	
Appendix C: RAID levels	
Glossary	.269

# About this manual

This user guide provides detailed procedures for setting up, configuring, and running Nexsan E-Series and Nexsan BEAST Storage Systems, using the Web-based graphical user interface and Nexsan Storage Tools.

**Note** While Nexsan makes every effort to ensure the accuracy of technical documentation, screen images and procedures may change after publication. In case of discrepancy, please check for the latest updates on the E-Series and BEAST Documents and Downloads page. Also, refer to the latest Release Notes.

# Conventions

Here is a list of text conventions used in this document:

Convention	Description
underlined blue	Cross-references, hyperlinks, URLs, and email addresses.
boldface	Labels on the physical Nexsan Storage System or interactive items in the graphical user interface (GUI).
italics	System messages and non-interactive items in the GUI. References to software user guides.
monospace	Command-line interface (CLI) text or text that refers to file or directory names.
monospace bold	Text strings that must be entered by the user in the CLI or in text fields in the GUI.

# Notes, tips, cautions, and warnings

Note Notes contain important information, present alternative procedures, or call attention to certain items.

Tip Tips contain handy information for end-users, such as other ways to perform an action.



**CAUTION:** In hardware manuals, cautions alert the user to items or situations which may cause damage to the Nexsan Storage System or result in mild injury to the user, or both. In software manuals, cautions alerts the user to situations which may cause data corruption or data loss.



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

# **Contacting Nexsan**

For questions about Nexsan products, please visit the Nexsan support Web page, and the E-Series and BEAST Documents and Downloads page. If you are unable to find the answer to your question there, please see our contact information below.

# Service and support

Nexsan's Technical Services Group provides worldwide assistance with installation, configuration, software support, warranty, and repair for all Nexsan products. A variety of service and support programs are available to provide you with the level of coverage and availability your operation requires.

#### **Nexsan Headquarters**

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www.nexsan.com

E-Series and BEAST support:

https://helper.nexsansupport.com/esr\_support

## European Head Office, UK

Units 33–35 Parker Centre Mansfield Road Derby, DE21 4SZ United Kingdom Contact: https://helper.nexsansupport.com/contact

# Related documents

The following Nexsan product manuals contain related information:

- Nexsan High-Density Storage Snapshots and Replication User Guide
- Nexsan High-Density Storage Multipathing Best Practices Guide

## VMware guides

- Nexsan VMware Best Practices Guide
- Nexsan RAID Plugin for VMware vCenter Installation Guide
- Nexsan RAID Storage Plugin for VMware vCenter User Guide

## **BEAST-specific guides**

- Nexsan BEAST BT60 and BT60X Storage System Installation Guide
- Nexsan BEAST BT60 and BT60X Storage System FRU Removal and Replacement Guide
- Nexsan BEAST BT60 and BT60X Quick Start Guide

#### Nexsan E18 and Nexsan E32 guides

- Nexsan E18 and Nexsan E32 Storage System Quick Start Guide
- Nexsan E18 and Nexsan E32 Storage System Installation Guide
- Nexsan E18 and Nexsan E32 Storage System FRU Removal and Replacement Guide
- Nexsan E18X and Nexsan E32X Storage Expansion Installation Guide
- Nexsan E18X and Nexsan E32X Storage Expansion FRU Removal and Replacement Guide

#### Nexsan E48 and Nexsan E60 guides

- Nexsan E48 and Nexsan E60 Storage System Quick Start Guide
- Nexsan E48 and Nexsan E60 Storage System Installation Guide
- Nexsan E48 and Nexsan E60 Storage System FRU Removal and Replacement Guide
- Nexsan E48X and Nexsan E60X Storage Expansion Installation Guide
- Nexsan E48X and Nexsan E60X Storage Expansion FRU Removal and Replacement Guide

# Safety notices

Always observe the following precautions to reduce the risk of injury and equipment damage:

• Only a fully-trained Service Engineer is authorized to disassemble any other part of the storage system, and then only when the storage system is powered off.

# **Revision history**

This section lists updates and new material added to Nexsan High-Density Storage User Guide.

# P04050147, Rev D, April 2022

Removed duplicate quick start section, up-issued the document to address a revision problem caused by the importation of Agile data into the new Arena management system.

# P04050147, Rev C, March 2022

- Revised IP settings topics to include new instructions and screen captures for configuring IPv6.
- Revised pages throughout the manual to reflect updated options.
- Revised Initial network address setup on page 16
- Converted most procedures and bulleted lists to tables for easy of use.
- Revised references to Nexsan RAID System, Nexsan Storage Unit, Nexsan Expansion Unit and variants to Nexsan Storage System and Nexsan Storage Expansion respectively.
- Revised the E-Alert configuration procedures for encrypted connection (TLS) and setting authentication. Refer to Configure E-Alert Settings on page 27 and E-Alert Settings on page 220
- Replaced the former "Multiple View HTML Builder" page. Refer to Multiple System View on page 118
- Replaced the former "Network Statistics" page with the Port Statistics on page 106
- Removed the former "10Ge iSCSI Statistics" page. Refer to <u>10Ge iSCSI Information on page 91</u>
- In the the Nexsan Storage Tools appendix, extensively revised all sections. Refer to <u>Nexsan Storage</u> <u>Tools on page 253</u>
- Standardized images sizes and added borders.

# P04050147, Rev B, March 2017

- Revised and promoted the procedure <u>Restore Encryption Keys on page 212</u>, and cross referenced it from related sections in other parts of the document.
- Added a subheading and introduction to emphasize the section about backing up or changing an encryption key for encrypted arrays. See <u>Back Up or Change an Encryption Key on page 131</u>

# P04050147, Rev A, July 2016

- Changed document number to part number
- Added Information for E60P and E48P
- Added information about restoring encryption keys

# NXS-BBES-UG, Rev. 05, November 2015

- Changed name of document to Nexsan High-Density Storage User Guide
- Removed all references to SATABeast and SATABoy
- Updated all pertinent sections with information on the BEAST BT60 and BT60X storage systems
- Updated Home page on page 65 to reflect changes made in most recent firmware release

# NXS-BBES-UG, Rev. 04, September 2015

- Added section <u>Configure Array Encryption on page 127</u>, and also added descriptions of new disk icons to <u>Home page on page 65</u> and <u>Disk Information on page 81</u>
- Added instructions for creating encrypted arrays on self-encrypting disks (SEDs) to <u>Create a new</u> <u>RAID array on page 49</u> and <u>Create a new RAID array on page 122</u>
- Updated Array Status/Health section of RAID Information on page 71 to reflect array encryption status
- Added new item, Encryption, to the Disk Information detail pages in Disk Information on page 81
- Updated sections <u>Delete a RAID Array on page 132</u>, <u>Add Hot Spare on page 134</u>, <u>Retire Disk on page 137</u>, and <u>Reset to Factory Defaults on page 215</u> with new encrypted array information
- Updated section Audible Alarm on page 201 to include ability to turn off audible alarms
- Updated formatting throughout with new single-page layout

# NXS-BBES-UG, Rev. 03, May 2015

- Added to the list of <u>Related documents on page x</u>
- Updated terms used in on the *Configure Time and Date* page in <u>Set time and date on page 30</u> and <u>Configure Time and Date on page 225</u>
- Added new item, Used capacity, to the RAID Information page in RAID Information on page 71
- Added new item, *Disk health*, to the *Disk Information* detail pages in *Disk Information* on page 81
- Updated <u>Disk Statistics on page 87</u> to include the disk health measurement for SSD disks
- Added new item, Javascript hot tracking, to the GUI Settings section of <u>Network Services on page 107</u>
- Added section <u>Retire Disk on page 137</u>, and also added descriptions of new disk icons to <u>Home page on</u> page 65 and <u>Disk Information on page 81</u>
- Updated screen shot and description of *Configure Volume Snapshots* page to include Clone Snapshot button in <u>Configure Volume Snapshots on page 161</u>
- Updated <u>Acknowledge Rebuild on page 146</u> with new configuration information
- Added section Migrate Logical Volumes on page 169
- Added two new items, Generate warnings from drive heuristics and SCSI third-party copy extensions, to <u>Configure Cache on page 198</u>
- Added new item, Disk retirement scheme, to <u>Configure Rebuild Priority on page 206</u>

- Added new item, Enable hot tracking, to GUI Settings on page 232
- Fixed various formatting errors

# NXS-BBES-UG, Rev. 02, July 2014

- Changed more formatting throughout to more closely match Nexsan corporate style
- Added description of **Automatically adjust for Daylight Saving Time** option in <u>Set time and date on</u> page 30 and <u>Configure Time and Date on page 225</u>
- Added note under step 7 in <u>Create a new RAID array on page 49</u> and under step 6 in <u>Create a new</u> <u>RAID array on page 122</u> regarding the maximum number of RAID arrays per system
- Added section Configure 1Ge iSCSI on page 178 describing new features available for 1Ge iSCSI ports
- Updated information regarding AutoMAID settings in Configure AutoMAID Settings on page 192
- Updated information about beaconing in Configure Enclosures on page 202

# NXS-BBES-UG, Rev. 01, April 2014

Changed formatting throughout to reflect Nexsan as an Nexsan brand; changed name of document to *Nexsan RAID Storage User Guide*.

# Chapter 1

# **Basic Setup**

This User Guide is designed to help you get your Nexsan Storage System up and running in a short amount of time. It provides basic setup instructions and complete system configuration details. It does not cover the physical features or rack installation instructions for the system. For that information, see the Nexsan Storage System *Installation Guide*.

All Nexsan BEAST and E-Series Storage Systems have a common operating system and nearly identical graphical user interface (GUI). Therefore, this User Guide is appropriate for both Nexsan BEAST and Nexsan E-Series Storage Systems. For Nexsan Unity Storage Systems, see the *Nexsan Unity Software User Guide*.

This User Guide covers all of the features that can be accessed through the GUI. However, because Nexsan Storage Systems are shipped preconfigured, only the basic setup procedures in this chapter are needed for most Nexsan Storage System installations.

#### Notes:

- GUI screens vary between Nexsan Storage Systems. Screens in this User Guide may not exactly match the GUI for the product you are using.
- These instructions assume that you are setting up a single Nexsan Storage System or Nexsan Storage System and one Nexsan Storage Expansion. You must perform these procedures for each storage system and expansion you set up.

This chapter contains the following sections:

Configure the Nexsan Storage System IP address
Set up the system: Quick Start Configuration Checklist
Network and E-Alert settings
Set time and date
Array Configuration
Volume Configuration and Access
When the Quick Start Configuration Check List is complete

15

# Initial network address setup

Before you can configure your Nexsan Storage System through the GUI, you must assign a unique IP address to its management port (**MGMT**) and enter the proper gateway and DNS settings. This procedure uses the Nexsan IP Configuration Tool, which is included in the Nexsan Storage Tools.

Other methods of assigning the IP address of your Nexsan Storage System are discussed in Appendix A, Alternate IP configuration on page 245.

# Install the Nexsan Storage Tools

This installation procedure walks you through the steps to install the Nexsan Storage Tools on a Windowsbased server or workstation. The tools include the IP Configuration Tool, which you'll need for initial setup of your Nexsan Storage System. For details about the tools, see the Nexsan Storage Tools help and <u>Appendix</u> <u>B: Nexsan Storage Tools on page 253</u>.

## Installing on Mac or Linux

To install the Nexsan Storage Tools on Macintosh OS X, drag the application files to your hard drive. To install on Linux systems, drag the appropriate installer file (RPM, DEB, or tar.gz) to your hard drive and run it using your application launcher.

The Server Features are only available for installation on Windows Server.

#### Notes:

- This installation procedure requires that the Nexsan Storage System be connected to the LAN via an Ethernet cable attached to its management port (**MGMT**) (see the *Installation Guide* for your system for details).
- This procedure may require a restart of the operating system where the tools are installed.

#### Before you begin

 Download NexsanTools\_x.x.x.exe from https://helper.nexsansupport.com/esr\_downloads or obtain it from Nexsan Technical Support (see <u>Technical Support on page 235</u>).

#### To install Nexsan Storage Tools:

- 1. On a server or workstation that is attached to the same LAN that the Nexsan Storage System is attached to, locate the **NexsanTools\_***x.x.x.***exe** icon.
- 2. Double-click the **NexsanTools\_***x.x.***x.exe** icon to launch the installer. The *Welcome* dialog displays.
- 3. Click Next to display the End-User License Agreement.
- 4. Click the check box next to *l accept the terms in the License Agreement*, then click **Next**. The *Custom Setup* dialog displays.

 The Nexsan Storage Tools include both local tools and server features, as shown. Accept the default or make changes as needed. If you are not installing to a Windows Server, the Server Features are excluded. For details, see <u>Nexsan Storage Tools on page 253</u>. Click Next when you're ready to proceed.

Nexsan Storage Tools 1.7.76 Setup		( <b>-</b> )	
Custom Setup			
Select the way you want features to be installed			e
	Nexsan Stor deploying an RAID system	age Tools f d managing s.	or 9 Nexsan
Server Features     Multipathing (MPIO)     Provisioning (VDS)     Snapshots (VSS)     Management (SMP)	This feature your hard dr subfeatures subfeatures hard drive.	requires 39 ive. It has selected. 7 require 131	925KB on 5 of 5 The MB on your
Location: C:\Program Files (x86)\Wexsan\Stor	ageManager\		Browse
Recet	Back Next		Cancel

Figure 1-1: Custom Setup dialog box

- 6. Click **Install** to begin the installation process. Once the installation is complete, the *Completed the Nexsan Storage Tools Setup Wizard* dialog box displays.
- 7. Click **Finish** to close the dialog box and complete the installation.
- 8. If prompted to restart the system, click **Yes** to complete the setup process or **No** if you plan to manually restart later.

For more information about the Nexsan Storage Tools, refer to the PDF file included with the tools and Appendix B, Nexsan Storage Tools on page 253.

# Configure the Nexsan Storage System IP address

This procedure requires that the Nexsan Storage System be connected to the LAN via an Ethernet cable attached to its management port (**MGMT** – see the Installation Guide for your system for details).

#### **b** To configure the Nexsan Storage System IP address:

1. Launch the IP Configuration Tool. In Windows, click **Start > Nexsan > IP Configuration Tool**.

The Nexsan IP Configuration Tool opens. If the new Nexsan Storage System is already attached to the same broadcast network, the New RAID system detected dialog displays.

Systems:						
System Name	S	ystem ID	Firmware	IP Address	,	
New RAID syste	m detected					x
New RAID syste	m detected ew Nexsan RAIE wish to config	) system ha: ure it now?	s been detected or	the local net	work. Do	×
New RAID syste	m detected ew Nexsan RAID wish to config	) system ha: ure it now?	s been detected or	n the local net	twork. Do <u>N</u> o	×
New RAID syste	m detected ew Nexsan RAIE wish to configu	) system ha: ure it now?	s been detected or	n the local net	twork. Do <u>N</u> o	×
New RAID syste A n an P Andress Subnet Mask	m detected ew Nexsan RAIE wish to configi	) system ha: ure it now?	s been detected or IP Address Subnet Mask	n the local net	work. Do <u>N</u> o	× 1
New RAID syste Read at at provide the system P Address Subnet Mask. Gateway	m detected	) system haa ure it now?	s been detected or IP Address Subnet Mask Gateway	n the local net	work. Do	× ````````````````````````````````````
New RAID syste New RAID syste at at provide the system Primary DN5	m detected	) system has ure it now?	s been detected or IP Address Subnet Mask Gateway Primary DNS	Yes	work. Do <u>No</u>	× · ·

Figure 1-2: New RAID system detected dialog

Click Yes. The dialog closes, and the Nexsan Storage System is displayed in the RAID Systems list.

2. If the storage system is not already selected, select it in the list.

Figure 1-3: Nexsan IP Configuration Tool RAID Systems list

- /	System ID	Firmwa	are IP Addres	s	
Nexsan E60	05F9C2AC	R011.1	1208.10 172.17.10	0.240, 172.17.100.241	
ystem: Nexsa	n E60				
Status: 05590	n E60 IP settings				
ystem: Nexsa Status: Check System ID: 05F9C URL: http://	n E60 IP settings 2AC (E60) 172.17.100.240				Beacon
ystem: Nexsa Status: Check System ID: 05F9C URL: http://	n E60 IP settings ZAC (£60) 172. 17. 100. 240			C	Beacon
ystem: Nexsa Status: Check System ID: 05F9C URL: http:// v4 Settings IPv6 Se Controller 0 Mgmt	n E60 TP settings A26 (E60) 172: 17: 100.240 ttings		Controller 1 Mgmt		Beacon
ystem: Nexsa Status: Check System ID: 05F9C URL: http:// v4 Settings IPv6 Se Controller 0 Mgmt - IPv4 Mode	n E60 IP settings NAC (E60) 172. 17. 100. 240 ttings Static IP	~	Controller 1 Mgmt IPv4 Mode	Static IP	Beacon
ystem: Nexsa Status: Check System ID: 05F9C URL: http:// v4 Settings IPv6 Se Controller 0 Mgmt – IPv4 Mode IP Address	n E60 IP settings NAC (E60) 172. 17. 100.240 ttings Static IP 172. 17. 100. 240	~	Controller 1 Mgmt IPv4 Mode IP Address	Static IP 172 - 17 - 100 - 241	Beacon
ystem: Nexsa Status: Check System ID: 05F9C URL: IPv6 Se Controller 0 Mgmt - IPv4 Mode IP Address Subnet Mask	n E60 IP settings NAC (E60) 172: 17.100.240 ttings Static IP 172: 17 . 100 . 240 255: 255: 0 . 0	~	Controller 1 Mgmt IPv4 Mode IP Address Subnet Mask	Static IP 172 . 17 . 100 . 241 255 . 255 . 0 . 0	Beacon ~
ystem:: Nexsa Status: Check URL: 05F9C URL: 01F9C V4 Settings IPv6 Se Controller 0 Mgmt IPv4 Mode IP Address Subnet Mask Gateway	n E60 IP settings NAC (E60) 172. 17. 100.240 Static IP 172. 17 . 100 . 240 255. 255. 0 . 0 	~	Controller 1 Mgmt IPv4 Mode IP Address Subnet Mask Gateway	Static IP 172 . 17 . 100 . 241 255 . 255 . 0 . 0 	Beacon ~
ystem: Coed Status: Coed URL: 0599C URL: 0599C URL: 1994 Se Controller 0 Mgmt IPv4 Mode IP Address Subnet Mask Gateway Primary DNS	n E60 IP settings NAC (E60) ttings Static IP 172 . 17 . 100 . 240 255 . 255 . 0 . 0  	~	Controller 1 Mgmt IPv4 Mode IP Address Subnet Mask Gateway Primary DHS	Static IP 172 · 17 · 100 · 241 255 · 255 · 0 · 0 · · · ·	Beacon ~

3. Configure the IP Settings for your Nexsan Storage System, as described:

Table 1-4: IP Settings

Setting	Action
IPv4 Settings	Select <b>Static IP</b> or <b>Automatic</b> to enable IPv4 for both controllers on the storage system, or select <b>Disable</b> to disable IPv4.
tab	• If you select Static IP, you must fill in values for IP Address and Subnet Mask.
	• If you select <b>Automatic</b> , the firmware uses DHCP to assign IP addresses.
	<b>Note</b> To use automatic IP assignment, your network must be configured for DHCP. If not, you MUST use a static IP address.
IPv6 Settings	Select <b>Static IP</b> or <b>Automatic</b> to enable IPv6 for both controllers on the storage system, or select <b>Disable</b> to disable IPv6.
tab	• If you select Static IP, you must fill in values for IP Address and Prefix Length.
	<ul> <li>If you select Automatic, the firmware uses router advertisements (SLAAC) to assign IP addresses. A fixed link-local IPv6 address will also be assigned.</li> </ul>
	<b>Note</b> To use automatic IP assignment, your network must be configured to use SLAAC. If not, you MUST use a static IP address.

4. When you have completed making your selections, click **Apply Changes**. If any items remain orange, fill in the necessary information and click **Apply Changes** again.

# Accept the End User License Agreement (EULA)

#### To accept the End User License Agreement:

1. Access the Nexsan Storage System GUI using one of the following methods:

Using Nexsan Storage Manager (Windows systems only):

- a. Open Nexsan Storage Manager.
- b. In the RAID Systems list, select the Nexsan Storage System.
- c. Click Manage system.

#### Using a Web browser (all systems):

- a. Launch a Web browser (Microsoft Internet Explorer, Mozilla Firefox, Google Chrome, etc.).
- b. In the browser's address field, enter the Management IP address which was set in the Configure the Nexsan High-Density IP section, for example:

Figure 1-5: Browser address field with Nexsan Storage System IP address entered



c. Press Enter or click the browser's Go button.

#### The login screen for the Nexsan Storage System displays:

Figure 1-6: Nexsan Storage System login screen



NEXSAN E32

Nexsan E32

#### AUTHORIZED USE ONLY

Click Here To Login

**Note** The login screen varies depending on the type of Nexsan Storage System you are connected to. However, the **Click Here to Login** button is always displayed.

#### 2. Click the **Click Here to Login** button to log in to the Nexsan Storage System.

#### The End-User License Agreement screen displays.

NEXSAN	
Home	
RAID Information	Contact tech End User App Details Support License License
System Information	Technical Support
Configure RAID	End User License Agreement
Configure Volumes	NEXSAN END-USER SOFTWARE LICENSE AGREEMENT
Configure Host Access	
Power Settings	IMPORTANTI THIS LICENSE AGREEMENT S A BINDING AGREEMENT BETWEEN THE END USER (sometimes referred to as "YOU") AND NEXSAN
System Admin	IECHNOLOSIS, INC. AND ITS RELATED COMPANIES (INC.SAW), read this Agreentine beiner download, installing, using or ordening the soliward that accompanies Nexsan's products ("Solivare"). When you, the End User, order, download, install or use the Software, you acknowledge that you have read this
Configure Network	Agreement and understand it, and agree to be bound by its terms. It you act on behalf of a company or other entity, you warrant that you are duly authorized to enter into this Agreement on behalf of such company or other entity as the End User. If you did not obtain this copy of the Software legally, immediately delete the
Quick Start	Software from the system and destroy any copies. If you do not accept all of the terms and conditions of this Agreement do not download, install, or use the Software. Please return the Software to the entity from which you licensed it for a full refund.
Technical Support	THE RIGHT TO USE THE SOFTWARE IS GRANTED ONLY UPON THE CONDITION THAT YOU AGREE TO THE TERMS AND CONDITIONS OF THIS
Log Off	AGREEMENT.
	1. DEFINITIONS
	"Agreement" means this End-User Software License Agreement.
	"Designated Storage System" means the hardware storage array upon which you are authorized by Nexsan to use the Software and in conjunction with which this Software has been provided.
	"End User" means the entity or individual that has been granted a license to use the Software, as well as its employees, officers, directors, consultants, agents or others who are authorized to have access to the Software through the End User.
	"Nexsan" means Nexsan Technologies, Inc. and any related companies, as well as " when applicable " Nexsan's employees, officers, directors and shareholders.
	"Services" means Software updates, upgrades or other related services provided by Nexsan and subscribed to by the End User. The terms and conditions of such Services are set forth in a separate agreement ("Services Agreement") to be entered into by the End User and Nexsan.
	"Software" means (a) the software, firmware or other computer information with which this Agreement is provided including, but not limited to: (i) Nexsan or third party computer information or software and (ii) related explanatory written materials or files ("Documentation"); and (b) modified versions, updates, upgrades, additions and copies of the Software, if any, licensed to the End User by Nexsan.
	2. LICENSE
	(a) PER CAPACITY LICENSE. The licensing and pricing of the Software is based on "Registered Capacity." Registered Capacity is defined as the maximum raw capacity (measured in terabytes) with which the Software may be legally and properly used under the License (as further defined in Section 2(b), below). Exceeding the Registered Capacity is a breach of this Agreement and is grounds for termination of the License by Nexsan. In addition, Software is licensed for use only on one (1) specifically identified Designated Storage System: Originally the purchase of (a) the purchase of (b) the Designated Storage System Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach of the Designated Storage System Capacity is a breach Designated

#### Figure 1-7: End User License Agreement

3. Read the EULA, check the box at the end to indicate your agreement, then click the **I Agree** button. A message displays, indicating that you have agreed to the terms of the EULA.

#### Notes:

- To access the full functionality of the Nexsan Storage System, you MUST agree to the terms of the EULA.
- Once you have agreed to the terms of the EULA, the End-User License Agreement screen will not be displayed again unless you select Tech Support > EULA (see End User License Agreement on page 238).

# Set up the system: Quick Start Configuration Checklist

Once you accept the EULA, the graphical user interface (GUI) displays the *Quick Start Configuration Checklist*, which you'll use to set up your Nexsan Storage System.

The *Quick Start Configuration Checklist* displays automatically the first time you log in to a system, and can always be accessed by going to **Quick Start > Check List**. However, until the checklist has been completed, the message *The configuration checklist* has not yet been completed appears on the *Home* page along with the **Review Checklist** button, which takes you to the *Quick Start Configuration Checklist* page.

NEXSAN		ALL OK	
Home			
RAID Information	Basic Expert List		l
System Information		Quick Start	1
Configure RAID		Configuration Checklist	1
Configure Volumes			l
Configure Host Access		N=XSAN	1
Power Settings			1
System Admin		NEXSAN E32	l
Configure Network			l
Quick Start	Welcome to the Nexsan E32. This checklist will help yo	u to correctly set up your RAID system.	
Technical Support	To hide this checklist in the future, unselect 'Show the o available via the 'Quick Start' menu on the left.	onfiguration checklist on home page' at the bottom and click 'Close Checklist'. The checklist will always remain	1
Log Off			l
		Product Registration	l
	System type Serial number	E32 000402F71378	l
	Firmware version	R011	1
	Registration complete	No	1
	Registering this product with Nexsan p this product, click the link below:	rovides access to technical support, firmware updates, software downloads, and other benefits. To register	
	•	http://registration.nexsan.com/	l
		This product has been registered with Nexsan	l
		Submit	l
			1
	Current 'ADMIN' password requirem	ent Not required	1
	Current 'USER' password requireme	nt Not required	l
	Current host trust setting	Limited	/

Figure 1-8: Quick Start Configuration Checklist page

## The items on the Quick Start Configuration Checklist are:

Table 1-9: Quick Start Configuration Checklist

Checklist item	Related procedures
Product Registration	Product Registration on the facing page
Security Settings	Security settings on the facing page
System Name	System name on page 24 or Configure Enclosures on page 202
Network Settings	Network and E-Alert settings on page 25
Time and Date	Set time and date on page 30

Checklist item	Related procedures
Array Configuration	Array Configuration on page 33 or Configure RAID on page 121
Volume Configuration and Access	Volume Configuration and Access on page 42 or Configure Volumes on page 148

Each item in the list displays its status on the *Quick Start Configuration Checklist*. If an item has a green check mark next to it, that item has been completed with a recommended setting. If an item has a red exclamation point next to it, that item has either not been completed or has an unrecommended setting.

# **Product Registration**

- To register your Nexsan product:
- 1. Click the link to go to http://registration.nexsan.com.
- 2. Once you have completed the registration, return to the GUI, check the box next to **This product has been registered with Nexsan**, and click **Submit**.

# Security settings

To protect the integrity of the storage system, it is strongly recommended that you at least create a password for the ADMIN account. This prevents unauthorized personnel from making changes to the storage system's configuration.

#### To change security settings

1. Click the **Change Security Settings** button. This takes you to the *Password Configuration* page.

Figure 1-10: *Password Configuration* page

NEXSAN			ALL OK
Home	Network FAlert SNMP Date & Security SSI GUI		
RAID Information	Settings Syslog Time Security SSL Settings		
System Information		Configure Network	(?)
Configure RAID	Pa	assword Configuration	0
Configure Volumes		Administrator access	
Configure Host Access	Current 'ADMIN' login password requirement	Security disabled - login password NOT required	
Power Settings	Change 'ADMIN' login password requirement to	Required     NOT Required	
System Admin	Login user name is fixed to	ADMIN	
System Admin	New Password	Not Required	
Configure Network	Confirm password	Not Required	
Quick Start			
Technical Support		Set ADMIN Password	
Log Off			Tel
	Current IUSED! Is signed an uniform ant	User access	
	Current USER login password requirement	Boguired	
	Change 'USER' login password requirement to	NOT Required	
	Login user name is fixed to	USER	
	New Password	Not Required	
	Confirm password	Not Required	
		Set USER Password	
		Connected Host access	
	Current host trust setting	Limited	
	Change host trust setting to	○ None ○ Read-only ● Limited ○ Full	
		Set Host Trust Setting	
72 17 118 223/admin/users as		Help	

#### 172.17.118.223

- 2. Next to Change "ADMIN" login password requirement to, select Required.
- 3. Enter the password into the **New Password** and **Confirm Password** fields.
- 4. Click Set ADMIN Password. A message displays, informing you that the password has been set.
- 5. Select Quick Start > Check List to return to the Quick Start Configuration Checklist.

Passwords take effect immediately. The next time you try to access a configuration page, the GUI will ask you to enter the user name and password to gain access. Both fields are case-sensitive, and user names must be entered in all capitals ("ADMIN" or "USER").

#### System name

Although the system comes preconfigured with a name, it is recommended that you change it to a name more suitable to your environment.

- To set the system name:
- 1. In the **RAID system name** field, type the name.
- 2. Click Set System Name.

A message displays, letting you know that the setting has been changed.

3. Click the **Back** button to return to the *Quick Start Configuration Checklist*.

# Network and E-Alert settings

It is recommended that you confirm your network and E-Alert settings to make sure that they will work with your local area network (LAN) setup.

# **Configure Network Settings**

To verify or change the network settings for the management (Mgmt) port for each controller, click the **Change Network Settings** button. This takes you to the *Configure Network Settings* page.

NEXSAN			JALL OK
Home	Network E-Alert SNMP Date & Security	SSL GUI	-
RAID Information	Setungs Systog Time	Semula	
System Information		Configure Network	?
Configure RAID		Configure Network Settings	
Configure Volumes	Controller 0	Management	
Configure Host Access	Port status	Link up at 1Gbit Full Duplex	
Dawas Cattings	Port setting	Auto Speed/Duplex	
Power Settings	Hostname	NXS-0109304D-0	
System Admin	IPv4 mode	Static IP V	
Configure Network	IP address	172.17.118.223	
Quick Start	Subnet mask	255.255.0.0	
Technical Cunned	Gateway	172.17.1.1	
recinical Support	Primary DNS	172.17.1.11	
Log Off	Secondary DNS	172.17.1.15	
	IPv6 mode	Disabled V	
	IP address		
	Prefix length		
	Gateway		
	Primary DNS		
	Secondary DNS		
	Secondary Birds		
	Controller 1	Management	_
	Port status	Unk up at 1Gbit Full Duplex	
	Port setting	Auto Speed/Duplex	
	Hostname	NXS-0109304D-1	
	IPv4 mode	Static IP 🗸	
	IP address	172.17.118.224	
	Subnet mask	255.255.0.0	
	Gateway	172.17.1.1	
	Primary DNS	172.17.1.11	
	Secondary DNS	172.17.1.15	
	IPv6 mode	Disabled V	
	IP address		
	Prefix length		
	Gatoway		
	Drimony DNS		
	Secondary DNS		
		Save Configuration Save and Apply Changes Reset	

Figure 1-11: Configure Network Settings page

The information is arranged by controller, with Controller 0 at the top and Controller 1 at the bottom. **Current status** indicates whether the link is up or down. If the link is up, it displays the current link speed and duplex mode setting.

If at any time you wish to return the Configure Network Settings page to its initial state, click Reset.

1

#### To configure network settings:

1. Apply the appropriate network settings for the **Mgmt** port on both controllers of your Nexsan Storage System:

Table 1-12: Configure Network Settings

Setting	Action
Port Settings	For most networks, the default setting of <b>Auto Speed/Duplex</b> is recommended. However, if your LAN switch doesn't support auto-negotiation, you can "force" one or both settings. The options are:
	Auto Speed/Duplex (the default) Auto Speed, Full Duplex Auto Speed, Half Duplex 1Gbit Full Duplex 100Mbit Full Duplex 100Mbit Half Duplex 10Mbit Full Duplex 10Mbit Full Duplex
Hostname	This defaults to the host's address. Enter a "friendly" host name for the port, if desired.
IPv4 mode	Choose <b>Automatic</b> , <b>Static IP</b> , or <b>Disabled</b> for each controller in the Nexsan Storage System.
	If you select <b>Automatic</b> , then the Nexsan Storage System will use DHCP and no other configuration is needed.
	<b>Note</b> To use <b>Automatic</b> , your network must be configured for DHCP. If it is not, you MUST use a static IP address.
	If you select Static IP, then you must fill in the IP Address and Subnet Mask.
IPv6 mode	Choose <b>Automatic</b> , <b>Static IP</b> , or <b>Disabled</b> for each controller in the Nexsan Storage System.
	If you select <b>Automatic</b> , then no other configuration is needed. IPv6 will be configured automatically from router advertisements (SLAAC), and a fixed link-local IPv6 address will be assigned.
	<b>Note</b> To use <b>Automatic</b> , your network must be configured for SLAAC. If not, you MUST use a static IP address.
	If you select Static IP, then you must fill in the Static IP Address and Prefix length.

- 2. When you have selected the desired new settings, do one of the following:
  - Click **Save Configuration**. The settings are saved and are applied after the storage system is restarted (see <u>Reboot System on page 203</u>).
  - Click **Save and Apply Changes**. The settings are saved and applied immediately.
  - Return to Set up the system: Quick Start Configuration Checklist on page 22.

# **Configure E-Alert Settings**

## Use this procedure to configure E-Alert settings.

<b>(SAN</b>						-
Home D Information	Network Settings E-Alert SNMP Date & Security	SSL GUI Settings				
m Information			Configure Network E - Alert Settings			
nure Volumes		ΕΛ	lert General Configuration			
	Sender email address	LA	MauveE48@Nex	san.com		
HOSTACCESS	SMTP email server		smtp.example.co	m		
ower Settings	Use encrypted connection (TLS)		Preferred V			
ystem Admin	11		O Enabled			
gure Network	Ose authentication		Disabled			
Quick Start	Username		Not Required			
nical Support	Password		Not Required			
nical Support	Email subject format		FriendlyName Me	odel (SysID) AlertType Ev	vent 🗸	
			Apply Reset			
		All a	Clear Email Queue	ost		
		🏮 All q	Clear Email Queue pueued emails will be deleted / lo Certificates	ost.		
		🏮 All q	Clear Email Queue Jueued emails will be deleted / lo Certificates Saved Certificate	ost.	Last Received Certi	ificate
	Issued by	All q	Clear Email Queue ueued emails will be deleted / lo Certificates Saved Certificate		Last Received Certi	ificate
	Issued by Issued to Valid from	•	Clear Email Queue ueued emails will be deleted / lo Certificates Saved Certificate	- -	Last Received Certi	ificate
	Issued by Issued to Valid from Valid until View Certificate		Clear Email Queue ueued emails will be deleted / lo Certificates Saved Certificate		Last Received Certi	ificate
	Issued by Issued to Valid from Valid until View Certificate	All q	Clear Email Queue ) ueued emails will be deleted / lo Certificates Saved Certificate	st. - - - - - - - - - - - - - - - - - - -	Last Received Certi	ificate
	Issued by Issued to Valid from Valid until View Certificate	All q	Clear Email Queue Used emails will be deleted / Id Certificates Saved Certificate rom the SMTP server does not r ve Last Received Certificate Clear All Certificates	est.	Last Received Certi	ificate
	Issued by Issued to Valid from Valid until View Certificate	All q	Clear Email Queue Uueued emails will be deleted / lo Certificates Saved Certificate rom the SMTP server does not r ve Last Received Certificate Clear All Certificates mary of All Email Recipients	est.	Last Received Certi	ificate
	Issued by Issued to Valid from Valid until View Certificate	All q	Clear Email Queue Use of the deleted / lo Certificates Saved Certificate rom the SMTP server does not ro the Last Received Certificate Clear All Certificates mary of All Email Recipients Automatic Status Schedular	est.	Last Received Certi	ificate
	Issued by Issued to Valid from Valid until View Certificate	All q	Clear Email Queue Useued emails will be deleted / lo Certificates Saved Certificate rom the SMTP server does not r ve Last Received Certificate Clear All Certificates mary of All Email Recipients Automatic Status Schedule Disabled	st.	Last Received Certi e. Test Email	ificate
	Issued by Issued to Valid from Valid until View Certificate Email Address Not Configured Not Configured	All q     A	Clear Email Queue Use demails will be deleted / lo Certificates Saved Certificate  rom the SMTP server does not r ve Last Received Certificate  Clear All Certificates  mary of All Email Recipients Automatic Status Schedule Disabled	est.	Last Received Certi e. Test Email -	ificate Configure Configure
	Issued by Issued to Valid from Valid until View Certificate  Email Address Not Configured Not Configured Not Configured Not Configured	All q     -	Clear Email Queue Used emails will be deleted / Id Certificates Saved Certificate  rom the SMTP server does not r ve Last Received Certificate Clear All Certificates Clear All Certificates Automatic Status Schedule Disabled Disabled Disabled Disabled	est.	Last Received Certi e. Test Email	ificate

Figure 1-13: *E-Alert Settings* page

The E-Alert General Configuration section displays settings for the sender (the Nexsan Storage System).

- **•** To verify or change E-Alert settings:
- 1. Click **Configure Network > E-Alert** to open the *E-Alert Settings* page.
- 2. Apply settings as described in the following table:

Table 1-14: Verify or change E-Alert settings

Setting	Action
Sender email address	Enter the address for the E-Alert sender. Although this can be any address that the mail server will accept as valid, you may wish to make the sender email address unique to the Nexsan Storage System.

Setting	Action
SMTP email server	Enter the SMTP server IP address or DNS host name of the mail server. You can only use a mail server name (for instance, smtp.example.com) if you have a domain name server (DNS) configured (see <u>Configure Network</u> <u>Settings on page 218</u> ). Otherwise, you must use the server's IP address.
Use encrypted connection (TLS)	Choose the encrypted connection setting: <b>Required</b> , <b>Preferred</b> , or <b>Disabled</b> .
Use authentication	Choose the authentication preference, either <b>Enabled</b> or <b>Disabled</b> . <b>User name</b> : Define a user name to be used for authentication. <b>Password</b> : Define a password to be used for authentication.
Email Subject format	<ul> <li>Select the email subject format using the Email Subject format drop-down list. There are three options:</li> <li>FriendlyName Model (SysID) AlertType Event — Populates the subject line with the Nexsan Storage System's friendly name, model, system ID, alert type, and a short description of the event.</li> <li>FriendlyName Model (SysID) SubSystem AlertType Event — Populates the subject line with the Nexsan Storage System's friendly name, model, system ID, system ID, specific enclosure, alert type, and a short description of the event.</li> <li>FriendlyName Model (SysID) (S,A) Event — Populates the subject line with the Nexsan Storage System's friendly name, model, system ID, specific enclosure, alert type, and a short description of the event.</li> </ul>
Current emailer status	Shows whether there are emails waiting in the queue to be sent. You can click <b>Clear Email Queue</b> to delete any emails currently in the queue. This may be necessary or useful if you need to have the Nexsan Storage System send a critical alert immediately.

3. Click the **Apply** button to save your settings. A message appears, informing you that the settings have been saved.

The Certificates section includes the following viewing options:

Table 1-15: Certificate valid dates

Field	Description
Issued by	Displays a list of all certificates issued by the system.
Issued to	Displays a list of all certificates issued to the system.
Valid from	Displays the certificate valid from date.
Valid until	Displays the certificate valid until date.
View certificate	Displays the certificate details.

You can perform the following actions with certificates:

- Save the last received certificate. Click the **Save Last Received Certificate** button.
- Clear all certificates by clicking the Clear All Certificates button.

Next, use the *Summary of All Email Recipients* section to configure the types of alerts to be sent to Nexsan Storage System email recipients.

#### To configure alert types to be sent:

1. In the *Summary of All Email Recipients* section, click the **Configure** link for an email recipient. The *Configure E-Alert Recipient* page displays:

	A links				V
Home RAID Information	Network Settings E-Alert SNMP Syslog	Date & Security SSL G Time Set	UI		
System Information	¢		Configure Network Configure E Alert Recipie	ent	0
Configure Volumes					Next >
onfigure Host Access			Configure Recipient 1		
Power Settings	Email address	storageadmin1@example.c	om	Send Test	t Email Now
System Admin		teret. Na	Filter Options for Recipient 1		
Configure Network		Errors	Warnings	Information	System
Conligure Network	Network	<u>U</u>	<u>U</u>	<u> </u>	
Quick Start	Disk		0		
Technical Support	RAID	<u>U</u>		0	
Log Off	Host		0		
Log On	Misc				
	Арр				
			Select All Clear All		
	Email Schedule	Auton Disabled V	natic Status Email options for R	ecipient 1	
	Email formatting	Send as MIME attachment	•		
	Email formatting	Send as MIME attachment	Apply Recipient Options		

Figure 1-16: Configure E-Alert Recipient page

2. You can configure up to five email addresses to receive email alerts. Configure a selected email recipient using the following table:

Table 1-17: Summary of All Email Recipients for E-Alerts

Setting	Action
Configure Recipient n Email Address	Enter a valid email address in the <b>Email address</b> field. You can test that the email is valid using the <b>Send Test</b> <b>Email Now</b> button.
Filter Options for Recipient <i>n</i> Network, Disk, RAID, Host, Misc, and Application	Check the boxes for the kinds of messages that you wish to notify the recipient of by email. You can select to receive <b>Error</b> , <b>Warning</b> , <b>Information</b> , or <b>System</b> alerts for each category. You can also us the <b>Select All</b> and <b>Clear All</b> buttons.

1

Setting	Action
Automatic Status Emails Email schedule	Select <b>Disabled</b> , <b>Every 1 Day</b> , <b>Every 2 Days</b> , <b>Every 4</b> <b>Days</b> , <b>Weekly</b> , or <b>Monthly</b> .
Email formatting	Select Send as MIME attachment or Send as plain-text email.

- 3. Click the Apply Recipient Options button.
- 4. Click the **Back** button to return to the *E-Alert Settings* page.
- 5. Select **Quick Start > Check List** to return to the *Quick Start Configuration Checklist*.

# Set time and date

It is important to set the time and date so that events in the event log (see <u>Event Log on page 112</u>), E-Alerts (see <u>E-Alert Settings on page 220</u>), and SNMP traps (see <u>SNMP/SYSLOG Settings on page 223</u>) show the correct time stamp.

In the quick start checklist, click the **Change Time and Date Settings** button. The *Configure Time and Date* page displays:

NEXSAN			
Home RAID Information	Network E-Alert SNMP Date & Security SSL GUI Time		
System Information Configure RAID		Configure Network Configure Time and Date	?
Configure Volumes		Time and Date Configuration	
Configure Host Access	Current local time (in 'hh:mm:ss' format)	15:14:10	
Power Settings	Current local date	21 v / Dec v / 2021 v	
System Admin Configure Network	Timezone	Use fixed GMT offset:     GMT ✓     GMT ✓     Automatically adjust for Daylight Saving Time:     GMT 0000 Functor (I and an	
Quick Start Technical Support	Time server address	Use IP address from list:     1296.15.28     Use time server address:	
	Time server protocol	SNTP     Daytime with format:     ijiji yy-mm-dd hh:mm:ss tt l h [NIST format] >	
	Set system time and date by the time server every 24 hours		
	Save Settings		
	Attempt to configure system time and date automatically (contact time server now) Contact Time Server To Auto Configure Time And Date		
	Retrieve Time Server Data		
	Data retrieved from contacting the time server No data retrieved		

Figure 1-18: Configure Time and Date page

# Set time and date manually

Use this procedure to set your Nexsan Storage System time and date manually. To manually set the time, the time server address and SNTP sections may be left as default.

## To set time and date manually:

1. Use the following table for details about setting the parameters:

Table 1-19: Setting time and date manually

Setting	Action	
Current local time (in 'hh:mm:ss' format)	Enter the time in the field. The time entered in the <b>Current local time (in 'hh:mm:ss' format)</b> field will be set when you click the <b>Save Settings</b> button. Therefore, it is suggested that you enter the time rounded to the next five-minute mark, then click <b>Save Settings</b> when the entered time is reached.	
Current local date	Enter the date using the drop-down lists.	
Timezone	<ul> <li>In this section, do one of the following:</li> <li>Select Use fixed GMT offset and set the GMT offset using the drop-down list.</li> <li>Select Automatically adjust for Daylight Saving Time and select the appropriate time zone in the drop down list.</li> </ul>	
Time server address and Time server protocol	Leave the default settings in these sections. No changes are required when you are setting the time and date manually and no SNTP server is available.	
Set system time and date by the time server every 24 hours	In this section, click to enable the setting as required. If no SNTP server is available, the setting remains deselected.	

- 2. Click Save Settings.
- 3. Select **Quick Start > Check List** to return to the *Quick Start Configuration Checklist*. Proceed to <u>Array</u> <u>Configuration on page 33</u>.

# Set time and date automatically

Use this procedure to set your Nexsan Storage System time and date automatically.

- **•** To configure the Nexsan Storage System to set time and date automatically:
- 1. Use <u>Table 1-20: "Configuring time and date automatically" below</u> for details about setting the parameters:

**Note** For automatic time setting to work, you may have to configure the **Gateway** setting for your network. See <u>Configure Network Settings on page 218</u> for more information.

Table 1-20: Configuring time and date automatically

Setting	Action

#### Time and Date Configuration

	0
Timezone	<ul> <li>In this section, do one of the following:</li> <li>Select Use fixed GMT offset and set the GMT offset using the drop-down list.</li> <li>Select Automatically adjust for Daylight Saving Time and select the appropriate time zone in the drop down list.</li> </ul>
Time server address	<ul> <li>In this section, do one of the following:</li> <li>Select Use IP address from list and select a time server IP address from the drop-down list.</li> <li>Select Use time server address and enter the IP address of a known time server into the text box.</li> </ul>
Time server protocol	Select either SNTP or Daytime with format.
Daytime with format	If you entered a time server address and selected <b>Daytime with format</b> , select the time server time and date format using the drop-down list. <b>Note</b> If you do not know the format of the time server data, click the <b>Retrieve Time</b> <b>Server Data</b> button in the <i>Attempt to configure system time and date automatically</i> (contact time server now) section. The data is retrieved and displayed next to <i>Data</i> <i>retrieved from contacting the daytime server</i> . Use this data to choose the proper format in the time and date format drop-down list.
Set system time and date by the time server every 24 hours	Enable this option if you want the Nexsan Storage System to contact the time server every twenty-four hours to update the time and date.

Attempt to configure system time and date automatically

Setting	Action
Contact Time Server To Auto Configure Time And Date	If you want to update the time immediately, click the button in this section. The time and date are updated immediately.

#### 2. Click Save Settings.

Select **Quick Start > Check List** to return to the *Quick Start Configuration Checklist*. Proceed to <u>Array</u> <u>Configuration below</u>.

# Array Configuration

Arrays must be set up before volumes (where data is stored) can be assigned to them. To set up arrays, click the **Change Array Configuration** button. This takes you to the Basic *Quick Start* page.

If you want control over more parameters, click the **Expert** tab to be taken to the Expert *Quick Start* page (see Expert Quick Start on page 37).

**Note** For complete control over RAID configuration, volume configuration, logical unit number (LUN) mapping, and host access, see <u>Create a new RAID array on page 122</u>, <u>Create a Logical Volume on page 149</u>, <u>Map Logical Volumes on page 158</u>, and <u>Configure Host Access on page 172</u>.

# **Basic Quick Start**

If you are setting up a Nexsan Storage System with one or more attached Nexsan Storage Expansions, you are first asked to select the Nexsan Storage System that you wish to configure. When you are finished, you can configure any other Nexsan Storage System or expansion by repeating this procedure.

#### **Disk considerations**

If you have self-encrypting disks installed, you can enable encryption after array configuration is complete by going to **Configure RAID > Encrypt Array**. See <u>Configure Array Encryption on page 127</u>. Arrays are limited to the disks physically contained in a single Nexsan Storage System.

SAS, SATA, and SSD disk drives cannot be used in the same array. If your Nexsan Storage System contains a mixture of disk drive types, the *Quick Start* configuration page will have two or three *Quickstart Options* sections, one for each drive type.

#### To begin the Quick Start:

1. Select the Nexsan Storage System or Nexsan Storage Expansion you need to configure, then click **Next**.

The Quick Start configuration page displays.

NEXSAN		J <u>all ok</u>
Home	Check	^
RAID Information	Basic Expert List	
System Information	Quick Start	(2)
Configure RAID	Configure RAID System	m 🔍
Configure Volumes		
Configure Host Access	WARNING: Quickstart will delete all data in this enclosure as w	vell as all replicated data in remote enclosures.
Power Settings		
System Admin	Nexsan E32 Enclosure 0 : Nexsan E32	
Configure Network	SAS Quickstart Options (32 disks	s found)
Quick Start	Number of arrays	4 🗸
Technical Current	Select RAID level	RAID 5 (rotating parity)
recinical Support	Number of pool spares	2 🗸
Log Off	Number of volumes per array	1 🗸
	Limit volume size to less than 2TB	
	Reserve for snapshots (% of usable volume capacity)	Disabled
	Next>>	

Figure 1-21: Basic Quick Start page

2. Using the drop-down lists, set the following parameters:

Table 1-22: Configuring quick start

Setting	Action
Number of arrays	Choose the number of arrays that you wish to create. The maximum number depends on the number and size of disks detected in the Nexsan Storage System.

Setting	Action
Select RAID level	<ul> <li>Choose the RAID level that all arrays will be configured for. You can choose from the following:</li> <li>RAID 0 (striped)</li> <li>RAID 1/1+0 (mirrored)</li> <li>RAID 4 (parity)</li> <li>RAID 5 (rotating parity)</li> <li>RAID 6 (rotating dual parity)</li> <li>Notes:</li> <li>RAID 1+0, also known as RAID 10, is automatically configured if you select RAID 1/1+0 (mirrored) and use an even number of drives, with a minimum of four.</li> <li>For more information on RAID levels, see Appendix C, RAID levels on page 267.</li> </ul>
Number of pool spares	Choose the number of spare disks that will be available to use as backups in case a RAID disk fails. The maximum number of pool spares depends on the number of disks detected in the Nexsan Storage System.
Number of volumes per array	This setting controls whether or not each array will be further divided into two or more smaller volumes. The default setting is <b>1</b> . The number of volumes per array can be anywhere from <b>1</b> to <b>10</b> .
Limit volume size to less than 2TB	This option is unchecked by default. If your hosts do not support volumes of more than 2TB in size, check this option.
Reserve for Snapshots (% of total	In the drop-down list, select the amount of each volume's total capacity that you wish to reserve for snapshots. The default setting is <b>25%</b> . You can select <b>10%</b> , <b>25%</b> , <b>50%</b> , or <b>100%</b> . Enabling snapshots also enables replication.
volume capacity)	Arrays are automatically created with Advanced features. This option creates two hidden volumes per array, one for the snapshot reservation and one for metadata. These count towards the per-storage system maximum of 254 volumes. See <u>Create a new RAID array on page 49</u> .
	Notes: Selecting <b>Disabled</b> will cause the Quick Start operation to use all evoluble
	Selecting Disabled will cause the Quick Start operation to use all available space in the array for volumes. To enable snapshots and replication later, you'll need to delete a volume. At least two volumes must be free for snapshot reservation.
	• For detailed information about snapshots and replication features, see the Nexsan High-Density Storage Snapshots and Replication User Guide.

# 3. Click Next.

The New Configuration Preview page displays.

4. Ensure that the settings for Arrays, Volumes, Pool Spares, and Volume Access are correct.

5. If all settings are acceptable, select the confirmation check box, then click the **Quickstart** button.



**CAUTION**: If any arrays or volumes have already been configured on the Nexsan Storage System, the graphical user interface (GUI) displays the following warning:

Figure 1-23: Data erasure warning

0	0
This system already has at least one configured array and volume	
WARNING	- by confirming all stored data will be erased!
Confirm by clicking the checkbox and then clicking 'Confirm Quickstart Configure', or Cancel by clicking 'CANCEL Quickstart'.	
	Confirm Quickstart Configure
	CANCEL Quickstart

- If you wish to continue, click the check box and select Confirm Quickstart Configure.
- If you do not wish to continue, click **CANCEL Quickstart**.

**Note** The Quick Start makes volumes available right away, but the entire tuning operation and online array creation may take as long as several hours to complete, depending on the size and number of disk drives in the Nexsan Storage System. You can check the progress of the operation by going to **RAID Information > Progress**.

Select **Quick Start > Check List** to return to the *Quick Start Configuration Checklist*. Proceed to <u>Volume</u> Configuration and Access on page 42.
## **Expert Quick Start**

If you are setting up a Nexsan Storage System with one or more attached Nexsan Storage Expansions, you are first asked to select the Nexsan Storage System that you wish to configure. When you are finished, you can configure any other Nexsan Storage System or expansion by repeating this procedure.

#### **Disk considerations**

If you have self-encrypting disks installed, you can enable encryption after array configuration is complete by going to **Configure RAID > Encrypt Array**. See <u>Configure Array Encryption on page 127</u>. Arrays are limited to the disks physically contained in a single Nexsan Storage System.

SAS, SATA, and SSD disk drives cannot be used in the same array. If your Nexsan Storage System contains a mixture of disk drive types, the *Quick Start* configuration page will have two or three *Quickstart Options* sections, one for each drive type.

#### To begin the Quick Start:

1. Select the Nexsan Storage System or Nexsan Storage Expansion you need to configure, then click **Next**.

The Quick Start configuration page displays.

NEXSAN		<b>1</b>	ALL OK
Home	Regio Expert Check		-
RAID Information	List		- 1
System Information		Quick Start	?
Configure RAID	C	onfigure RAID System	
Configure Volumes			- 1
Configure Host Access	WARNING: Quick	start will delete all data in this enclosure	- 1
Power Settings			- 1
System Admin		Mauve_E48P_1 Enclosure 0 : Nexsan F48	- 1
System Admin	SAS Qu	ickstart Options (8 disks found)	- 1
Configure Network	Number of arrays	2 🗸	- 1
Quick Start	Select RAID level	RAID 5 (rotating parity)	- 1
Technical Support	Number of pool spares	1 🗸	- 1
Log Off	Number of volumes per array	1 🗸	- 1
Log on	Limit volume size to less than 2TB		- 1
	Reserve for snapshots (% of usable volume capacity)	25% 🗸	- 1
	NL-SAS C	uickstart Options (16 disks found)	- 1
	Number of arrays	2 •	- 1
	Select RAID level	RAID 5 (rotating parity)	- 1
	Number of pool spares	1 •	- 1
	Number of volumes per array	1 •	- 1
	Limit volume size to less than 2TB		- 1
	Reserve for snapshots (% of usable volume capacity)	25% 🗸	- 1
		Advanced Options	- 1
	Preferred stripe size	128 Kbytes 🗸	- 1
	Select host connection type	Fibre (multi-path)	- 1
	Select default host access	Deny 🗸	
	Online Create		- 1
	Leave free space on each array (for future volumes / expansion)	0% 🗸	- 1
		Next>>	

Figure 1-24: Expert Quick Start page

1

2. Using the drop-down lists, set the following parameters:

Table 1-25: Configuring quick start

Setting	Action
Number of arrays	Choose the number of arrays that you wish to create. The maximum number depends on the number and size of disks detected in the Nexsan Storage System.
Select RAID level	<ul> <li>Choose the RAID level that all arrays will be configured for. You can choose from the following:</li> <li>RAID 0 (striped)</li> <li>RAID 1/1+0 (mirrored)</li> <li>RAID 4 (parity)</li> <li>RAID 5 (rotating parity)</li> <li>RAID 6 (rotating dual parity)</li> <li>Notes:</li> <li>RAID 1+0, also known as RAID 10, is automatically configured if you select RAID 1/1+0 (mirrored) and use an even number of drives, with a minimum of four.</li> <li>For more information on RAID levels, see Appendix C, RAID levels on number of a second content of the second content of th</li></ul>
	page 207.
Number of pool spares	Choose the number of spare disks that will be available to use as backups in case a RAID disk fails. The maximum number of pool spares depends on the number of disks detected in the Nexsan Storage System.
Number of volumes per array	This setting controls whether or not each array will be further divided into two or more smaller volumes. The default setting is <b>1</b> . The number of volumes per array can be anywhere from <b>1</b> to <b>10</b> .
Limit volume size to less than 2TB	This option is unchecked by default. If your hosts do not support volumes of more than 2TB in size, check this option.

Setting	Action
Reserve for Snapshots (% of total	In the drop-down list, select the amount of each volume's total capacity that you wish to reserve for snapshots. The default setting is <b>25%</b> . You can select <b>10%</b> , <b>25%</b> , <b>50%</b> , or <b>100%</b> . Enabling snapshots also enables replication.
volume capacity)	Arrays are automatically created with Advanced features. This option creates two hidden volumes per array, one for the snapshot reservation and one for metadata. These count towards the per-storage system maximum of 254 volumes. See <u>Create a new RAID array on page 49</u> .
	Notes:
	• Selecting <b>Disabled</b> will cause the Quick Start operation to use all available space in the array for volumes. To enable snapshots and replication later, you'll need to delete a volume. At least two volumes must be free for snapshot reservation.
	• For detailed information about snapshots and replication features, see the Nexsan High-Density Storage Snapshots and Replication User Guide.

3. Using the drop-down lists, set the parameters under *Advanced Options* as described in <u>Table 1-26:</u> <u>"Setting advanced quick start options"</u> on the next page.

Table 1-26:	Setting	advanced	quick	start	options
-------------	---------	----------	-------	-------	---------

Setting	Action
Preferred stripe size	The default stripe size is <b>128Kbytes</b> . You can choose to use smaller stripes by selecting <b>64Kbytes</b> , <b>32Kbytes</b> , or <b>16Kbytes</b> . <b>Note</b> It is strongly recommended that you do not change this setting.
Select host connection type	By default, this setting is set to <b>Fibre/10Ge/SAS (multi-path)</b> , which maps all logical unit numbers (LUNs) to all available host ports. If you wish to change the mapping, select one of the following:
	<b>None (leave unmapped)</b> : The LUNs will not be associated with any ports on the Nexsan Storage System and will not be available to the host. You can later manually assign each LUN to one or more ports using the procedure under <u>Volume Configuration and Access on page 42</u> or <b>Configure Volumes &gt; Map Volume</b> (see <u>Map Logical Volumes on page 158</u> ).
	Fibre/10Ge/SAS (non-redundant): Assigns each LUN to a single available FC/10GbE/SAS port.
	<b>Fibre/10Ge/SAS (multi-path)</b> : Assigns LUNs to all available FC/10GbE/SAS ports (requires multipathing software).
	<b>iSCSI/1Ge (non-redundant)</b> : Assigns each LUN to a single available 1Ge iSCSI port.
	<b>iSCSI/1Ge (multi-path)</b> : Assigns LUNs to all available 1Ge iSCSI ports (requires multipathing software).
Select default host access	This setting defaults to <b>Deny</b> . This will prevent all attached hosts from accessing any volumes on this Nexsan Storage System. If you wish to allow host access to this storage system, change this setting to <b>Read</b> or <b>Read/Write</b> .
	<b>Note</b> To ensure integrity of data, it is recommended that you leave this setting as <b>Deny</b> , then use the procedure under <u>Volume Configuration</u> and Access on page 42 to assign <b>Read</b> or <b>R/W</b> access to specific hosts.
Online Create	When this box is checked, volumes on this Nexsan Storage System will be available immediately, with RAID creation continuing in the background. This does, however, slow down the RAID creation process. You can speed up the creation process by unchecking this box, in which case volumes will be unavailable until RAID creation is complete.
Leave free space on each array for future volumes/expansion	By default, the volumes will take up all of the space in the arrays. This setting enables you to keep a percentage of the array space free for additional volumes or expansion of current volumes. Select <b>0%</b> , <b>10%</b> , <b>25%</b> , <b>50%</b> , or <b>75%</b> .

#### 4. Click Next.

The New Configuration Preview page displays.

- 5. Ensure that the settings for Arrays, Volumes, Pool Spares, and Volume Access are correct.
- 6. If all settings are acceptable, select the confirmation check box, then click the **Quickstart** button.



**CAUTION**: If any arrays or volumes have already been configured on the Nexsan Storage System, the graphical user interface (GUI) displays the following warning:

Figure 1-27: Data erasure warning

This system already has at least one configured array and volume					
WARNING	WARNING - by confirming all stored data will be erased!				
Confirm by clicking the checkbox and then clicking 'Confirm Quickstart Configure', or Cancel by clicking 'CANCEL Quickstart'.					
	Confirm Quickstart Configure				
	CANCEL Quickstart				

- If you wish to continue, click the check box and select Confirm Quickstart Configure.
- If you do not wish to continue, click **CANCEL Quickstart**.

**Note** The Quick Start makes volumes available right away, but the entire tuning operation and online array creation may take as long as several hours to complete, depending on the size and number of disk drives in the Nexsan Storage System. You can check the progress of the operation by going to **RAID Information > Progress**.

Select **Quick Start > Check List** to return to the *Quick Start Configuration Checklist*. Proceed to <u>Volume</u> Configuration and Access on the next page.

## Volume Configuration and Access

Although default volume and host access configuration is performed during Basic or Expert Quick Start, you may wish to change settings for individual volumes. To do so, click the **Change Volume Mapping** button, at the bottom of the Quick Start Checklist. This takes you to the *Map Logical Volumes* page.





Each volume information section lists the volume number, current volume name, the array the volume belongs to, the controller that the array is assigned to, the enclosure (if there is more than storage system or storage expansion), the volume's capacity, and the volume's host port assignments (see <u>Configure volumes</u> on a RAID array on page 53).

To map a volume to a logical unit number (LUN):

 Click the **Next** button next to the volume you wish to map. The volume mapping tools are displayed:

Figure 1-29: Volume mapping tools

NEXSAN										
Home RAID Information	Add Expa Volume Volu	and Delete Rena me Volume Volur	me Map me Volume	Volume Snapshot	Volume Migra Replicate Volu	ate me				
System Information Configure RAID	¢				Con Map I	figure Volur	mes			(?
Configure Volumes	< Previous									<u>Next &gt;</u>
Configure Host Access					T	est1' (Volume )	2)			
Power Settings	Volume nam	e			Test1		<i>.</i>			
System Admin	Volume capa Array	city			3360621   'Array #2	MB, 3360.6 GB 2 - Test ' (Array	(3129.8 GiB) 2), Controller	1, Enclosure 0		
Configure Network										
Quick Start	Volume LU	N Mapping 0 Ha	ost0 9 He	nst 1 🛛 🛛	Fibre	ost 3 9 Ho	st 4 9 Hos	t5 (9) Net ()	1Ge iSCSI	at 2 9 Net 3
Technical Support Log Off	2: 'T 3.3 (31	Test1' TB 29.8 GiB) ✓ Use sa	ame LUN for a	✓ ✓ Ill ports of t	→ → he same type	×	✓	V LUNO V	LUN 0 V LUN 0 LUN 0 V LUN 0	V LUN 0 V
	Туре			Host				Ac	cess	
							Jse Default	Deny	Read	R/W
		Default Access						۲	0	0
	○ iSCSI	Host #1 (iSCSI) iq	nom.micros	soft:jpsmith	5.derbylab.nexsa	an.com	✓	۲	0	0
	○ iSCSI	Host #2 (iSCSI) iq	n.1991-05.com	m.microsoft	t:yellowserver10		✓	۲	0	0
	○ iSCSI	Host #3 (iSCSI) iq	n.1991-05.com	m.microsoft	t:yellowserver9		✓	۲	0	0
	Fibre	Host #4 (Fibre) W	WPN: 20-01-0	00-0E-1E-C	.3-0D-5C		✓	۲	0	0
	G Fibre	Host #5 (Fibre) W	WPN: 21-00-0	00-0E-1E-1	1-4B-80		✓	۲	0	0
	Fibre	Host #6 (Fibre) W	WPN: 21-00-0	J0-0E-1E-1	1-4B-81		~	۲	0	0

- 2. In the *Volume LUN Mapping* section, assign a logical unit number (LUN) for each port that the volume will be accessed through. Check the **Use same LUN for all ports of the same type** check box to have all Fibre Channel, SAS-to-Host, and 10Ge or 1Ge iSCSI ports use the same LUN mapping.
- 3. Set the Default Access (applied to new or unknown hosts) by selecting Deny, Read, or R/W:

Table 1-30: Setting default access

Setting	Action
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

#### 4. If at least one host group has been created (see <u>Manage Host Groups on page 182</u>), set the **Group Default** by checking or unchecking the box in the *Use Default* column:

Table 1-31: Setting group default access

Setting	Action
Use Default	This is the default setting, and is the same as <b>Default Access</b> .
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

5. Set access privileges for individual hosts by checking or unchecking the box in the *Use Default* column: Table 1-32: Setting access privileges for individual hosts

Setting	Action
Use Default	When selected, the host or host group will use the <b>Group Default</b> setting (if the host is part of a group) or the <b>Default Access</b> setting (if the host is not part of a group). This is the default setting.
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

Note If at any time you wish to return the Map Logical Volumes page to its initial state, click Reset.

6. When you have finished assigning host access privileges, click **Apply Changes**. A message displays, indicating that the settings have been saved.

For more information about volumes, see <u>Configure Volumes on page 148</u>. For more information about host access, see <u>Configure Host Access on page 172</u>.

## When the Quick Start Configuration Check List is complete

When you have finished configuring the settings listed on the *Quick Start Configuration Check List*, do the following:

- When the Quick Start Configuration Check List is complete:
- 1. Scroll to the bottom of the list.
- 2. Uncheck the Show the configuration checklist on home page check box.
- 3. Click Close Checklist.

You are taken to the *Home* page (see <u>Home page on page 65</u>).

# Chapter 2

## **Common Tasks**

This chapter provides procedures for performing the most common Nexsan Storage System configuration tasks through the GUI.

This chapter contains the following sections:

Log in	48
Create a new RAID array	49
Configure volumes on a RAID array	53
Working with the Event Log	. 57
Update Firmware	59
Log off	59

## Log in

When you enter your Nexsan Storage System IP address into the address field of your Web browser (or select the system in Nexsan Storage Manager and click **Manage System**—see <u>Nexsan Storage Tools on page 253</u>), the login page displays. The appearance of this page varies depending on which Nexsan Storage System you are logging in to, but **Click Here to Login** is always displayed:

Figure 2-1: Nexsan Storage System login screen



Clicking the Click Here to Login button does one of two things:

- If no password has been set up for the USER or ADMIN account (see <u>Security on page 228</u>), clicking the Click Here to Login button takes you to the *Home* page (see <u>Home page on page 65</u>).
- If a USER or ADMIN account password has been set up, clicking **Click Here to Login** opens a security dialog similar to the one illustrated below:

Figure 2-2: Windows Security login screen (example)

Windows Security	4	×
The server 192. and password.	168.212.233 at SATABeast2-029C8040 requires a userna	me
Warning: This : sent in an insec connection).	server is requesting that your username and password l cure manner (basic authentication without a secure	be
	User name Password Remember my credentials	
	OK Can	cel

Enter the user name and password for either the USER or ADMIN account, then click **OK** to be taken to the *Home* page.

If you log in as ADMIN, you have access to all pages within the GUI. If you log in as USER, you have access to all information and status pages in the GUI, but are denied access to configuration pages.

**Note** Both the user name and password fields are case-sensitive. User names must be entered in all capitals ("ADMIN" or "USER").

## Create a new RAID array

Use this procedure if you need to create additional RAID arrays after initial setup.

#### Notes:

- The array creation process takes many hours, depending on how many disks are in the array and whether you select **Online Create** in the creation tool. You can check the array construction progress by clicking **RAID Information > Progress** (see RAID Array Utility Progress on page 75).
- Before you begin, make sure you have enough available disk space to add a new array.
- To create a new RAID array:
- 1. Click **Configure RAID > Add Array**. If your Nexsan Storage System has an attached Nexsan Storage Expansion, you are first prompted to select which storage system the new array will be built on. Make your selection and continue. The Create a New RAID Array page displays.

Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack			
						(	Con Create a	<mark>figure R</mark> New RA	<mark>AID</mark> ID Array					?
							E18 Enclosu	V 10.60.41 re 0 : Nexs	.52 an E18					
Arra	y name													
Sele	ct RAID le	vel						RAID S	(rotating)	parity)	$\checkmark$			
Pref	erred strip	e size						128 Kt	oytes 🗸					
Sele	ct array o	wner						Contro	ller 0 🗸					
Onli	ne Create							<ul> <li>Image: A start of the start of</li></ul>						
Ena	ble advanc	ed feature	e support					~						
Enc	rypted arra	ay												
	0.14		21	-		. 1.0				0:10		0110	0.14	
	Disk4			5		isk6				Disk6		Disk5	Zisa3	
			Disk SAS			isk9				Disk9		Disk8		
	Create RAID Set Reset													

Figure 2-3: Create a New RAID Array page

- 2. Click the Create RAID Set button. The Create a New RAID Array tool displays.
- 3. Use <u>Table 2-4: "RAID array creation tool settings"</u> on the next page for help with completing the RAID array creation.

Table 2-4: RAID array creation tool settings

Setting	Action
Array name	Enter a name for the array. If this field is left blank, a default array name ( <b>Array #N</b> ) is assigned. <b>Note</b> Array names can be changed on the <i>Rename RAID Arrays</i> page (see <u>Rename</u>
	RAID Arrays on page 126).
Select RAID level	<ul> <li>Select the RAID level in the drop-down list. You can choose from the following:</li> <li>RAID 0 (striped)</li> <li>RAID 1/1+0 (mirrored)</li> <li>RAID 4 (parity)</li> <li>RAID 5 (rotating parity) (default)</li> <li>RAID 5S (SSD parity)</li> <li>RAID 6 (rotating dual parity)</li> <li>RAID 6S (dual SSD parity)</li> <li>Notes:</li> <li>RAID 1+0, also known as RAID 10, is automatically configured when you select RAID 1/1+0 (mirrored) and use an even number of drives, with a minimum of four.</li> <li>For more information on RAID levels, see Appendix C, RAID levels on page 267.</li> <li>RAID 5S and RAID 6S are only available if SSDs are installed.</li> </ul>
Preferred stripe size	Set the stripe size using the drop-down list. <b>128Kbytes</b> is the default and recommended setting, but you can also choose <b>64Kbytes</b> , <b>32Kbytes</b> , or <b>16Kbytes</b> . <b>Note</b> It is strongly recommended that you do not change this setting.
Select array owner	Set which controller will be the "owner" of this array (that is, the one that manages it under most circumstances) using the drop-down list.
Online Create	<ul> <li>The box is checked by default. Do one of the following:</li> <li>Leave it checked if you want to be able to access your volumes right away. This slows down the array creation process, and access to the volumes can be slow during this time.</li> <li>Uncheck the box if you want to speed up the array creation process. This option makes your volumes unavailable until the array creation process is complete.</li> </ul>

Setting	Action
Enable	The box is checked by default.
advanced	Note This setting is NOT CHANGEABLE after initial configuration.
feature sup-	Do one of the following:
port	• Leave <b>Enable advanced feature support</b> checked if you want advanced features to be enabled for this array. This option creates two hidden volumes per array, one for the snapshot reservation and one for metadata. These count towards the perstorage system maximum of 254 volumes.
	<ul> <li>Uncheck the box if you want advanced features to be disabled for this array.</li> </ul>
	Notes:
	<ul> <li>Each Nexsan Storage System (whether a single Nexsan Storage System or with Nexsan Storage Expansions attached) can contain a maximum of 32 individual arrays.</li> </ul>
	• For detailed information regarding the snapshots and replication features, see the Nexsan High-Density Storage Snapshots and Replication User Guide.
Encrypted array	(E-Series only) If there are self-encrypting disks (SEDs) installed in the Nexsan Storage System, apply the <b>Encrypted array</b> option to encrypt the array immediately.
	Checking this box disables the check boxes below all disks that are not SEDs.
	Encrypting an array ensures that user data on disks that are removed from the Nexsan Storage System cannot be read without the corresponding encryption key.
	If this option is selected, you will be prompted to download the encryption key once the array has been created.
Select disks	Select each disk that you would like to include in the array (click the check box beneath each available disk). You must select a minimum of two disks for RAID 0 or RAID 1/1+0, a minimum of three disks for RAID 4 or RAID 5, or a minimum of four disks for RAID 6.
	• There is a section below the <b>Create RAID Set</b> button that enables you to select a section of disks all at once. Click the check box next to <b>Disk </b> <i>N</i> <b> through </b> <i>N</i> <b> for each group of disks that you wish to select.</b>
	• If at any time you wish to return the array creation tool to its initial state, click <b>Reset</b> .
Create RAID Set	Click the Create RAID Set button.

Setting	Action								
Export Encryption	(E-Series only) If you are creating an encrypted array, the <i>Configure Array Encryptic</i> page displays.	on							
Key	Figure 2-5: Configure Array Encryption confirmation page	Figure 2-5: Configure Array Encryption confirmation page							
	Add Rename Encrypt Delete Array Add Delete Retire Spare Array Lost Rebuild Array Array Array Array Owner Spare Spare Disk Mode Venty Data Ack								
	Configure RAID Change Array Encryption								
	Array has been successfully configured								
	Confirm that you wish to ENCRYPT the below array								
	Array name : 'Accounting' Array name : 1, Controller 0 RAD level : RAD (striped) Number of members : 2 Constructing 1.2 TB (1.0 TIB)								
	New Encryption Key Key Created Friday 07-Aug-2016 13.46.59								
	Encryption Key File NexsenKey-NiKA-Beda119c0002768-1896.dat Export Encryption Key								
	Please export a copy of the encryption key, and store that copy in a safe place. ALL DATA ON THE ARRAY MAY BECOME PERMANENTLY INACCESSIBLE IN THE EVENT OF A SYSTEM FAILURE UNLESS THE ENCRYPTION KEY CAN BE PROVIDED								
	Use the 'Export Encryption Key' button above to download a copy of the encryption key. Confirm by clicking the checkbox and then clicking the 'Confirm Encryption' or Cancel by clicking the 'CANCEL Encryption' button.								
	☐ The encryption key has been exported and stored in a safe place.								
	Confirm Encryption CANCEL Encryption								
	Do the following:								

a. Click the **Export Encryption Key** button to save the encryption key to your hard drive.

**Note** When the encryption key for an encrypted array is changed, previous encryption keys cannot be used to restore access to the array. Export the new encryption key file and keep the backup in a secure place. If drives become inaccessible (for example, if they are removed from the chassis), you can restore access to the drives by uploading exported encryption key files. See <u>Restore</u> Encryption Keys on page 212.

- b. Check the check box next to **The encryption key has been exported and stored in a safe place**.
- c. Click the Confirm Encryption button.

**Note** If you decide that you do not wish to create an encrypted array, click the **CANCEL Encryption** button.

You are taken to the **Configure Logical Volume** page (see <u>Configured Logical Volumes on page 76</u>). The message Array has been successfully configured displays at the top of the page, along with an additional message:

- If you left the **Online Create** check box checked, the message displayed is *Performance will be degraded until tuning is completed*.
- If you unchecked **Online Create**, the message displayed is *Volumes will not be accessible until initialization is completed*.

## Configure volumes on a RAID array

Use this procedure to configure volumes on a RAID array.

- To add volumes to a RAID array:
- 1. Click **Configure Volumes** in the navigation pane to go to the *Configure a Logical Volume* page.

Figure 2-6: Configure a Logical Volume array selection page

NEXSAN	1									Jall ok
Home RAID Information	Add Volume	Expand Volume	Delete Volume	Rename Volume	Map Volume	Volume Snapshot	Volume Replicate	Migrate Volume		-
System Information Configure RAID							(	Configure Volumes Create a Logical Volume		?
Configure Volumes Configure Host Access Power Settings	Arra Encl Arra RAII	ay name : losure : 0 ay number D level : R	'Array #1' · : 1, Cont AID 5 (rot	roller 0 tating pari	tv)				O Fault tolerant 10.0 TB (9.0 TiB)	
System Admin Configure Network	Num Arra Encl Arra	nber of me ay name : losure : 1	embers : * 'Array #2'	roller 1					©	
Quick Start Technical Support	RAII	D level : R nber of me	AID 5 (rot embers : *	ating pari	ty)				<b>15.0 TB</b> (13.6 TiB)	
Log Off								Next>> Reset		

- 2. Select which RAID array you want to create volumes on by clicking its selection button.
- 3. Click Next to go to the volume creation tool.

NEXSAN			J <u>ALL O</u>
Home RAID Information	Add Expand Delete Rename Map Volume Volume Migra Volume Volume Volume Volume Volume Snapshot Replicate Volum	ate ne	
System Information Configure RAID	Cor Create	n <mark>figure Volumes</mark> e a Logical Volume	(?)
Configure Volumes	Arrav#2 selected. Cd	ntroller 1. BAID5. 15.0 TB (13.6 TiB)	
Configure Host Access	Volume name		
Power Settings	Volume size (Giga bytes (GB) to one decimal place)	13349 0 GB	
System Admin	Limit volume size to less than 2TB		
Configure Network	Enable snapshots		
Quick Start	Reserve for snapshots (Giga bytes (GB) to one decimal place)	GB	
Technical Support	Crea	ate Volume Reset	
	⊘ MB ⊛ GB ⊘ % Configure	○ MiB ○ GiB Change Units ed Volume Information	
	Free space on Array #2 Array 2, Controller 1, Enclosure 1 Total capacity 15.0 TB (13.6 TIB)		
	Free Area Size in MB	Size in GB	% of Array
	Total 13349938 MB	13349.9 GB	0
	Below bar represents the	size and position of the free space areas	•

#### 4. Enter the following information:

Table 2-8: Adding volumes to a RAID array

Setting	Action
Volume Name	Enter a name for the volume. Volume names can be up to 63 characters long. If this is the first volume configured for this array, the name defaults to the name of the array. If there are already volumes on the array, then the <b>Volume Name</b> field is
Volume Size (X to one decimal place)	Enter the desired size of the new volume. The value of this field defaults to all of the remaining space left on the array. The Nexsan Storage System defaults to true gigabytes (GB), but this can be changed using the unit type selection buttons and <b>Change Units</b> button (located below the <b>Create Volume</b> and <b>Reset</b> buttons).
Limit volume size to less than 2TB	This option is unchecked by default. If your hosts do not support volumes of more than 2 terabytes (TB) in size, check this option. <b>Note</b> If you select this option, the value entered in <b>Volume Size (<i>X</i> to one decimal place)</b> must not exceed 2 TB, or else the volume will not be built and an error message will appear.
Enable snapshots	<ul> <li>To enable snapshots (and replication) for this volume, leave this box checked. To disable snapshots for this volume, uncheck the box.</li> <li>On arrays that have advanced feature support enabled, (see <u>Create a new</u> <u>RAID array on page 122</u>), this option is checked by default.</li> <li>Notes:</li> <li>If you disable snapshots for this volume, you can enable them later on the <i>Configure Volume Snapshots</i> page (see <u>Configure Volume Snapshots on page 161</u>).</li> <li>For detailed information regarding the snapshots and replication features, see the <i>Nexsan High-Density Storage Snapshots and Replication User Guide</i>.</li> </ul>
Reserve for snapshots (X to one decimal place)	Enter the desired size of the snapshot reserve. When <b>Enable snapshots</b> is checked, the value of this field defaults to approximately 25% of the value of <b>Volume Size (X to one decimal place)</b> . <b>Note</b> It is recommended that the snapshot reservation be set to approximately 25% of the volume size. See the <i>Nexsan High-Density Storage Snapshots and Replication User Guide</i> for more information.

Note If at any time you wish to return the Create a Logical Volume page to its initial state, click Reset.

5. When you have entered all of the required information, click **Create Volume**.

A message is displayed, informing you that the volume as been created, and you are prompted to assign the logical unit numbers (LUNs) and host port access:

Home	Add Expan	d Delete Rename Man Volume Volume Miarate				
RAID Information	Volume Volum	e Volume Volume Volume Snapshot Replicate Volume				
System Information		Config	ure Velumee			(
Configure RAID		Create a	Logical Volume			
Configure Volumes						
nfigure Host Access		Logical volume has	been created succes	sfully		
Power Settings	_			Fibre	16	e iSCSI
System Admin		Volume LUN Mapping	0 H	ost 0 🛛 🖲 Host	1 9 1Ge-iSCSI	0 9 1Ge-iSCSI 1
Configure Network	2:	'Training'	C0	▼ [	· · ·	v
Quick Start	Ar	ray: 'Training', Controller 0, Enclosure 0 apacity: 2.1 TB (2047.9 GiB)	C1	· ···	· · ·	v
Technical Support		····,	Use s	ame LUN for all po	orts of the same type	1
Log Off	Type	Host		Ac	cess	
5	1,100		Use Default	Deny	Read	R/W
		Default Access		۲	Ô	O
		(	Group #1			
		Group Default		۲		
		0	hor Voete		· · · · · · · · · · · · · · · · · · ·	
	⊘ iSCSI	Host 'LIMNIC ign. 1991-05.com.microsoft:limnic'		0	0	0
	⊘ iSCSI	Host #2 (iSCSI) ign. 1991-05.com.microsoft:wildfire		0	0	0
	⊘ iSCSI	Host #3 (iSCSI) iqn.1991-05.com.microsoft:host2	<b>V</b>	۲	0	0
	Fibre	Host 'MAC Port-1 10-00-00-06-2B-1A-8A-F8'	<b>V</b>	۲	0	0
	\varTheta Fibre	Host #5 (Fibre) WWPN: 21-FD-00-05-1E-0E-EA-B9		۲	0	0

Figure 2-9: Volume mapping tool

- 6. In the *Volume LUN Mapping* section, assign a logical unit number (LUN) for each port that the volume will be accessed through. Check the **Use same LUN for all ports of the same type** check box to have all Fibre Channel, SAS-to-Host, and 10Ge or 1Ge iSCSI ports use the same LUN mapping.
- 7. Set the Default Access (applied to new or unknown hosts) by selecting Deny, Read, or R/W:

Table 2-10: Setting default access

Setting	Action
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

#### 8. If at least one host group has been created (see <u>Manage Host Groups on page 182</u>), set the **Group Default** by checking or unchecking the box in the *Use Default* column:

Table 2-11: Setting group default access

Setting	Action
Use Default	This is the default setting, and is the same as <b>Default Access</b> .
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

9. Set access privileges for individual hosts by checking or unchecking the box in the *Use Default* column: Table 2-12: Setting access privileges for individual hosts

Setting	Action
Use Default	When selected, the host or host group will use the <b>Group Default</b> setting (if the host is part of a group) or the <b>Default Access</b> setting (if the host is not part of a group). This is the default setting.
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

Note If at any time you wish to return the *Map Logical Volumes* page to its initial state, click **Reset**.

10. When you have finished assigning host access privileges, click **Apply Changes**. A message displays, indicating that the settings have been saved.

Note For more information about host access, see Configure Host Access on page 172.

## Working with the Event Log

To view, manage, or download the system's event log, click **System Information** in the left navigation pane, then click **Event Log** in the top navigation bar to be taken to the *Event Log* page.



Figure 2-13: Event Log page

This log can be used to find information about configuration changes, data errors, hardware failures, and other events experienced by the Nexsan Storage System (and Nexsan Storage Expansion, if present).

Event log entries follow a standard format:

Figure 2-14: Event log entry format

0002;C1 18-Ju	I-2011 at 12:1	2:18;(S); [1	]; Link Up 4GHz
Event number	Event date	Event type	Event description

Table 2-15: Event log entry format description

Setting	Description
Event number	The reference number for the event, in reverse order of occurrence (event 0000 is the most recent event).
Controller number	The RAID Controller that the event is related to.

2

Setting	Description								
Event date	The date and ti format.	The date and time of the event's occurrence, in "dd-mmm-yyyy at hh:mm:ss" format.							
Event type	The broad category that the event falls into:								
	Error (E)	Serious problems that likely require user intervention. Examples include a failed disk, a RAID Controller going offline, or a fan problem.							
	Warning (₩)	Problems that may indicate an imminent failure, but are them- selves unlikely to compromise data. Examples include excess- ive temperature, firmware errors, or disk block failures.							
	Information (I)	Events that indicate items of interest to the user. Examples include array creation or deletion, verification scan start and stop, or a new disk being inserted.							
	System (S)	Lower-level information events. Examples include port status, IP address changes, or array initialization messages.							
Port number	For events that	pertain to a particular port, the number of the port.							
Event description	A brief description of the event.								

## Filtering and formatting the Event Log

The event log can be filtered and formatted using the controls under Display Options:

Table 2-16: Setting filters and formats for the Event Log

Setting	Description
Filter by Con- troller	Shows events for <b>Controller 0</b> , <b>Controller 1</b> , or both RAID Controllers.
Filter by Date	Shows events from the last day, week, or month; or show all entries.
Filter by Importance	Shows only error events ( $E$ ); errors and warnings ( $E \& W$ ); errors, warnings, and information events ( $E, W, I$ ); or all events ( $E, W, I, S$ ).
Date Format	<ul> <li>Shows dates in one of three formats:</li> <li>dd-mmm-yyyy at hh:mm:ss (international format, the default)</li> <li>dd/mm/yyyy hh:mm:ss (European format)</li> <li>mm/dd/yyyy hh:mm:ss (North American format)</li> </ul>
Show event icons	Display icons for each event category at the beginning of each event entry. Icons are color coded: pink for system events, blue for information events, yellow for warnings, and red for errors. This option is deselected by default. If <b>Show event icons</b> is selected, the event type is not displayed after the event date.

Setting	Description
Show con- troller col- ours	Display events for Controller 0 in black and events for Controller 1 in blue. This option is selected by default.

## Viewing Only Errors

Clicking the **Error Log** link on the *Event Log* page displays only the error events (E) in the log.

#### Downloading Event Log Files

You can download the Event Log in text format by clicking the **Download log/config dump as text** link. You can download them as an HTML file by clicking the **HTML** link in parentheses next to it.

## Update Firmware

From time to time, Nexsan issues updates to Nexsan Storage System firmware to introduce new features or to solve firmware-related issues. New firmware files can be acquired by clicking **System Admin > Update Firmware > Check for Updates** or from Nexsan Technical Support (see <u>Technical Support on page 235</u>). Usually, the new firmware file is compressed in a .zip archive and must be extracted before uploading.

See also Update Firmware on page 213

## Log off

Use this procedure for detailed instructions for logging off from your Nexsan Storage System.

#### To log off of the system:

1. Click the **Log Off** button in the left navigation pane.

The logoff.asp page displays, with the message Please shutdown your browser to log off.

2. Close the browser to clear its cache and prevent unauthorized access to the storage system.

# Chapter 3

## The Graphical User Interface

This chapter describes each of the sections of the graphical user interface (GUI) and their functions. It contains the following sections:

Vavigation and Status	62
Home page	65
RAID Information	71
System Information	99
Configure RAID	.121
Configure Volumes	. 148
Configure Host Access	.172
Power Settings	.188
System Administration	197
Configure Network	.217
Гесhnical Support	.235
_og Off	.240

## Navigation and Status

This section contains the following topics:

Navigation Menus	62
Status indicator	63

#### **Navigation Menus**

The main menu is located on the left side of each page and links to each section of the graphical user interface (GUI) for the Nexsan Storage System:

Figure 3-1: Nexsan Storage System left navigation panel

Home
RAID Information
System Information
Configure RAID
Configure Volumes
Configure Host Access
Power Settings
System Admin
Configure Network
Quick Start
Technical Support
Log Off

#### Each section (except the Home and Login pages) also has a navigation bar across the top.

Figure 3-2: Nexsan Storage System top navigation bar (example)

Array Progress Volumes Drives Stats Info Info Stats Rep	Replicate
---	-----------

These are different for each section of the GUI.

#### Status indicator

The upper right corner of the GUI displays a storage system status indicator. When the storage system is operating within specifications, this indicator displays ALL OK with a green check mark.



When an environmental reading is outside of specified limits, but no failure has yet occurred, this indicator displays WARNING with a red exclamation point.



If a module fails, this indicator displays FAILURE with a red X.



Click the WARNING or FAILURE indicator to be taken to the *Summary of System Problems* page (see <u>Summary of System Problems on page 111</u> for more information).

Figure 3-3: Summary of System Problems page



When an array has been rebuilt or data has been lost after the storage system has recovered from a failure, the indicator displays a red exclamation point next to the ALL OK indicator.



Click the exclamation point to be taken to the *Lost Data/Bad Blocks* page (see <u>Lost Data/Bad Blocks on</u> page 145) or the *Acknowledge Rebuild* page (see <u>Acknowledge Rebuild on page 146</u>).

Figure 3-4: Lost Data/Bad Blocks page

Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk Cont Lost Dat	Spare Mode figure R/ ta / Bad I	Array Verify AID Blocks	Lost Data	Rebuild Ack		?
Arra	y 1 ('Sas5'	) has som	e unrecov	verable da	ta blocks	Ad	Acknow	ledge Los e Lost Dat	at Data ta Warning				

Figure 3-5: Acknowledge Rebuild page

dd Re ray A	ename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack	
							Co Ackno	nfigure wledge	<mark>RAID</mark> Rebuild			?
Array 2	has hos	n rocone	tructod				Ackn	owledge	Rebuild			
Array 2	nas bee	in recons	uucteu			Ackr	nowledge (		Reconstr	uction		
						71011	iowiedge i	o uD 7 ulu	y reconstr	uction		
						Re	equire Rel	build Ackı	nowledgen	nent		
Array re	ebuilds i	must be r	nanually	acknowled	lged					۲		
Array re	builds	do not ree	quire ack	nowledger	nent					0		
							Set Ack	nowledgen	nent Mode			

## Home page

The *Home* page provides a quick summary of the state of your Nexsan Storage System and all of its modules. Its appearance depends on whether you are connecting to a single Nexsan Storage System or to a Nexsan Storage System with one or more Nexsan Storage Expansions.

## Single Nexsan Storage System

When you are viewing a single Nexsan Storage System, the *Home* page displays a diagram of the storage system with icons for each component.

Figure 3-6: Nexsan Storage System Home page (example, single storage system)



Each icon indicates the associated component's current status. Generally:

- A green status bar indicates that the associated component is functioning correctly.
- A flashing red status bar indicates that the associated component has failed or is indicating a fault.

Some icons can indicate additional states, depending on the component:

- Black text above a Controller icon indicates the controller currently accessing the system's GUI. The
  other controller is indicated by gray text above the icon. To switch between the two, click the icon with the
  gray text.
- Text beneath each **Controller** icon indicates the current temperature of that RAID Controller.

• The Management, 1Ge iSCSI, Host, and Exp (out) icons can indicate several states:

Table 3-7: Host/port cons

lcon	Description
۲	Green indicates that the host/port is connected.
$\bigcirc$	Gray indicates that the host/port is not connected or is offline.
۲	Red indicates that the host/port is on a failed RAID Controller.

In Figure 3-6 on page 65, the host icon is labeled "Fibre," as the controller contains a Fibre HBA.

Disk icons indicate the disk's type and state. See Disk Information on page 81.

Additionally, clicking on any **Disk** icon takes you to that drive's *Disk Information* detail page (see <u>Disk</u> <u>Information on page 81</u>).

On Nexsan Storage Systems with active drawers (Nexsan E-Series Storage Systems), each drawer has a lock icon:

- A closed lock icon with a green status bar indicates that the drawer is locked.
- An open lock icon with a yellow status bar indicates that the drawer is unlocked.

#### Nexsan Storage System with Nexsan Storage Expansions

When you are viewing a Nexsan Storage System with attached Nexsan Storage Expansions, the *Home* page displays a summary diagram of each enclosure, with icons for each subsystem. If the system has one attached Nexsan Storage Expansion, the *Home* page looks like this:

Figure 3-8: Nexsan Storage System Home page (example, one Nexsan Storage Expansion)



If the system has two attached Nexsan Storage Expansions, the Home page looks like this:

Figure 3-9: Nexsan Storage System Home page (example, two Nexsan Storage Expansions)



Each icon indicates the status of the components within each subsystem. Generally:

- A green status bar indicates that the associated component is functioning correctly.
- A flashing red status bar indicates that the associated component has failed or is indicating a fault.

Some icons can indicate additional states, depending on the subsystem:

- The text beneath the **Enclosure** icon indicates whether the Nexsan Storage System is online or offline.
- The Arrays icon can indicate several states:

Table 3-10: Array icons

lcon	Description
	<b>Fault tolerant array</b> : A green status bar indicates that all arrays are functioning correctly and are fault-tolerant.
	<b>Array under construction</b> : A moving green status bar indicates that one or more arrays are being constructed.
	<b>Array critical</b> : A status bar alternating amber and red indicates that one or more arrays are in a critical state.
	<b>Array rebuilding</b> : A status bar alternating green and amber indicates that one or more arrays are being rebuilt.
	<b>Array offline</b> : A red icon with a flashing red status bar indicates that one or more arrays are offline or have failed.

The Management, 1Ge iSCSI, Host, and Exp (in or out) icons can indicate several states:

Table 3-11: Management, 1Ge iSCSI, Host, and Exp icons

lcon	Description
۲	Green indicates that the host/port is connected.
$\bigcirc$	Gray indicates that the host/port is not connected or is offline.
۲	Red indicates that the host/port is on a failed RAID Controller.

In Figure 3-8 and Figure 3-9, the host icon is labeled "1Ge iSCSI", as the controllers contain 1Ge iSCSI HBAs.

Additionally, each icon (except **Exp**) is a link to its associated subsystem:

Table 3-12: Storage System Home page icons

lcon	Description
Enclosure	Links to the status page for that physical Nexsan Storage System, which is identical to the status page for a single storage system (see <u>Single Nexsan Storage System on page 65</u> ).
Fans, PSUs, and Controller icons	Link to the <i>Environmental Information</i> page (see <u>Environmental Information on</u> page 102).
Disks	Links to the Disk Information page (see Disk Information on page 81).
Arrays	Links to the RAID Array Information page (see RAID Array Information on page 72).
Replications	Links to the Replica Information page (see Replication Information on page 97).
Management	Links to the Network Information page (see Network Information on page 105).
1Ge iSCSI	Links to the 1Ge iSCSI Information page (see <u>1Ge iSCSI Information on page 94</u> ).
Host	Links to the <i>Fibre/SAS/10Ge Information</i> page (see <u>Fibre Channel Information on</u> page 88, <u>SAS Information on page 90</u> or <u>10Ge iSCSI Information on page 91</u> ,

#### Alarms and warnings

If a failure occurs, the top of the *Home* page contains an alarm statement and extra buttons.

**Problem Summary and Silence Alarm buttons** 

Note - the audible alarm is sounding due to at least one problem.
Problem Summary Silence Alarm

Table 3-13: Problem Summary and Silence Alarm buttons

Button	Description
Problem Summary	Takes you to the <i>Summary of System Problems</i> page (see <u>Summary of System Problems</u> on page 111).
Silence Alarm	Silences the audible alarm on the Nexsan Storage System. A message displays, indicating that the alarm has been silenced. Click the <b>Back</b> button to return to the <i>Home</i> page. Note If further problems occur, the audible alarm will sound again.

Acknowledge Array Reconstruction button

When an array has been rebuilt following a failure, the top of the *Home* page contains a rebuild statement and the **Acknowledge Array Reconstruction** button:

One or more RAID array	s has been reconstructed and at least one spar	e disk has been used.
	Acknowledge Array Reconstruction	

#### Action

Click the **Acknowledge Array Reconstruction** button to acknowledge the rebuilt array. A message displays, stating that the rebuild has been acknowledged (see <u>Acknowledge Rebuild on page 146</u>).

Acknowledge Lost Data Warning button

When data in an array has been lost following a failure, the top of the *Home* page contains a data loss statement and the **Acknowledge Lost Data Warning** button:

The RAID controller has found some unrecoverable data blocks.
Acknowledge Lost Data Warning

#### Action

Click the **Acknowledge Lost Data Warning** button to acknowledge the data loss. A message displays, stating that the data loss has been acknowledged (see Lost Data/Bad Blocks on page 145).

## **RAID** Information

Clicking **RAID Information** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-14: *RAID Information* navigation bar (10GbE iSCSI)

RAID Array	Progress	Volumes	Disk Drives	Disk Stats	10Ge Info	1Ge Info	Host Stats	Volume Replicate
---------------	----------	---------	----------------	---------------	--------------	-------------	---------------	---------------------

For SAS and Fibre Channel variants of the navigation bar, see <u>For SAS and Fibre-Channel Storage</u> <u>Systems below</u>.

Refer to Table 3-15 for help with the Nexsan E-Series/BEAST RAID information:

Table 3-15: RAID information pages

Nav bar button	GUI pages and documentation links
RAID Array	RAID Array Information on the next page
Progress	RAID Array Utility Progress on page 75
Volumes	Configured Logical Volumes on page 76
Disk Drives	Disk Information on page 81
Disk Stats	Disk Statistics on page 87
10Ge Info	10Ge iSCSI Information on page 91
1Ge Info	1Ge iSCSI Information on page 94
Host Stats	Host Statistics on page 96
Volume Replicate	Replication Information on page 97

#### For SAS and Fibre-Channel Storage Systems

On Nexsan E-Series Storage Systems configured for SAS-to-Host, the navigation bar includes a **SAS Info** tab. See <u>SAS Information</u>

Disk	SAS	1Ge	Host
Stats	Info	Info	Stats
Stats	Info	Info	

On Nexsan E-Series Storage Systems configured for Fibre Channel-to-Host, the navigation bar includes a **Fibre Info** tab. See <u>Fibre Channel Information</u>.

Figure 3-17: RAID Information navigation bar (Fibre Channel)

Disk	Fibre	1Ge
Stats	Info	Info

3

## **RAID** Array Information

Clicking **RAID** Information takes you to the *RAID* Array Information page, which displays summary information for each array that has been configured on the Nexsan Storage System. This includes arrays that are being constructed or rebuilt.



Figure 3-18: RAID Array Information page

There is an information block for each array, which contains the following information:

#### Table 3-19: RAID Array Information

Label	Description	
Title bar	The Array name, Array number, and Enclosure.	
Array name	The user-defined name of the array. If no name has been assigned, this item defaults to <i>Array #n</i> , where <i>n</i> is the <i>Array number</i> . The name can be changed of the <i>Rename RAID Arrays</i> page (see <u>Rename RAID Arrays</u> on page 126).	
Array number	Reference number for the array, assigned in order of creation.	
Enclosure	Reference number of the enclosure that houses the disks that make up this array. <i>Enclosure 0</i> is the storage system; <i>Enclosure 1</i> is the first Nexsan Storage Expansion; and <i>Enclosure 2</i> is the second Nexsan Storage Expansion.	
Configured owner	Displays the RAID Controller to which this array is assigned. Can be changed on the <i>RAID Array Ownership</i> page (see <u>RAID Array Ownership</u> on page 133).	
Label	Description	
---------------------	--	
Current owner	Displays the RAID Controller that is currently controlling this array. This may dif- fer from <i>Configured owner</i> if the assigned RAID Controller is restarting or has failed.	
Array status/health	Displays the current status of the RAID array: fault tolerant, not fault tolerant, constructing, critical, rebuilding, or offline. Arrays that were created "online" (see <u>Create a new RAID array on page 122</u> ) also display the <i>Tuning</i> progress.	
	If the array is encrypted (see <u>Configure Array Encryption on page 127</u> ), then <i>Encrypted</i> is also displayed here.	
	If an array verification is currently being performed (see <u>Verify RAID Array on</u> page 141), the progress of the scan is also displayed here.	
RAID level	Displays the RAID level that this array is configured for. See Appendix C, <u>RAID</u> levels on page 267 for more information.	
Disk Type	Displays the type of disks used for this array. This can be SATA, SAS, or SSD.	
Array capacity	Displays the total data storage space of the array, in true terabytes (TB) followed by binary terabytes (TiB).	
No. of members	The number of disks that make up the array.	
No. of spares	The total number of spares available for the array. This includes both pool spares and dedicated spares. New spares can be added on the <i>Add Hot Spare</i> page (see <u>Add Hot Spare</u> on page 134).	
No. of volumes	The number of configured volumes in this array.	
Data stripe size	The size of the individual data stripes in this array.	
Cache memory	Indicates whether the cache is enabled, its mirroring status, its streaming mode, and its FUA status.	
Cache size	The total size of the cache, in megabytes (MB).	
Rebuild priority	Displays the configured rebuild priority, ranging from Lowest to Highest. This con- trols the amount of resources that a RAID Controller assigns to rebuilding the array versus handling host data requests. See <u>Configure Rebuild Priority on</u> <u>page 206</u> for more information.	
Verify utility	Displays the user-configured verification tests for this array, as well as how often they are run. Verification tests are configured on the <i>Verify RAID Array</i> page (see <u>Verify RAID Array</u> on page 141).	

Label	Description
Verify due	The date and time of the next scheduled verification, formatted as "Day-of-week DD-Mmm-YYYY HH:MM". If the verification is scheduled to begin within a few hours, this displays [Verification test] will start shortly. If the verification is currently running, it displays [Verification test] is currently active. You can run a RAID array verification at any time by going to the Verify RAID Array page and clicking the <b>Start</b> button (see Verify RAID Array on page 141).
No. of reads	Displays the number of reads from the array.
No. of writes	Displays the number of writes to the array.
Created	Displays the date and time that the array was created, formatted as "Day-of- Week DD-Mmm-YYYY HH:MM".

The bottom area displays the array status icon, the *Array status/health*, and the *Array capacity*. The array status icon can indicate several states:

Table 3-20: Array icons

lcon	Description
	<b>Fault tolerant array</b> : A green status bar indicates that all arrays are functioning correctly and are fault-tolerant.
	<b>Array under construction</b> : A moving green status bar indicates that one or more arrays are being constructed.
	<b>Array critical</b> : A status bar alternating amber and red indicates that one or more arrays are in a critical state.
	<b>Array rebuilding</b> : A status bar alternating green and amber indicates that one or more arrays are being rebuilt.
	<b>Array offline</b> : A red icon with a flashing red status bar indicates that one or more arrays are offline or have failed.

New arrays can be created on the *Create a New RAID Array* page (see <u>Create a new RAID array on</u> page 122). Arrays can be deleted on the *Delete a RAID Array* page (see <u>Delete a RAID Array on page 132</u>).

# **RAID Array Utility Progress**

Clicking **RAID Information > Progress** takes you to the *RAID Array Utilities Progress* page, which displays the progress of active RAID array utilities.

NEXSAN		J <u>all ok</u>
Home RAID Information	RAID Array Volumes Disk Disk Fibre 1Ge Host Volume System	<b>^</b>
System Information Configure RAID	RAID Information RAID Array Utility Progress	0
Configure Volumes Configure Host Access Power Settings System Admin	'Training' (Array 1)       Enclosure : 0, Controller 0       Utility     Surface scan       Progress %     21%	E
Configure Network Quick Start Technical Support	0% 100%	
Log Off	Enclosure : 1, Controller 0 Utility Progress % - 10%	
	Array 3 Enclosure : 1, Controller 0 Utility - Progress % - 0% 100%	

Figure 3-21: RAID Array Utilities Progress page

#### Processes that can be viewed on this page are:

Table 3-22: RAID Array Utility Progress fields

Setting	GUI pages and documentation links
Array construction/tuning	Create a new RAID array on page 122
Array reconstruction	Configure Rebuild Priority on page 206
Disk retirement	Retire Disk on page 137
Surface scan	Verify RAID Array on page 141
Parity scrub	

# **Configured Logical Volumes**

Clicking **RAID Information > Volumes** takes you to the *Configured Logical Volumes* page, which displays the configured volumes for each array.

NEXSAN						ALL OK
Home RAID Information	RAID Progress Volumes Disk Disk Fibre 1Ge Host Volume Array Info Info Stats Replicate	System Nav				
System Information Configure RAID	RAID Inform Configured Logic	<mark>ation</mark> al Volumes				
Configure Volumes Configure Host Access	Volume Details	9 Host 0	Fibre 9 Host 1	1Ge IGe-iSCSI0	iSCSI Ø 1Ge-iSCSI 1	
Power Settings System Admin	1: 'training volume' Array: #Array ##, Controller 0, Enclosure 1 Capacity: 35 MB (0.0 GiB)	C0 LUN1 C1 LUN1	LUN1 LUN1			
Configure Network Quick Start	2: 'Operations' Array: 'Array #2', Controller 0, Enclosure 1 Capacity: 6.0 TB (5587.9 GIB)	C0 LUN0 C1 LUN0	LUN0 LUN0			CNEXT->
Technical Support Log Off	3: 'Sales' Array: 'Array #2', Controller 0, Enclosure 1 Capacity: 6.0 TB (5589.7 GIB)	C0 LUN3 C1 LUN3	LUN3 LUN3			CNEXT->
	4: 'Technical Support' Array: 'Array #3', Controller 0, Enclosure 1 Capacity: 6.0 TB (5587.9 GiB)	C0 LUN2 C1 LUN2	LUN2 LUN2			CNEXT >
	5: 'Engineering' Array: Array #3', Controller 0, Enclosure 1 Capacity: 10.0 TB (9315.6 GIB)	C0 LUN4 C1 LUN4	LUN4 LUN4			CNEXT >
	6: 'Operations 2' Array: 'Operations 2', Controller 0, Enclosure 0 Capacity: 8.0 TB (7451.6 GiB)	C0 LUN5 C1 LUN5	LUN5 LUN5			CNEXT->
	Click here to view volum Click here to view detai	e access su led volume	mmary ayout		·	

Figure 3-23: Configured Logical Volumes page

Table 3-24: Configured Logical Volumes information

Column	Description
Volume Details	Displays the volume number, volume name, the array to which it is assigned, the number of the controller to which the array is assigned, the storage system that the array is in (if this is a Nexsan Storage System with one or more Nexsan Storage Expansions), and the total capacity of the volume.
	The volume name can be changed on the <i>Rename Logical Volumes</i> page (see <u>Rename</u> <u>Logical Volumes on page 157</u> ).
	If there is room left in the array, the total capacity of the volume can be expanded on the <i>Expand a Logical Volume</i> page (see <u>Expand a Logical Volume</u> on page 154).
<i>Fibre</i> (or	Display the host port configurations and LUN mappings.
SAS or 10GE) and 1Ge iSCSI	The LUN mappings can be changed on the <i>Map Logical Volumes</i> page (see <u>Map Logical</u> <u>Volumes</u> on page 158).

#### Clicking the **Next** button beside a volume takes you to the details page for the volume.

Figure 3-25: Configured Logical Volumes detail page

NEXSAN									
Home	RAID -	Disk Disk	Fibre 1Ge	Host Volur	ne System				
RAID Information	Array Progress Vo	Drives Stats	Info Info	Stats Replic	ate Nav				
System Information	¢.			RAID Infor	mation				
Configure RAID	-		Co	nfigured Log	ical Volume	s			
Configure Volumes	< Previous								<u>Next &gt;</u>
Configure Host Access		Maluma I				Fil	ore	1Ge	iSCSI
Power Settings		Volume L	UN Mapping			Host 0	Host 1	0 1Ge-iSCSI 0	1Ge-iSCSI1
System Admin	2: 'Opera	tions' ray #2' Controllor 0 Encl	osuro 1		C0	LUN 0	LUN 0		
Configure Network	Capacity:	6.0 TB (5587.9 GiB)	usure i		C1	LUN 0	LUN 0		
Quick Start	Type			Host		_			ccess
Technical Support									
Log Off		Default Access (default	behaviour for new ini	tiators)				None	
Log On	IGe iSCSI	Host 'LIMNIC iqn. 1991-05	5.com.microsoft:limr	iic'				None	
	IGe iSCSI	Host #1 (1Ge iSCSI) iqn.	1991-05.com.micros	soft:fibertest8				None	
	1Ge iSCSI Host #2 (1Ge iSCSI) iqn.1991-05.com.microsoft:raghuwin200332bit							None	
	Fibre         Host 'MAC Port-1 10-00-06-2B-1A-8A-F8'							None	
	Fibre Host #5 (Fibre) WWPN: 21-FD-00-05-1E-0E-EA-B9     Read/Write     Read/Write								
	- Hore	Host #6 (Fibre) WWPN:	21-FD-00-05-1E-0F-	J/-6/				Read/Write	

#### Table 3-26: Configured Logical Volumes details

Column	Description
Volume LUN Mapping	Displays volume LUN mapping information: the LUN name and total capacity.
Туре	<ul> <li>Displays the kind of host link (Fibre/SAS/10GE or 1Ge iSCSI) and its status:</li> <li>green for connected</li> <li>yellow for connected but with no LUNs assigned</li> <li>gray for disconnected or offline.</li> </ul>
Host	Displays the host number or name, and its type and connection.
Access	Displays the kind of access the host has to the volume: <i>None</i> , <i>Read</i> , or <i>Read/Write</i> . You can change access on the <i>Host Access</i> page (see <u>Configure Host Access on</u> page 172).

You can create volumes on the *Add Volume* page (see <u>Create a Logical Volume on page 149</u>) and delete them on the *Delete Volume* page (see <u>Delete a Logical Volume on page 156</u>).

#### Volume Access Summary

If you click the **Click here to view volume access summary** link at the bottom of the main *Configured Logical Volumes* page, it takes you to a summary page that displays which hosts have access to which volumes.

Figure 3-27: Configured Logical Volumes access summary page

NEXSAN														1
Home	RAID	Drogroop	Valumas	Disk	Disk	Fibre	1Ge	Host	Volume	System				
RAID Information	Array	Flogless	volumes	Drives	Stats	Info	Info	Stats	Replicate	Nav				
System Information	4							RAI	) Informa	tion				(
Configure RAID	-						Con	figure	d Logica	Volumes				
Configure Volumes								traini	na volume	Operations	Sales	Technical Support	Engineering	Operations 2
Configure Host Access		Туре			He	ost			0	0	0	0	0	0
Power Settings			Dofault	Accoss	ofault hoh	aviour for n	ow initiatore)							
System Admin			Delaun	Access (c	elault bell	aviour for fi	iew initiators)							
Configure Network								(	Other Hosts					
	01	IGe iSCSI	Host 'Ll	MNIC iqn.1	991-05.co	m.microso	oft:limnic'							
Quick Start	01	IGe iSCSI	Host #2	Host #2 (1Ge iSCSI) ign.1991-05.com.microsoft:wil										
Technical Support	01	IGe iSCSI	Host #3 (1Ge iSCSI) iqn.1991-05.com.microsoft:ho											
	0	Fibre	Host 'M	AC Port-1	10-00-00-0	)6-2B-1A-8	BA-F8'							
Log Off	🔴 F	ibre	Host #5	(Fibre) W	WPN: 21-	-D-00-05-1	E-0E-EA-B9		0	0	0	0	0	0
	) 🔘 F	ibre	Host #6	(Fibre) W	WPN: 21-	FD-00-05-1	E-0F-07-67			0	0	0	0	0

There are columns for *Type*, *Host*, and each configured volume in the system. There are rows for *Default Access*, *Groups* (if any), and each Host connection.

The icons in the volume columns indicate the access privileges each host has to that volume, as described in the following table.

Table 3-28: Status icons

lcon	Description
-	No icon indicates no access.
۲	A green icon on a gray background indicates Read/Write access.
۲	An amber icon on a gray background indicates Read/Write access, but the host is not connected to a port with a logical unit number (LUN) mapping.
$\bigcirc$	A gray icon on a gray background indicates Read/Write access, but that the host is dis- connected or offline.
۲	A green icon on a green background indicates Read Only access.
0	An amber icon on a green background indicates Read Only access, but the host is not con- nected to a port with a logical unit number (LUN) mapping.
$\bigcirc$	A gray icon on a green background indicates Read Only access, but that the host is dis- connected or offline.

Clicking the gray arrow button on the left takes you back to the main Configured Logical Volumes page.

## **Detailed Volume Layout**

Clicking the **Click here to view detailed volume layout** link at the bottom of the *Configured Logical Volumes* page takes you to this page, which shows the free space left in each array (if any), the size of each volume, the percentage of the total array that the volume takes up, and the volume's relative position within the array.



Figure 3-29: Configured Logical Volumes detailed layout page

The information sections are arranged by array. Each array's section displays a status icon, the array name, the array number, the controller number, the total capacity, and a list of any free areas in the array (see <u>RAID Array Information on page 72</u> for more information). If there is no free space in the array, a message displays in place of the list.

Below each array's information section are sections for each volume in the array. These display the following information:

Table 3-30: Volume information

Label	Description
Title bar	The volume ID, volume number, array name, and array number.
Volume name	The user-defined name of the volume.
Volume capacity	Displays the total data storage space of the array, in megabytes (MB), true gigabytes (GB), and binary gigabytes (GiB).

Label	Description
% of total array	Displays the percentage of the array capacity that this volume uses.
Used capacity	Displays the amount of the total volume capacity that is taken up by data. This item is only displayed for arrays that have advanced features enabled (see <u>Create a new RAID array on page 122</u> ).
Number of bad blocks	Displays the number of blocks in the volume that cannot be read or written to because of disk media errors.
LUN Mapping	Displays a link: <b>Click to view</b> . Clicking the link takes you to the volume's detail page.
Volume serial number	Displays the volume's unique serial number.
Volume created	Displays the date and time that the volume was created, formatted as "Day of Week DD-Mon-YYYY HH:MM".

The darker area below the listed items displays the name of the array that the volume belongs to, the controller number, and the volume capacity.

The bottom area contains a bar which represents the percentage of the array's capacity that the volume uses, as well as the volume's relative position within the array.

## **Disk Information**

Clicking **RAID Information > Disk Drives** takes you to the *Disk Information* page, which shows all of the disk drives in the system and displays information about each disk. On E-Series systems, this information is organized by drawer (*Pod 0, Pod 1,* etc.).

EXSAN		
Home RAID Information	RAID Progress Volumes Disk Disk Fibre 1Ge Host Volume System Array Stats Info Info Stats Replicate Nav	
System Information	RAID Information	
Configure RAID	Disk Information	
Configure Volumes	F60	
configure Host Access	Enclosure 0 : Nexsan E60	
Power Settings	Disk Status Details	
System Admin	Disk 1 Array MAID *1 (C)) active Serial: 54MPL35N01 Firmware: A5D0	Beacon
Quick Start	Disk 2 Array MAID *1 Model: HUS156060VLS600 Capacity: 600127 MB Type: SAS 15030 RPM Serial: 54MPL35N02 Firmware: A5D0	Beacon
Technical Support	Disk 3 Array MAID *1 array MAID *1 array MAID *1 Serial: 54MPL35N03 Firmware: A5D0	Beacon
Log On	Disk 4 Array MALD Kodel: HUS156060VLS600 Capacity: 600127 MB Type: SAS 15030 RPM Serial: 54MPL35N04 Firmware: A5D0	Beacon
	Disk 5 Array MALD Kodel: HUS156060VLS600 Capacity: 600127 MB Type: SAS 15030 RPM Serial: 54MPL35N05 Firmware: A5D0	Beacon
	Disk 6 Array MALD	Beacon
	Disk 7 Array MALD *1 active Serial: 54MPL35N07 Firmware: A5D0	Beacon
	Disk 8 Array MALD #1 Biologiactive Serial: 54MPL35N08 Firmware: A5D0	Beacon
	Disk 9 Array MALD	Beacon
	Disk 10 Array MAID #1 array MAID (co) active Serial: 54MPL35N10 Firmware: A5D0	Beacon
	Disk 11 Array MAID =1 array MAID =1 array MAID =1 array MAID =1 array MAID Serial: 54MPL35N11 Firmware: A5D0	Beacon
	Disk 12 Array MAID *1 array MAID *	Beacon
	Disk 13 #1 Array MAID Model: HUS156060VLS600 Capacity: 600127 MB Type: SAS 15030 RPM	Beacon

Figure 3-31: Disk Information page

Table 3-32: Disk information classes

Column	Description
Disk	Displays the disk number and a disk icon. Clicking the disk icon takes you to a detail page for that disk (see <u>Disk Information Detail Page on page 85</u> ).
Status	Displays the array that the disk belongs to, the controller number, and the AutoMAID status of the disk (see <u>Power Settings on page 188</u> ).
Details	<ul> <li>Lists the following information:</li> <li><i>Model</i> is the manufacturer's model number for the drive.</li> <li><i>Capacity</i> is the raw data storage capacity of the drive, in megabytes (MB).</li> <li><i>Serial Number</i> is the manufacturer's serial number for the drive.</li> <li><i>Firmware</i> is the firmware that the drive is currently running.</li> </ul>

The **Beacon** button, on the far right of each disk's row, causes the status LED for that disk to blink. This makes it easier to find a specific disk in the storage system. The disk status LEDs are located immediately

next to each disk in the storage system. For specific LED locations and other information, see the Nexsan Storage System *Installation Guide*.

The disk icon indicates the disk's type and state.

Table 3-33: Disk icons

Disk icon			State	Description
			Disk not present	A grayed out icon with a grayed out status bar indic- ates that no drive is installed in that slot.
	SAS	SSD	Disk not configured	A gray status bar indicates that the drive is func- tioning, but is not assigned to an array and is not des- ignated as a spare.
	SAS	SSD	Array disk, functioning normally	A green status bar indicates that the drive is func- tioning and is part of a array (see <u>RAID Array Inform- ation on page 72</u> ). The text below it indicates which array it belongs to and which RAID Controller owns that array.
	SAS	SSD	Spare disk	A blue status bar indicates that the drive is functioning and is designated as a spare, which will be used to rebuild arrays when other drives fail (see <u>Add Hot</u> <u>Spare on page 134</u> , <u>Delete Hot Spare on page 136</u> , and <u>Configure Hot Spare Mode on page 140</u> ). The text below it indicates whether it is a "Pool Spare" (which can be used by any array) or a dedicated spare (assigned to a specific array).
Zzz	SAS		Disk idle	A green "Zzz" on a disk icon indicates that the drive is in low-power mode (see <u>Power Settings on</u> <u>page 188</u> ). This does not apply to SSD disks.
	SAS	55D	Disk inaccessible	A red status bar indicates that the drive is functioning, but the array to which it belongs is currently inac- cessible.
	SAS	55D	Disk in critical array	A status bar alternating amber and red indicates that the drive is functioning, but is part of a array that is in a critical state (see <u>RAID Information on page 71</u> ).
	SAS	88D	Disk failed	A red icon with a flashing red status bar indicates that the drive has failed.
	SAS)	SSD	Spare added to array	A "filling" green status bar indicates that this disk was a spare, but is being added to the array. Data from the missing drive is being rebuilt and saved onto this disk.

Disk icon			State	Description
	SAS	SSD	Disk being retired	An "emptying" green status bar indicates that this disk is being retired. Data from this drive is being rebuilt and saved onto a spare disk.
	SAS	SSD	Disk retired	A flashing red status bar indicates that the disk has been retired. A retired disk cannot be added to an array or added as a spare disk.
	SAS	SSD	Array rebuilding	A status bar alternating green and amber indicates that the drive is functioning and is part of a array that is being rebuilt.
	SAS	SSD	Disk locked	An orange icon with a flashing red status bar indic- ates that the drive is locked and cannot be used. Locked disks are disks that previously belonged to an encrypted array (see <u>Configure Array Encryption on</u> <u>page 127</u> ), but that were moved from one Nexsan Storage System to another without first being decryp- ted. Uploading the proper encryption key unlocks the disks. Access to the drives can be restored by upload- ing the exported encryption key file(s). See <u>Download</u> & Upload System Settings on page 210.

When a disk's **Beacon** button is clicked, a message appears, letting you know that the disk status LED is blinking, and that this can be canceled by either removing the associated disk from the storage system or by clicking the **Beacon Off** button.

NEXSAN					
Home	RAID Progress	Volumes	Disk Disk Fibre	1Ge Host System	
RAID Information	Array	voidinea	Drives Stats Info	Info Stats Nav	
System Information				RAID Information	
Configure RAID				Disk Information	
Configure Volumes					
Configure Host Access			Disk LED will flas	sh until the disk is removed, or ur	til cancelled by the user
Power Settings					
System Admin				E60	
Configure Network	Disk	Status		Enclosure 0 : Nexsan E00 Detail:	
Quick Start	Pod 0				
Technical Support	Disk 1	Array #1 (C0) AAID	Model: HUS156060VLS600 Serial: 54MPL35N01	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
Log Off	Disk 2	Array #1 (C0) AAID	Model: HUS156060VLS600 Serial: 54MPL35N02	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon Off
	Disk 3	Array #1 (C0) MAID active	Model: HUS156060VLS600 Serial: 54MPL35N03	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	Disk 4	Array #1 (C0) MAID active	Model: HUS156060VLS600 Serial: 54MPL35N04	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	Disk 5	Array #1 (C0) AAID	Model: HUS156060VLS600 Serial: 54MPL35N05	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	Disk 6	Array #1 (C0) AAID	Model: HUS156060VLS600 Serial: 54MPL35N06	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	Disk 7	Array #1 (C0) AAID	Model: HUS156060VLS600 Serial: 54MPL35N07	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	Disk 8	Array #1 (C0) MAID	Model: HUS156060VLS600 Serial: 54MPL35N08	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	Disk 9	Array #1 (C0) MAID	Model: HUS156060VLS600 Serial: 54MPL35N09	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	Disk 1	0 Array MAID #1 (CO) active	Model: HUS156060VLS600 Serial: 54MPL35N10	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon
	SAS Disk 1	1 Array MAID #1 active	Model: HUS156060VLS600 Serial: 54MPL35N11	Capacity: 600127 MB Type: SAS 15030 Firmware: A5D0	RPM Beacon

Figure 3-34: *Disk Information* page with beacon message and **Beacon Off** button displayed

Clicking the **Beacon Off** button stops the disk status LED blinking.

Figure 3-35: Disk Information page with beacon disabled message displayed

NEXSAN		
Home RAID Information	RAID Progress Volumes Disk Fibre 1Ge Host System Array Progress Volumes Stats Info Info Stats Nav	
System Information Configure RAID	RAID Information Disk Information	
Configure Host Access Power Settings	Disk LED beaconing disabled	
System Admin Configure Network	E60 Enclosure 0 : Nexsan E60 Disk Status Details	
Quick Start Technical Support	Pod 0 Array MALD Array MALD Model: HUS156060VLS600 Capacity: 600127 MB Type: SAS 15030 RPM Firmware: A500	Beacon
Log Off	Disk 2 Artis MAILD (C) active Serial: 54MPL35002 Firmware: A5D0	Beacon
	Oisk 3         Oracle         HUS156060VLS80         Capacity: 600127 MB         Type: SAS 15030 RPM           (co)         arav         AdMPL3SN03         Firmware: 4500           Disk 4         fill         Model: HUS156060VLS800         Capacity: 600127 MB         Type: SAS 15030 RPM	Beacon
	Image: Conjunction         Array & errial: 54MPL35N04         Firmware: A5D0           Disk 5         Array & arra	Beacon
	Disk 6         Array (C) (C) (C)         Model: HUS156060VLS600         Capacity: 600127 MB         Type: SAS 15030 RPM           Serial: 54MPL35N06         Firmware: A5D0           Model: HUS156060VLS600         Capacity: 600127 MB         Type: SAS 15030 RPM	Beacon
	Disk (         c1 active         Serial: 54MPL35N07         Firmware: A5D0           Image: Serial: 54MPL35N07         Firmware: A5D0         Model: HUS156060VL560         Capacity: 600127 MB Type: SAS 15030 RPM           Image: Serial: 54MPL35N08         Firmware: A5D0         Firmware: A5D0         Firmware: A5D0	Beacon

3

#### **Disk Information Detail Page**

When you click a disk icon on the *Disk Information* page or an information icon on the *Disk Statistics* page (see <u>Disk Statistics on page 87</u>), you are taken to the detail page for that particular disk.

Figure 3-36: Disk Information detail page (SATA and SAS disks)



Figure 3-37: Disk Information detail page (SSD disks)



#### The following information displays:

Table 3-38: Disk Information details

Label	Description
Status	Displays the array that the disk belongs to, the controller number, and the status icon.
Capacity	Displays the raw data storage capacity of the drive, in megabytes (MB).
Туре	Displays the drive type (SAS, SATA, or SSD) and it's speed in revolutions per minute (RPMs).
Model	Displays the manufacturer's model number for the drive.
Serial number	Displays the manufacturer's serial number for the drive.
Firmware	Displays the firmware that the drive is currently running.
Read IOs	Displays the number of reads executed on the drive because of array access by attached hosts.
Write IOs	Displays the number of writes executed on the drive because of array access by attached hosts.
Other IOs	Displays the number of disk input/output operations (I/Os) executed on the drive that are not because of array access, but are directly from the RAID Controller.
R/W Transfer Retries	Displays the number of times that the RAID Controller has had to retry a read or write operation on a block of data on this drive due to data transfer problems.
R/W Media Retries	Displays the number of times that the RAID Controller has had to retry a read or write operation on a block of data on this drive due to disk media problems.
Disk Health	Displays the disk responsiveness score (see <u>Disk Statistics</u> on the facing page) and the percentage of disk life remaining (for SSD disks).
AutoMAID status	Displays the current AutoMAID level of the disk, if any (see <u>Power Settings on</u> page 188).
Qualified by	Shows who qualified the drive for use in Nexsan Storage Systems. If the disk is unqualified, this row is not displayed.
Encryption	Displays the encryption status of the disk: <i>Encrypted</i> , <i>Disabled</i> , or <i>Not supported</i> .

Clicking **Previous** or **Next** takes you to other disk's detail pages.

3

# **Disk Statistics**

Clicking **RAID Information > Disk Stats** takes you to the *Disk Statistics* page, which displays data on how often individual disks have been accessed and how many retries have been performed in data recovery attempts. On E-Series systems, this information is organized by drawer (*Pod 0, Pod 1*, etc.).

<b>NEXSAN</b>										
Home	PAID		Diak	Diak Eibra 10	la Haat Val	umo Sustam				
RAID Information	Array Progress	Volumes	Drives	Stats Info Inf	fo Stats Rep	licate Nav				
System Information					DAID Infe	rmation				6
Configure RAID		Child Information								
Configure Volumes										
Configure Host Access					E60_4	1.200 Novean E60				
Somigure Host Access	Dis	k		IOs	Linciosure 0.	Transf	er Retries	Med	lia Retries	
Power Settings	Numl	ber	Read	Write	Others	Read	Write	Read	Write	Disk Health
System Admin	Pod 0									
Configure Network	Disk1 (C0)	0	3	12035628	383712	0	0	0	0	1.00 (100%)
Quick Start	Disk2 (C0)	0	0	12036551	383481	0	0	0	0	1.00 (100%)
Technical Support	Disk3 (C0)	0	3	12034587	383464	0	0	0	0	1.00 (100%)
Log Off	Disk4 (C0)	0	0	12039750	383458	0	0	0	0	1.00 (100%)
Log Oli	Disk5 (C1)	0	3	10589107	2085	0	0	0	0	1.00
	Disk6 (C1)	0	0	10591102	2069	0	0	0	0	1.00
	Disk7 (C1)	0	3	10588361	2063	0	0	0	0	1.00
	Disk8 (C1)	0	0	10591562	2063	0	0	0	0	1.00
	Disk9 (C0)	0	6	12410441	2078	0	0	0	0	1.00
	Disk10 (C0)	0	1	12408985	2083	0	0	0	0	1.00
	Disk11 (C0)		5	12411960	2079	0	0	0	0	1.00
	Disk12 (C0)		1	12411882	2069	0	0	0	0	1.00
	Disk13 (C0)	0	5	12412723	2348	0	0	0	0	1.00
	Disk14 (C0)	0	1	12410092	2345	0	0	0	0	1.00
	Disk15 (C0)	•	4	12412503	2354	0	0	0	0	1.00
	Disk16 (C0)		0	12411277	2341	0	0	0	0	1.00
	Disk17 (C1)	0	3	10590304	2074	0	0	0	0	1.00
	Disk18 (C1)	0	1	10589602	2075	0	0	0	0	1.00
	Disk19 (C1)	0	5	10589628	2078	0	0	0	0	1.00
	Disk20 (C1)		1	10589543	2078	0	0	0	0	1.00
	Pod 1									

Figure 3-39: Disk Statistics page

#### Table 3-40: Disk statistics

Column	Description
Disk Num- ber	Displays the disk number, the controller to which it belongs, and an information icon. Hover the mouse over the information icon for a pop-up dialog that displays that disk's information. Click the icon to be taken to that disk's detail page (see <u>Disk Information Detail Page on page 85</u> ).
IOs	<ul> <li>Displays the number of input/output operations performed on the disk in the following categories:</li> <li><i>Read</i> indicates the number of times the drive has been read because of host array access.</li> </ul>
	• <i>Write</i> indicates the number of times the drive has been written to because of host array access.
	• Others indicates the number of times that the drive has been accessed by the RAID Controller directly. Examples include array creation, array rebuilds, and verifications.

Column	Description
Transfer Retries	Displays the number of times (for <i>Read</i> and <i>Write</i> operations, respectively) that the RAID Controller has had to retry an I/O operation due to data transfer problems.
Media Retries	Displays the number of times (for <i>Read</i> and <i>Write</i> operations, respectively) that the RAID Controller has had to retry an I/O operation due to disk media problems.
Disk Health	Displays a numerical assessment of each drive's performance based on command com- pletion times aggregated over time. For SSD drives, it also displays the percentage of expected disk life left.

## **Fibre Channel Information**

Clicking **RAID Information > Fibre Info** takes you to the *Fibre Channel Information* page, which provides an information summary for each Fibre Channel port on each RAID Controller in the system.

For a system with four Fibre Channel ports per controller, the Fibre Channel Information page looks like this:

Figure 3-41: Fibre Channel Information page (for storage systems with four ports per controller)

NEXSAN									ALL OK
Home	RAID Progress	Volumes Di:	k Disk Fibre 1G	e Host Volume System					
RAID Information	Array	Driv	es Stats Info Info	o Stats Replicate Nav					
System Information				RAID Information					
Configure RAID				Fibre Information					
Configure Volumes	Contr	oller 0	Fibre - Host 0	Fibre - Host 1	Fibre - Ho	ost 2		Fibre - Host 3	
Configure Host Access	Port status		Link up at 16Gbit (P2P)	Link up at 16Gbit (P2P)	Link Down		Link D	own	
Configure Host Access	Port name		50-00-40-20-01-C7-11-0D	50-00-40-21-01-C7-11-0D	50-00-40-22-01-C7	7-11-0D	50-00-	40-23-01-C7-11-0D	
Power Settings	Node name		20-01-00-04-02-C7-11-0D	20-01-00-04-02-C7-11-0D	20-01-00-04-02-C7	7-11-0D	20-01-	00-04-02-C7-11-0D	
Custom Admin	Topology		P2P, N-port	P2P, N-port	Loop Down		Loop D	own	
System Admin	Loop ID		?(N.A)	?(N.A)	? (Loop Down)		? (Loo	Down)	
Configure Network	Port ID		00-00-EF	00-00-EF	Loop Down		Loop D	own	
	Link speed		16Gbit	16Gbit	Loop Down		Loop D	lown	
Quick Start Technical Support	SFP information	on	16G LC AVAGO AC1550J046B	16G LC AVAGO AA1516J6GN3	16G LC AVAGO AA1516J6	G82	SFP offline		
1									
Log Oil	Contr	oller 1	Fibre - Host 0	Fibre - Host 1	Fibre - Ho	ost 2	1	Fibre - Host 3	
	Port status		Link up at 16Gbit (P2P)	Link up at 16Gbit (P2P)	Link Down Li		Link D	Link Down	
	Port name		50-00-40-26-01-C7-11-0D	50-00-40-27-01-C7-11-0D	50-00-40-28-01-C7-11-0D 5		50-00-	40-29-01-C7-11-0D	
	Node name		20-01-00-04-02-C7-11-0D	20-01-00-04-02-C7-11-0D	20-01-00-04-02-C7-11-0D 20-01-00-04		00-04-02-C7-11-0D		
	Topology		P2P, N-port	P2P, N-port	Loop Down		Loop D	lown	
	Loop ID		?(N.A)	?(N.A)	? (Loop Down)		? (Loo	Down)	
	Port ID		00-00-EF	00-00-EF	Loop Down		Loop D		
	Link speed		16Gbit	16Gbit	Loop Down		Loop D	lown	
	SFP information	on	16G LC AVAGO AA1516J6GRS	16G LC 16G LC 16G LC AVAGO AA1516J6G8A AVAGO AA1516J6GLF			SFP offline		
	2 N			Click to view port statistics					
	Status	Port ID		Host Name	HO	Controller	)	Controller 1	ц2
	Eibro	00.00 50	Hast #7 (Eibra) WW/DN: 10.00	00.00 EA 8E 71 2D	nu				
	- Fibro	00-00-E0	Host #2 (Fibre) WWPN, 10-00	00 00 EA 9E 0P 27	0	000	0		0
	Fibro	00-00-28	Host #9 (Fibre) WWPN: 10-00	-00-50-1 A-0E-9D-37		000	0		0
	Fibre	00-00-28	Heat #10 (Fibre) WW/PN: 10-00	-00-30-1 A-0E-3D-30		000	0		0
	Fibre	-	Host #10 (FIDRE) WWWPN: 10-0	0-00-50-FA-6E-79-2C	0	000	0		0
	Fibre	-	Host #11 (Fibre) WWPN: 10-0	0-00-90-FA-0E-79-2D	0		0		0
	UDre 🖉	00-00-E8	nost #12 (Fibre) WWPN: 10-0	U-UU-9U-FA-0E-11-3C	0		0		0

The Fibre information is arranged by controller and host port. For each, the following information displays: Table 3-42: Fibre Channel Information

Label	Description
Port status	Displays the status of the Fibre Channel Loop, either up or down. It also displays the loop speed in gigabits per second (Gb/s).
Port name	The World Wide Port Name (WWPN) of the Fibre Channel port.
Node name	The World Wide Node Name (WWNN) of the Fibre Channel node. This is the address of the Nexsan Storage System, which is able to support multiple ports.
Topology	Displays the current Fibre Channel topology, either Loop or Point-to-Point (P2P). It also indicates whether the topology is full-fabric.
Loop ID	Shows the loop address if the port is in loop mode.
Port ID	Shows the ID if the port is in point-to-point mode.
Link speed	Shows the current Fibre Channel link speed in gigabits per second (Gb/s).
SFP Information	Displays the make and model of the installed SFPs (see your Nexsan Storage System <i>Installation Guide</i> for more information).

For port statistics information about the volume of transmitted and received data per port and controller, refer to <u>Port Statistics on page 106</u>.

Table 3-43: Fibre Channel Host Connectivity

Label	Description					
Status	Icons indicate the following host states:					
	0	Green indicates that the host is connected.				
	0	Gray indicates that the host is not connected or is offline.				
	0	Amber indicates that the host is connected, but no volumes have been mapped to it.				
	۲	Red indicates that the host is on a failed RAID Controller.				
Port ID	Displays the port ID for connected hosts.					
Host Name	Displays the page 184).	default or user-configured name of the host (see <u>Manage Hosts on</u>				
Controller	The <i>Controlle</i> to. There are controllers) o on that RAID	er columns show which host ports on which controllers the host is connected two Controller columns, which are subdivided into $H0$ and $H1$ (for two-port r $H0$ , $H1$ , $H2$ , and $H3$ (for four-port controllers), indicating the specific port Controller.				

## **SAS** Information

If your Nexsan Storage System is configured for SAS-to-Host connectivity, clicking **RAID Information > SAS Info** takes you to the *SAS Information* page, which provides an information summary for each SAS-to-Host port on each RAID Controller in the system.

On systems with four SAS ports per controller, the SAS Information page looks like this:

Figure 3-44: SAS Information page (for storage systems with four ports per controller)

NEXSAN					JALL O
Home	RAID Progress Volumes	Disk Disk SAS 1Ge	Host Volume System	1	
RAID Information	Array	Drives Stats Info Info	Stats Replicate Nav		
System Information					
Configure RAID			SAS Information		
Configure Volumes	Controller 0	Host 0	Host 1	Host 2	Host 3
Configure Host Access	SAS Port ID	50-00-40-20-04-DF-42-B0	50-00-40-21-04-DF-42-B4	50-00-40-22-04-DF-42-C0	50-00-40-23-04-DF-42-C4
Power Settings	SAS Node Name	20-04-00-04-02-DF-42-3F	20-04-00-04-02-DF-42-3F	20-04-00-04-02-DF-42-3F	20-04-00-04-02-DF-42-3F
r ower oeungs	Link Speed	6Gbit (4 lanes)	6Gbit (4 lanes)	6Gbit (4 lanes)	6Gbit (4 lanes)
System Admin	Phy 0 Status	Up	Up	Up	Up
Configure Network	Phy 1 Status	Up	Up	Up	Up
	Phy 2 Status	Up	Up	Up	Up
Quick Start	Phy 3 Status	Up	Up	Up	Up
Technical Support	Controller 1	Host 0	Host 1	Host 2	Host 3
1.00.08	SAS Port ID	50-00-40-20-04-DF-42-D0	50-00-40-21-04-DF-42-D4	50-00-40-22-04-DF-42-E0	50-00-40-23-04-DF-42-E4
Log Oli	SAS Node Name	20-04-00-04-02-DF-42-3F	20-04-00-04-02-DF-42-3F	20-04-00-04-02-DF-42-3F	20-04-00-04-02-DF-42-3F
	Link Speed	6Gbit (4 lanes)	6Gbit (4 lanes)	6Gbit (4 lanes)	6Gbit (4 lanes)
	Phy 0 Status	Up	Up	Up	Up
	Phy 1 Status	Up	Up	Up	Up
	Phy 2 Status	Up	Up	Up	Up
	Phy 3 Status	Up	Up	Up	Up
	Charters	_	Heat Name	Controlle	r 0 Controller 1
	Status		Host Name	H0 H1 H2	2 H3 H0 H1 H2 H3
	SAS Host #3 (SA)	AS) 50-06-05-B0-03-5A-81-F0			
	SAS Host #4 (SA	AS) 50-06-05-B0-03-5A-83-F0			

The information is arranged by controller and host port. For each, the following information displays: Table 3-45: SAS Information

Label	Description
SAS Port ID	The World Wide Port Name (WWPN) of the SAS port.
SAS Node Name	The World Wide Node Name (WWNN) of the SAS node. This is the address of the Nexsan Storage System, which is able to support multiple ports.
Link Speed	Shows the current SAS link speed in gigabits per second (Gb/s) and the number of operating lanes. If the link is not operating, displays <i>Port Down</i> .
Phy <i>N</i> Status	Displays the status of each physical SAS connection, either Up, Down, or Disabled.

The settings, display only at the bottom of the page, can be configured or changed on the *Configure SAS* page (see <u>Configure SAS</u> on page 174).

For Fibre Channel Host Connectivity, see Fibre Channel Host Connectivity on page 89.

#### 10Ge iSCSI Information

If your Nexsan Storage System is configured for 10Gb Ethernet iSCSI connectivity, clicking **RAID** Information > 10Ge Info takes you to the 10Ge-iSCSI Information page, which provides an information summary for each 10Gb Ethernet iSCSI port on each RAID Controller in the system. To configure the host connectivity settings, refer to Configure 10Ge iSCSI on page 175.

On Nexsan Storage Systems with four 10Ge iSCSI ports per controller, the *10Ge-iSCSI Information* page looks like this:

Home	RAID	Disk Disk 10Ge 10	Se Host Volume			
RAID Information	Array Progress Volumes	Drives Stats Info Int	fo Stats Replicate			
system Information			<b>RAID Information</b>			
Configure RAID			10Ge-iSCSI Information	1		
Configure Volumes	Controller 0	10Ge-iSCSI - Host 0	10Ge-iSCSI - Host 1	10Ge-iSCSI - Host 2	10Ge-iSCSI - Host 3	
0	Port status	Link up at 10Gbit Full Duplex	Link Down	Link Down	Link Down	
gure Host Access	Port mode	10Gbit Full Duplex	10Gbit Full Duplex	10Gbit Full Duplex	10Gbit Full Duplex	
Power Settings	Ethernet address	00-04-02-C3-D0-68	00-04-02-C3-D0-69	00-04-02-C3-D0-6A	00-04-02-C3-D0-6B	
System Admin	SFP information	10G Cu Pt CISCO-MOLEX	SFP offline	SFP offline	SFP offline	
Configure Network		MOC 16341039				
	nostname	NAS-0109304D-0-H0	NAS-0109304D-0-H1	NAS-0109304D-0-H2	NAS-0109304D-0-H3	
Quick Start	Target name	rxs-b01-000:05030024	rxs-b01-000:05030024	nxs-b01-000:05030024	nxs-b01-000:05030024	
echnical Support	TCP port	3260	3260	3260	3260	
Log Off	IPv4 mode	Static IP	Static IP	Static IP	Static IP	
203 011	IP address	10.11.11.45	10.11.11.46	10.11.11.47	10.11.50.48	
	Subnet mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	
	Gateway					
	IPv6 mode	Disabled	Disabled	Disabled	Disabled	
	IP address					
	Prefix					
	Gateway					
	Controller 1	10Ge iSCSL Host 0	10Ge iSCSL Host 1	10Ge iSCSL Host 2	10Ge iSC SL Host 3	
	Port status	Link up at 10Chit Full Duplay	Link Down	Link Down	Link Down	
	Port mode	10Chit Full Duplex	10Chit Full Duplay	10Chit Full Duploy	10Chit Full Duplay	
	Ethernet address	00.04.02.C2.10.49	00.04.02.C2.10.40	00.04.02.02.10.00	00.04.02.C2.10.AP	
	SFP information	10G Cu Pt CISCO-MOLEX MOC15036196	10G LC AVAGO AC2116P0183	SFP offline	SFP offline	
	Hostname	NXS-0109304D-1-H0	NXS-0109304D-1-H1	NXS-0109304D-1-H2	NXS-0109304D-1-H3	
	Target name	iqn.1999-02.com.nexsan:h8: nxs-b01-000:05030024	iqn.1999-02.com.nexsan:h9: nxs-b01-000:05030024	iqn.1999-02.com.nexsan:h10: nxs-b01-000:05030024	iqn.1999-02.com.nexsan:h11: nxs-b01-000:05030024	
	TCP port	3260	3260	3260	3260	
	IPv4 mode	Static IP	Static IP	Static IP	Static IP	
	IP address	10.11.10.49	10.11.10.50	10.11.10.51	10.11.50.52	
	Subnet mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	
	Gateway					
	IPv6 mode	Disabled	Disabled	Disabled	Disabled	
	IP address					
	Prefix					
	Gateway					
			Click to view port statistics			

Figure 3-46: 10Ge iSCSI Information page

For port statistics information about the volume of transmitted and received data per port and controller, refer to <u>Port Statistics on page 106</u>.

The information is arranged by controller and host port. For each, the following information displays: Table 3-47: iSCSI Host Fields

Setting	Description
Port status	Displays the current speed and duplex setting for the port. If the port is not active, Link Down displays.
Port mode	Displays the speed and duplex configuration settings for the port, either auto- matic or fixed.
Ethernet address	Displays the physical Ethernet (MAC) address of the port.
Hostname	Displays the default or user-assigned host name of the port.
Target Name	Displays the name of the iSCSI target.
TCP port	Displays the TCP port that iSCSI is using. This is fixed at 3260.
IPv4 Mode	
IP address	Displays the current port IP address.
Subnet mask	Displays the current subnet mask.
Gateway	Displays the configured gateway IP address.
IPv6 mode	
IP address	Displays the current port IP address.
Prefix	Displays the network prefix of the IP address.
Gateway	Displays the configured gateway IP address.

Host connectivity details appear at the bottom of the iSCSI information page for the controllers and host ports:

Table 3-48: iSCSI Host Connectivity

lcon	Description					
Status	Icons indicate the following host states:					
	۲	Green indicates that the host is connected.				
	0	Gray indicates that the host is not connected or is offline.				
	0	Amber indicates that the host is connected, but no volumes have been mapped to it.				
	۲	Red indicates that the host is on a failed RAID Controller.				
Host Name	Displays the default or user-configured name of the host (see <u>Manage Hosts on</u> page 184).					
Config	Displays digest and CHAP authentication settings.					
Controller	Displays whic Controller col <i>N1</i> , <i>N2</i> , and <i>I</i> Controller.	ch host ports on which controllers the host is connected to. There are two lumns, which are subdivided into <i>N0</i> and <i>N1</i> (for two-port controllers) or <i>N0</i> , V3 (for four-port controllers), indicating the specific port on that RAID				

#### **1Ge iSCSI Information**

Clicking **RAID Information > 1Ge Info** takes you to the *1Ge iSCSI Information* page, which provides an information summary for each 1Ge iSCSI port on each RAID Controller in the system. To configure the host connectivity settings, refer to <u>Configure 1Ge iSCSI on page 178</u>.

On Nexsan Storage Systems with four active 1Ge iSCSI ports per controller, the 1Ge iSCSI Information page looks like this:



Figure 3-49: 1Ge iSCSI Information page

For port statistics information about the volume of transmitted and received data per port and controller, refer to Port Statistics on page 106.

The information is arranged by controller and host port. For each, the following information displays: Table 3-50: iSCSI Host Fields

Setting	Description
Port status	Displays the current speed and duplex setting for the port. If the port is not active, Link Down displays.
Port mode	Displays the speed and duplex configuration settings for the port, either automatic or fixed.
Ethernet address	Displays the physical Ethernet (MAC) address of the port.
Hostname	Displays the default or user-assigned host name of the port.
Target Name	Displays the name of the iSCSI target.
TCP port	Displays the TCP port that iSCSI is using. This is fixed at 3260.
IPv4 Mode	
IP address	Displays the current port IP address.
Subnet mask	Displays the current subnet mask.
Gateway	Displays the configured gateway IP address.
IPv6 mode	
IP address	Displays the current port IP address.
Prefix	Displays the network prefix of the IP address.
Gateway	Displays the configured gateway IP address.

Host connectivity details appear at the bottom of the iSCSI information page for the controllers and host ports. See <u>iSCSI Host Connectivity on page 93</u>.

## **Host Statistics**

Clicking **RAID Information > Host Status** takes you to the *Host Statistics* page, which displays I/O, block, and reset statistics for each host port.

NEXSAN								1
Home	PAID Disk	Diak Eibr	100	Jest Volumo	Sustam			
RAID Information	Array Progress Volumes Disk Drives	Stats Info	Info S	Stats Replicate	Nav			
System Information								
Configure RAID				Host statistics	on S			
Configure Volumes			10-			1		Decete
Configure Host Access	Controller 0	Read	Write	Others	Read	Write	Port	LUN
Power Cottings	Fibre - Host 0	39506315	39688866	8396	17369366905	17444408997	0	0
Fower Settings	Fibre - Host 1	0	0	0	0	0	0	0
System Admin	1Ge-iSCSI - Net 0	0	0	0	0	0	0	0
Orafining Mahurdi	1Ge-iSCSI - Net 1	0	0	0	0	0	0	0
Conligure Network	Rep-iSCSI - Net 0	0	0	0	0	0	0	0
Quick Start	Rep-iSCSI - Net 1	0	0	0	0	0	0	0
Technical Support			lOs		B	locks		Resets
Log Off	Controller	Read	Write	Others	Read	Write	Port	LUN
Log On	Fibre - Host 0	21480851	22054211	18064	9451200537	9705066970	0	0
	Fibre - Host 1	0	0	0	0	0	0	0
	1Ge-iSCSI - Net 0	0	0	0	0	0	0	0
	1Ge-iSCSI - Net 1	0	0	0	0	0	0	0
	Rep-iSCSI - Net 0	0	0	0	0	0	0	0
	Rep_iSCSL_Net 1	0	0	0	0	0	0	0

Figure 3-51: Host Statistics page

The information, described in the following table, is arranged by controller.

Table 3-52: Host statistics

Column	Description
Controller	Lists the host ports for each controller.
IOs	Displays the number of input/output operations (I/Os) performed through the port in the following categories:
	• <i>Read</i> indicates the number of times that a read operation has been performed through the port.
	• <i>Write</i> indicates the number of times that a write operation has been performed through the port.
	• <i>Others</i> indicates the number of times an I/O operation has been performed through the port. Examples include array creation, rebuilding, and verification.
Blocks	Displays the number of 512-byte data blocks that have been accessed by a <i>Read</i> or <i>Write</i> I/O operation through the host.
Resets	Displays the number of times that a logical unit ( <i>LUN</i> ) or a <i>Port</i> has been reset according to the host communication management protocol.

## **Replication Information**

Clicking **RAID Information > Volume Replicate** takes you to the *Replication Information* page, which displays outgoing and incoming replication information for the Nexsan Storage System.

**Note** For detailed information regarding the snapshots and replication features of Nexsan Storage Systems, see the *Nexsan High-Density Storage Snapshots and Replication User Guide*.

Outbound replications are displayed in the Outbound Replications section:

Figure 3-53: Replication Information page (with Outbound Replications section only)



The Outbound Replication section contains the following columns:

Table 3-54: Outbound Replication

Label	Description
Source Volume Details	Displays information for each configured volume on the storage system: the volume number, volume name, the <i>Array</i> to which it is assigned, the number of the <i>Controller</i> to which the array is assigned, the <i>Enclosure</i> on which the array resides, and the total <i>Capacity</i> of the volume.
Replication Status	<ul> <li>Displays one of the following:</li> <li>The message Not configured. OR</li> <li>The replication Status, the Replication partner, and the time and date of the Latest recovery point.</li> </ul>

#### If one or more inbound replications are configured, the Inbound Replications section displays:

Figure 3-55: Replication Information page (with Inbound Replications section)



#### The Inbound Replication section contains the following columns:

Table 3-56: Inbound replication

Label	Description
Replica Details	Displays the replica number, replica name, the <i>Array</i> to which it is assigned, the number of the <i>Controller</i> to which the RAID set is assigned, and the total <i>Capacity</i> of the replica.
Replication Status	Displays the replication <i>Status</i> , the <i>Replication partner</i> , and the time and date of the <i>Latest recovery point</i> .

Replications are configured on the *Replicate Logical Volumes* page (see <u>Replicate Logical Volumes on</u> page 164).

# System Information

Clicking **System Information** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-57: System Information navigation bar

System Info	Enviro Info	Network Info	Network Services	Problems	Event Log	Multi View	System Nav	Key
----------------	----------------	-----------------	---------------------	----------	--------------	---------------	---------------	-----

Refer to Table 3-58 for help with the Nexsan E-Series/BEAST system information firmware:

Table 3-58: System information pages

Nav bar button	GUI pages and documentation links
System Info	Summary Information on the next page
Enviro Info	Environmental Information on page 102
Network Info	Network Information on page 105
Network Services	Network Services on page 107
Problems	Summary of System Problems on page 111
Event Log	Event Log on page 112
Multi View	Multiple System View on page 118
System Nav	System Hierarchal View on page 119
Кеу	Icon Key on page 120

## Summary Information

Clicking **System Information** takes you to the *Summary Information* page, which displays information about the Nexsan Storage System.

NEXSAN			J <u>all ok</u>	
Home RAID Information	System Enviro Network Network Network Proble	ms Event Multi Log View Key		
System Information Configure RAID		System Information Summary Information		
Configure Volumes	Description		Information	
Configure Host Access	System	E60		
Power Settings	System ID	02BA104U		
Evistory Admin	System Mode	All Ports All LUNs		
System Admin	Active controllers			
Configure Network	Enclosure type	Rack, 4U		
Quick Start	Host fibre connection	2 x Dual 8Gbit fibre ports		
	Svetom Time	Z X Dual TGbit ISCSI ports		
Technical Support	Description	Controller 0	Controller 1	
Log Off	Controller status	Up (Master)	Up (Slave)	
	Controller up time	3 Days, 19 Hours, 46 Mins 15 Secs	3 Days, 19 Hours, 46 Mins 24 Secs	
	Firmware revision	Q011.1100.rc5	Q011.1100.rc5	
	Boot Loader revision	V10E	V10E	
	Emergency revision	Q001.1007	Q001.1007	
	Controller serial number	3X4MP135N01	3X4MP135N02	
	Cache	3840 MB, Enabled, Mirrored, FUA ignored	3840 MB, Enabled, Mirrored, FUA ignored	

Figure 3-59: Summary Information page

**Note** Only the information for the main Nexsan Storage System displays, not for the Nexsan Storage Expansion.

The displayed information includes the following:

Table 3-60: System Summary Information

Label	Description
System	The Nexsan Storage System family model (Nexsan BEAST, Nexsan E18, Nexsan E32, Nexsan E48, or Nexsan E60).
System ID	The storage system's unique system identifier.
System Mode	Displays the controller failover configuration.
Active Controllers	Displays the number of active RAID Controllers in the system.
Enclosure Type	Displays the physical attributes of the system, including its U-height.
Host fibre/SAS/10Ge iSCSI connection	Displays the configuration of the Fibre Channel, SAS-to-Host, or 10Ge iSCSI connection.
Host 1Ge iSCSI con- nection	Displays the configuration of the 1Ge iSCSI connection.
System Time	Displays the current date and time according to the storage system's internal clock.

Label	Description
Controller Status	Displays the current status of each RAID Controller (Up or Down) as well as which controller is primary ( <b>Master</b> or <b>Slave</b> ).
Controller up time	Displays the total amount of time that each RAID Controller has been run- ning continuously.
Firmware revision	Displays the firmware version that each RAID Controller is running.
Boot Loader revision	Displays the revision number of the boot loader.
Emergency revision	Displays the version number of code used for alternative system booting. Booting the system into Emergency mode enables you to upload a main firm- ware file if the main firmware gets corrupted during upload or if it contains a bug that prevents the normal uploading of new firmware. Refer to your <i>Nex-</i> <i>san Storage Systems FRU Removal and Replacement Guide</i> for details.
Controller serial number	Displays the serial number of each RAID Controller.
Cache	Indicates the total cache size in megabytes (MB), whether the cache is enabled, its mirroring status, its streaming mode, and its FUA status. Refer to <u>Configure Cache on page 198</u>

## **Environmental Information**

Clicking **System Information > Enviro Info** takes you to the *Environmental Information* page, which displays the values of various environmental sensors throughout the storage system. Each item displays its status (*OK* or *FAULT*) and related information, if any. The information is arranged by component, and different storage systems will display this information in different arrangements.

If one or more Nexsan Storage Expansions are attached to the Nexsan Storage System, a **Next Enclosure** > link displays at the top right of the screen. Click it to be taken to the *Environmental Information* page for the first storage expansion.

N <del>i</del> xsan					1
Home	System Enviro Network Network Network	oblame Event Multi Key			
RAID Information	Info Info Info Services Stats	Log View Key			
System Information		System Information			
Configure RAID		Environmental Information	tion		
Configure Volumes		CS E32D			
Conligure volumes		Enclosure 0 : Nexsan E3	2		
Configure Host Access			System Compo	onents	
Power Settings	Element	PSU 0	Status	PSU 1	Status
Custom Admin	State		OK		OK
System Admin	Temperature	33°C	OK	33°C	OK
Configure Network	Blower 0	RPM : 15248	OK	RPM : 15632	OK
Out-th Ct. 1	3V3 Current	0.13 Amp	OK	0.14 Amp	OK
QUICK Start	12V Current	12.93 Amp	OK	13.08 Amp	OK
Technical Support	PSU Power	191 Watts	UK	194 Watts	UK
Log Off	Element		Statue	Information	er i Statue
Log Oli	CPII rail voltage	1 18V	OK	1 181/	OK
	1V0 rail voltage	0.97V	OK	0.97	OK
	1V1 rail voltage	1.06V	OK	1.06V	OK
	1V2 rail voltage	1.18V	OK	1.18V	OK
	1V8 rail voltage	1.78V	OK	1.78	OK
	2V5 rail voltage	2.51V	OK	2.50V	OK
	3V3 rail voltage	3.31V	OK	3.33V	OK
	5V0 rail voltage	5.05V	OK	5.05V	OK
	12V rail voltage	12.06V	OK	12.12V	OK
	PCB temperature	30°C	OK	33°C	OK
	CPU temperature	52°C	OK	49°C	OK
	SAS temperature	46°C	ОК	44°C	ОК
	Battery status	Fully charged	ОК	Fully charged	ОК
	Element	Fan Tube	Status		
	Tomporaturo	25°C	Status		
	Power Paile ( 3V3 12V 12V 1)	3 30/ 12 25/ 12 12//	OK		
	Poer Fan 1	DDM: 0137	OK		
	Rear Fan 2	RPM- 13012	OK		
		Pod 0		Pod 1	_
	Element		Statue	Info	Statue
	Temperatures (PCB A & B)	36°C 36°C	OK 36°C	36°C	OK
	i competatures (i CD A & D)	A: 1 20V 3 43V	Δ· 1	19V 3 38V	ON
	Davies Dalla	B: 1.19V 3.43V	B: 1	.20V 3.41V	CH
	Power Rails	SHR: 3 39V 12 12V	OK SHR	2-3 35V 12 12V	OK

Figure 3-61: *Environmental Information* page (example)

#### For power supply units (*PSU 0* and *PSU 1*), the following information displays:

Table 3-62: Power supply unit Environmental Information

Label	Description
State	The overall status of the power supply unit
Temperature	The current temperature of the power supply unit
BlowerN	The current RPMs of the designated PSU fan
3V3/12V Current	The electrical current being supplied from each output of the PSU
PSU Power	The power of the PSU in Watts

# For RAID Controllers and Expansion Controllers (*Controller 0* and *Controller 1*), the following information displays:

Table 3-63: RAID Controller and Expansion Controller Environmental Information

Label	Description
CPU rail voltage	The voltage of the Controller's central processing unit (CPU).
XX rail voltage	The voltage of each rail in the Controller.
<b>Controller temperature</b> (Nexsan Storage Expansions only)	The current temperature of the Expansion Controller.
XX temperature	The current temperature of each component in the RAID Con- troller.
Battery status	The charge status of the cache battery.

For Nexsan E18 and Nexsan E32 Storage Systems, the following information for the Fan Tube displays:

Table 3-64: Nexsan E18 and Nexsan E32 fan tube Environmental Information

Label	Description
Temperature	The current temperature of the fan tube.
Power Rails (3V3 12V 12V_1)	The voltage of each rail in the fan tube.
Rear Fan 1/2	The current RPMs of the designated rear tube fan.

For Nexsan BEAST Storage Systems, the following information for the left, middle, and right sections of the drive bay (*Slice 0, Slice 1*, and *Slice 2*) displays:

Table 3-65: Nexsan BEAST drive bay Environment Information

Label	Description
Power Module A/B	The current status of the power modules.
Power Pod Internals	The current status of the power pod's internal components.
Temperatures (PCB A & B)	The current temperatures of the printed circuit boards.
Power Rails	The current voltages of the A, B, SHR, and STBY power rails.
Rear Fans	The current RPMs of the four rear fans for each slice.
Front Fans	The current RPMs of the front fan for each slice.

# For Nexsan E18, E18X, and E32 Storage Systems, the following information for the active drawers (*Pod N*) displays:

Table 3-66: Nexsan E32 and Nexsan E18/E18X active drawer Environmental Information

Label	Description
Temperatures (PCB A & B)	The current temperature of each printed circuit board (A and B) in the active drawer.
Power Rails	The voltage of each rail in the active drawer.
Rear Fans	The current RPMs of the fans in the back of the active drawer.
Front Fans	The current RPMs of the fans in the front of the active drawer.

For Nexsan E48/E48X and E60/E60X Storage Systems, the following information for the active drawers (*Pod N*) displays:

Table 3-67: Nexsan E48/E48X and Nexsan E60/E60X active drawer Environmental Information

Label	Description
Power Module A/B	The status of power modules A and B in the active drawer.
Power Pod Internals	The status of internal power components in the active drawer.
Temperatures (PCB A & B)	The current temperature of each printed circuit board (A and B) in the active drawer.
Power Rails	The voltage of each rail in the active drawer.
Rear Fans	The current RPMs of the fans in the back of the active drawer.
Front Fans	The current RPMs of the fans in the front of the active drawer.

If a *FAULT* occurs in a field-replaceable module, refer to the storage system's *FRU Removal and Replacement Guide* for instructions on how to replace the module. If a *FAULT* occurs in a component that is not field-replaceable, contact Technical Support for instructions (see Technical Support on page 235).

# **Network Information**

Clicking **System Information > Network Info** takes you to the *Network Information* page, which displays LAN information for both the management (Mgmt) network ports. This information is arranged by RAID Controller and then by port.

NEXSAN		ALLOK
Home	System Enviro Network Network Even	t Multi System
RAID Information	Info Info Info Services Log	View Nav Key
System Information		System Information
Configure RAID		Network Information
Configure Volumes	Controller 0	Management
Orafava HashAssas	Port status	Link up at 1Gbit Full Duplex
Conligure Host Access	Port mode	Auto Speed/Duplex
Power Settings	Ethernet address	00-04-02-C3-D0-67
System Admin	Hostname	NX5-0109304D-0
oyotomritaniin	IPv4 mode	Static IP
Configure Network	IP address Subpot mask	172.17.110.223
Quick Start	Gateway	200,200,00
Technical Support	DNS server	172.17.1.11 172.17.1.15
Log Off	IPv6 mode	Disabled
Log On	IP address	
	Prefix	
	Gateway	
	DNS server	***
	Controller 1	Management
	Port status	Link up at 1Gbit Full Duplex
	Port mode	Auto Speed/Duplex
	Ethernet address	00-04-02-C3-19-A7
	Hostname	NX5-0109304D-1
	IPv4 mode	Static IP 170 17 119 224
	F dutiess	172.17.110.224
	Gateway	200,200,00
	DNS server	172.17.1.11 172.17.1.15
	IPv6 mode	Disabled
	IP address	
	Prefix	
	Gateway	
	DNS server	
		Click to view port statistics

Figure 3-68: *Network Information* page (with two active Mgmt ports)

On some storage systems, there are four active Mgmt ports. Regardless of the storage system being examined, this page provides the same information about each port.

Table 3-69: Network Information

Label	Description
Port status	Displays the current speed and duplex setting for the port. If the port is not active, Link Down displays.
Port mode	Displays the speed and duplex configuration settings for the port, either auto- matic or fixed.
Ethernet address	Displays the physical Ethernet (MAC) address of the port.
Hostname	Displays the default or user-assigned host name of the port.

Label	Description	
IPv4 mode		
IP address	Displays the current port IP address.	
Subnet mask	Displays the current subnet mask.	
Gateway	Displays the configured gateway IP address.	
DNS server	Displays the IP address of the primary and secondary domain name service (DNS) servers. This setting only applies to the management port ( <b>Mgmt</b> ).	
IPv6 mode		
IP address	Displays the current port IP address.	
Prefix	Displays the network prefix of the IP address.	
Gateway	Displays the configured gateway IP address.	
DNS server	Displays the IP address of the primary and secondary domain name service (DNS) servers. This setting only applies to the management port ( <b>Mgmt</b> ).	

For port statistics information about the volume of transmitted and received data per port and controller, refer to <u>Port Statistics below</u>.

#### **Port Statistics**

Nexsan Storage Systems provide the following types of port statistics for each controller and port:

Figure 3-70: Port Statistics

Controller 0	Management
Transmitted bytes	761299892
Received bytes	2441492186
Transmitted packets	1067785
Received packets	29394492
Received multicast packets	28627022
Transmit errors	0
Receive errors	0
Controller 1	Management
Transmitted bytes	63947823
Received bytes	2361428383
Transmitted packets	261962
Received packets	28664401
Received multicast packets	28626644
Transmit errors	0
Receive errors	0

Table 3-71: Port statistics

Controller 0 or 1	Description
Transmitted bytes	The number of bytes transmitted by the port.
Received bytes	The number of bytes received by the port.

Controller 0 or 1	Description
Transmitted packets	The number of packets transmitted by the port.
Received packets	The number of packets received by the port.
Received multicast packets	The number of multicast packets received by the port.
Transmit errors	The number of transmission errors reported by the port.
Receive errors	The number of reception errors reported by the port.

The management port settings can be configured or changed on the *Configure Network Settings* page (see <u>Configure Network Settings on page 218</u>), and the settings for the iSCSI ports can be configured or changed on the *Configure 1Ge iSCSI* page (see <u>Configure 1Ge iSCSI</u> on page 178).

#### **Network Services**

Clicking **System Information > Network Services** takes you to the *Network Services* page, which provides information about various network and system services.

NEXSAN		J ALL OK
Home	System Enviro Network Network Network Problems Event	Multi Key
RAID Information	Into Into Into Services Stats Log	View
System Information		System Information
Configure RAID		Network Services
Configure Volumes		E-Alerts
Configure Host Access	Email server Sender email address	smtp.example.com MauveE48@Nexsan.com
Power Settings	Email subject format	FriendlyName Model (SysID) AlertType Event
System Admin	AutoStatusEmail for Recipient 1	Disabled
System Admin	Recipient email address 2 AutoStatueEmail for Recipient 2	storageadmin2@example.com
Configure Network	Recipient email address 3	storageadmin3@example.com
Quick Start	AutoStatusEmail for Recipient 3 Recipient email address 4	Disabled storageadmin4@example.com
Technical Support	AutoStatusEmail for Recipient 4	Disabled
Log Off	Friendly name Current emailer status	Mauve_E48P_1 Send queue is empty (Ready)
		SNMP Traps
	IP address 1 for SNMP traps IP address 2 for SNMP traps	
	Community String	public
	Trap version	1
	Test String	Test string
	when to send simile traps	Time Server
	Auto set time and date	Disabled
	Timer server protocol	SNTP
	Selected time server	172.17.1.11
	Daytime server date and time format	NA (SNIP selected)
	Retrieved daytime server data	No data reneved
	ADMIN account login	Password is not required
	USER account login	Password is not required
	GUI mode	Full GUI access
		SSL
		Controller 0 Certificate and key are valid
	SSL certificate	Controller 1 Certificate and key are valid
		CA : False, Common name : 172.17.118.101
	SSL mode	HTTPS and HTTP
	Minimum SSL version	TLSv1.2
	Management API (NMP) TI S	Optoaded certificate and key Not required
	in an agent of the first first	GUI Settings
	Webpage refresh	Enabled, refresh rate 30 secs
	Colored array text	Enabled
	Javascript enhancements	Enabled
	Javascript RAID icon info	Enabled
	Javascript hot tracking	Enabled
	Reduce scrolling by using submenus	Disabled
	reduce scroning by showing less into	L'isabicu

|--|

Use the following tables for help with *Network Services* page details.

#### **E-Alerts**

Table 3-73: E-Alerts

Label	Description
Email server	The IP address or DNS name of the SMTP email server.
Sender email address	The email address that alerts and statuses are sent from.
Email Subject format	The format for the subject line of sent emails.
Recipient email address N	The email addresses that alerts and statuses are sent to.
AutoStatusEmail for Recipient N	The frequency that automatic status updates are sent to the asso- ciated email address.
AutoStyleEmail for Recipient N	The format of automatic status updates sent to the associated email address. This is only displayed if <i>AutoStatusEmail for Recipient N</i> is something other than <i>Disabled</i> .
Network/Disk/RAID/Host/Misc/ App Alerts for N	The kinds of events ( <i>Errors</i> , <i>Warnings</i> , <i>Information</i> , or <i>System</i> ) for each category that are sent to the recipient. If no events in a particular category are configured, the entry is not displayed.
Friendly name	The user-defined "friendly" name of the system.
Current emailer status	Indicates how many emails are queued to be sent.

E-Alerts are sent from the management port. E-Alert settings are configured on the *E-Alert Settings* page (see <u>E-Alert Settings on page 220</u>) except for *Friendly Name*, which is configured on the *Configure Enclosure* page (see <u>Configure Enclosures on page 202</u>).

# SNMP Traps

Table 3-74: SNMP Traps

Label	Description
IP address N for SNMP traps	The IP address that SNMP traps are sent to. One or two IP addresses can be specified.
Community string	The SNMP password. By default, this is <i>public</i> .
Trap version	The type of SNMP trap that is sent: SNMPv1 (abbreviated 1) or SNMPv2c (abbreviated 2 <i>c</i> ).
Test String	Text that is sent to test the SNMP trap.
When to send SNMP traps	Indicates when SNMP traps are sent: on errors; on warnings and errors; on information, warnings, and errors; or for all events. It can also be set to <i>Disabled</i> , meaning that no SNMP traps are sent.

3
SNMP trap settings are configured on the SNMP/SYSLOG Settings page (see SNMP/SYSLOG Settings on page 223).

Time Server

Table 3-75: Time Server

Label	Description
Auto set time and date	Indicates whether the time and date are configured to be automatically updated by a time server.
Time Server Protocol	The method by which the time server updates the storage system's time and date: <i>Daytime</i> or <i>SNTP</i> .
Selected time server	The IP address of the time server.
Daytime server date and time format	The date and time format used by the Daytime time server. Not applic- able if an SNTP time server is used.
Retrieved daytime server data	The retrieved data from the time server.

Time server settings are configured on the Configure Time and Date page (see Configure Time and Date on <u>page 225</u>).

#### Security

Table 3-76: Security

Label	Description
ADMIN account login	Indicates whether or not a password is required for the ADMIN account. If a password is required, but the default password has not been changed, the default password value <i>Password</i> displays.
USER account login	Indicates whether or not a password is required for the USER account. If a password is required, but the default password has not been changed, the default password value <i>Password</i> displays.
GUI mode	Indicates the current GUI restrictions. If there are none, <i>Full GUI access</i> displays.

Security settings are configured on the Password Configuration page (see Security on page 228).

SSL

Table 3-77: SSL

User Guide

Label	Description
SSL certificate	Indicates the type of SSL certificate currently in use, and also provides a download link for the current certificate.

Label	Description
SSL mode	Indicates what kinds of browser connections are allowed for the storage system: <i>HTTP only</i> , <i>HTTPS only</i> , or <i>HTTPS or HTTP</i> .
Minimum SSL version	Indicates the minimum SSL version set for the storage system.
Certificate mode	Indicates the current certificate mode.
Management API (NMP) TLS	Indicates the current NMP TLS setting.

SSL settings are configured on the SSL Configuration page (see <u>SSL Configuration on page 230</u>).

## **GUI** Settings

Table 3-78: GUI Settings

Label	Description
Webpage refresh	The current page auto-refresh setting.
Colored array text	Indicates whether different arrays are displayed with different colored text.
Javascript enhancements	Indicates whether JavaScript is currently being used in the GUI.
Javascript RAID icon info	Indicates whether JavaScript is being used for RAID icon help.
Javascript hot tracking	Indicates whether JavaScript is being used to highlight lines in tables when the mouse cursor is hovering over them.
Reduce scrolling by using sub- menus	Indicates whether optional submenus are being used in the GUI.
Reduce scrolling by showing less info	Indicates whether pages are displayed with reduced information.

Graphical user interface (GUI) settings are configured on the *GUI Settings* page (see <u>GUI Settings on</u> page 232).

# Summary of System Problems

Clicking **System Information > Problems**, the "Failure" indicator in the upper right corner of any page, or the **Problem Summary** button on the *Home* page takes you to the *Summary of System Problems* page, which displays a list of any current problems that the storage system is experiencing. When there are no problems, the *Summary of System Problems* page looks like this:

NEXSAN		<mark>√all ok</mark>
Home RAID Information	System Enviro Network Network Network Problems Event Multi Info Info Services Stats Log View	
System Information	System Information	(?)
Configure RAID	Summary of System Problems	•
Configure Volumes	Number	
Configure Host Access	There are no problems with this system	
Power Settings		
System Admin	Beacon	
Configure Network		
Quick Start		
Technical Support	Help	
Log Off	Clicking on the Beacon button will cause the front panel leds to flash green for one minute.	

Figure 3-79: Summary of System Problems page, displaying no problems

However, when problems exist, the *Summary of System Problems* page looks like this:

NEXSAN		
Home	System Enviro Network Network Problems Event Multi	
RAID Information	inio inio Selvices Stats Log View	
System Information	System Information	(?)
Configure RAID	Summary of System Problems	0
Configure Volumes	<ul> <li>Note the audible alarm is counding due to at least one problem.</li> </ul>	
Configure Host Access		
Power Settings	Problem Summary     Silence Alarm	
System Admin		
Configure Network	Number Description	
Quick Start	1 RAID array#1 on controller 0 (enclosure 0) is reconstructing	
Technical Support	Beacon	
Log Off		

Figure 3-80: Summary of System Problems page, displaying a problem

Each problem that the storage system is experiencing is listed, with a *Number* indicating its order of occurrence and a *Description* that gives a summary of the problem and the component that it is related to.

Clicking the **Beacon** button causes the LEDs on the front of the storage system to flash for one minute. This can help in locating a specific storage system in a large installation where multiple Nexsan Storage Systems are located.

Clicking the Silence Alarm button causes the audible alarm on the storage system to stop sounding.

Note If further problems occur, the audible alarm will sound again.

More information about each problem can be obtained by going to the information page for the indicated component (see <u>RAID Information on page 71</u> or <u>System Information on page 99</u>).

3

# Event Log

Clicking **System Information > Event Log** takes you to the *Event Log* page, which displays the event log for the Nexsan Storage System. This log can be used to find information about configuration changes, data errors, hardware failures, and other events experienced by the Nexsan Storage System (and Nexsan Storage Expansion, if present).



Figure 3-81: Event Log page

Event log entries follow a standard format:

Figure 3-82: Event log entry format

0002;C	1 18-Jul-2011	at 12:12:18	;(S); [1];	Link Up	o 4GHz
Event number	Event	date E	vent type	Event de	scription
Controller	number		Port numb	ber	

Table 3-83: Event log entry format description

Setting	Description
Event number	The reference number for the event, in reverse order of occurrence (event 0000 is the most recent event).
Controller number	The RAID Controller that the event is related to.

Setting	Description	
Event date	The date and time of the event's occurrence, in "dd-mmm-yyyy at hh:mm:ss" format.	
Event type	The broad cate	egory that the event falls into:
	Error (E)	Serious problems that likely require user intervention. Examples include a failed disk, a RAID Controller going offline, or a fan problem.
	Warning (w)	Problems that may indicate an imminent failure, but are them- selves unlikely to compromise data. Examples include excess- ive temperature, firmware errors, or disk block failures.
	Information (エ)	Events that indicate items of interest to the user. Examples include array creation or deletion, verification scan start and stop, or a new disk being inserted.
	System (S)	Lower-level information events. Examples include port status, IP address changes, or array initialization messages.
Port number	For events that	pertain to a particular port, the number of the port.
Event description	A brief description of the event.	

The event log can be filtered and formatted using the controls under Display Options:

Table 3-84: Setting filters and formats for the Event Log

Setting	Description
Filter by Con- troller	Shows events for <b>Controller 0</b> , <b>Controller 1</b> , or both RAID Controllers.
Filter by Date	Shows events from the last day, week, or month; or show all entries.
Filter by Importance	Shows only error events (E); errors and warnings (E & W); errors, warnings, and information events (E, W, I); or all events (E, W, I, S).
Date Format	<ul> <li>Shows dates in one of three formats:</li> <li>dd-mmm-yyyy at hh:mm:ss (international format, the default)</li> <li>dd/mm/yyyy hh:mm:ss (European format)</li> <li>mm/dd/yyyy hh:mm:ss (North American format)</li> </ul>
Show event icons	Display icons for each event category at the beginning of each event entry. Icons are color coded: pink for system events, blue for information events, yellow for warnings, and red for errors. This option is deselected by default. If <b>Show event icons</b> is selected, the event type is not displayed after the event date.

Setting	Description
Show con- troller col- ours	Display events for Controller 0 in black and events for Controller 1 in blue. This option is selected by default.

### Error Log

Clicking the **Error Log** link on the *Event Log* page displays only the error events (E) in the log. It is a shortcut for selecting **Errors only** in the **Filter by Importance** drop-down list under *Display Options*.

## **General Configuration**

Clicking the **General Configuration** link on the *Event Log* page displays a text-based summary of the current system configuration.

Figure 3-85: Event Log general configuration page

NEXSAN		✓ <u>all ok</u>
Home RAID Information	System Enviro Network Network Network Problems Event Log View Key	
System Information Configure RAID	System Information Event Log	?
Configure Volumes Configure Host Access Power Settings System Admin Configure Network Quick Start Technical Support	Log/Configuration     Display Options       • Error Log	
Log Off	General Configuration         *System Details*         *System Details*         System Mode         Solution of the state of t	

## Volumes and Host Access

Clicking the **Volumes & Host Access** link displays a text-based volume mapping and host access summary.



Figure 3-86: *Event Log* volume and host access summary page

# **Disk Configuration**

Clicking the **Disk Configuration** link displays a text-based summary of disk information.

Figure 3-87: Event Log disk configuration summary page



# **Replication Configuration**

Clicking the **Replication Configuration** link displays a text-based summary of the replication configuration status of the Nexsan Storage System.

For detailed information regarding the snapshots and replication features of Nexsan Storage Systems, see the Nexsan High-Density Storage Snapshots and Replication User Guide.





#### Download Event Log Files

You can download the Event Log, General Configuration, Volumes & Host Access, and Disk Information files in text format by clicking the **Download log/config dump as text** link. These files can be read in a text editor. You can download them as an HTML file by clicking the **HTML** link in parentheses next to it.

# Multiple System View

Clicking **System Information > Multi View** takes you to the *Multiple System View* page, where you can generate a summary of multiple Nexsan Storage Systems.

The multiple view page shows a summary of each scanned device. This summary includes system name, model, firmware version, and controller IP addresses. Clicking the IP address or the summary takes you to the *Login* page for that storage system.

Click Scan to display the summary:





# System Hierarchal View

Clicking **System Information > System Nav** takes you to the *System Hierarchal View* page, which gives an overview of the configured arrays, volumes, and array member disks in a hierarchical view.

Home Syste RAID Information System Information	m Enviro Network Network Info Info Services	Problems Event Multi System Log View Nav	Key	
System Information				
Configure RAID			System Information System Hierarchal View	
Configure Volumes Donfigure Host Access Power Settings System Admin Configure Network Guick Start Technical Support Log Off	ANNI MARVE_EABP_1  Propres  Progress  Progress Progress Progress  Progress  Progress  Progress  Progress  Progress  Progress  Progress  Progress  Progress Progress Progress Progress Prog	Description tem Tem D tem D tem D tem D tem D tem D tem Course type C tFibre connection t iSCSI connection tem Time D D D D D D D D D D D D D D D D D D D	Info           E48P         Info           0107110D         All Ports All LUNs           2         Rack, 4U           2 Rack, 4U         2 x Quad 16Gbit Fibre ports           2 x Quad 16Gbit Fibre ports         2 x Quad 16Gbit SCSI ports           Wednesday 05-Jan-2022 20 55.27 (GMT+00.00)         Controller 0           20 Dasc 07 Hours 2 All Mins 16 Sars	Controller 1 Up (Slave) 20 Dave: 07 Hours 24 Mine 53 Sere
	Volumes Pree S68.1GB	ware revision t Loader revision rgency revision troller serial number he	S011.1307 V381 S001.1303.1 000402C00367 36864 MB, Enabled, Mirrored, FUA ignored	S011.1307 V381 S001.1303.1 000402C31997 36864 MB, Enabled, Mirrored, FUA ignored

Figure 3-90: System Hierarchal View page

Click a "+" icon next to an item to expands it to list its components. Click an icon to display information related to the component. See Table 3-92: "Hierarchal component details" on the next page.

Figure 3-91: Hierarchal view closeup



3

#### Table 3-92: Hierarchal component details

Label	Description
System name	Displays Nexsan Storage System name, such as Mauve E48#2 10G in the example (see <u>Summary Information on page 100</u> ).
Array	Displays the RAID array name and capacity (see RAID Array Information on page 72).
Progress	Displays the progress of any running utilities (see RAID Array Utility Progress on page 75).
Members	Displays the member disks in the array, including individual capacity, as well as EPD (Enclosure:Pod:Disk) numbers, for example E:P:D (0:0:1).
Volumes	Displays information specific to the volume, but in a format similar to the Detailed Volume Layout page (see <u>Detailed Volume Layout on page 79</u> ).

# Icon Key

Clicking System Information > Key takes you to the Key page, which displays a legend of the various icons used throughout the Nexsan Storage System GUI.

NEXSAN		<mark>√</mark> all ok
Home	System Enviro Network Network Event Multi	<u>^</u>
RAID Information	Înfo Info Services Stats <sup>Problems</sup> Log View <b>Key</b>	
System Information	System Information	
Configure RAID	Кеу	
Configure Volumes	Icon Description	
Configure Host Access	Drive belongs to a RAID array	
Power Settings	Drive belongs to a RAID array (low power mode)	Ξ
Configure Network	Drive is a hot soare, will be used to reconstruct a critical array	
Quick Start		
Technical Support	Drive is a not spare (low power mode)	
Log Off	Drive does not belong to a RAID array	
	Drive does not belong to a RAID array (low power mode)	
	Drive belongs to a critical array	
	Drive is being rebuilt	
	Drive belongs to a RAID array that is rebuilding	
	Drive failed	
	Drive belongs to a failed controller	
	No drive installed	
	Blower is functioning correctly	
	Blower has failed	
	PSU is functioning correctly	
	PSU has failed	
	RAID controller is functioning correctly	-

Figure 3-93: Key page

# Configure RAID

Clicking **Configure RAID** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-94: Configure RAID navigation bar

Add Array	Rename	Encrypt	Delete	Array	Add	Delete	Retire Disk	Spare Mode	Array	Lost Data	Rebuild Ack
Anay	Partay	ranay	Anay	OWNER	opuro	opuro	DIDK	modo	vonity	Data	71011

Refer to Table 3-95 for help with the Nexsan E-Series/BEAST RAID configuration firmware:

Table 3-95: RAID configuration pages

Nav bar button	GUI pages and documentation links
Add Array	Create a new RAID array on the next page
Rename Array	Rename RAID Arrays on page 126
Encrypt Array	Configure Array Encryption on page 127
Delete Array	Delete a RAID Array on page 132
Array Owner	RAID Array Ownership on page 133
Add Spare	Add Hot Spare on page 134
Delete Spare	Delete Hot Spare on page 136
Retire Disk	Retire Disk on page 137
Spare Mode	Configure Hot Spare Mode on page 140
Array Verify	Verify RAID Array on page 141
Lost Data	Lost Data/Bad Blocks on page 145
Rebuild Ack	Acknowledge Rebuild on page 146

## Create a new RAID array

Clicking **Configure RAID** takes you to the *Create a New RAID Array* page, which enables you to create arrays from two or more unused disks.

#### Notes:

- The array creation process takes many hours, depending on how many disks are in the array and whether you select **Online Create** in the creation tool. You can check the array construction progress by clicking **RAID Information > Progress** (see <u>RAID Array Utility Progress on page 75</u>).
- Before you begin, make sure you have enough available disk space to add a new array.
- To create a new RAID array:
- 1. Click **Configure RAID > Add Array**. If your Nexsan Storage System has an attached Nexsan Storage Expansion, you are first prompted to select which storage system the new array will be built on. Make your selection and continue. The Create a New RAID Array page displays.

		Figure	3-96:	Create	a New	RAID	Array	page
--	--	--------	-------	--------	-------	------	-------	------

Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack			
						С	Con reate a	<mark>figure R</mark> New RA	AID ID Array	r				?
							E18 Enclosur	V 10.60.41 re 0 : Nex:	1.52 san E18					
Arra	y name													
Sele	ct RAID le	vel						RAID	5 (rotating	parity)	~			
Pref	erred strip	e size						128 K	bytes 🗸					
Sele	ct array ov	wner						Contro	oller 0 🗸					
Onli	ne Create							~						
Enal	ble advanc	ed feature	e support					<ul> <li>Image: A state of the state of</li></ul>						
Enc	ncrypted array													
				2		isk3				Disk3		Disk2		
			Disk SAS	5		isk6				Disk6 SAS		Disk5 Zzv: SAS		
	Disk7 SAS		Disk SAS			isk9				Disk9 SAS			Disk7	
	Create RAID Set Reset													

2. Click the Create RAID Set button. The Create a New RAID Array tool displays.

## 3. Use <u>Table 3-97</u> for details about RAID creation settings.

Table 3-97: RAID array creation tool settings

Setting	Action
Array name	Enter a name for the array. Array names can be up to 63 characters in length. If this field is left blank, a default array name ( <b>Array #N</b> ) is assigned.
	Note Array names can be changed on the <i>Rename RAID Arrays</i> page (see <u>Rename</u> <u>RAID Arrays</u> on page 126).
Select RAID level	<ul> <li>Select the RAID level in the drop-down list. You can choose from the following:</li> <li>RAID 0 (striped)</li> <li>RAID 1/1+0 (mirrored)</li> <li>RAID 4 (parity)</li> <li>RAID 5 (rotating parity) (default)</li> <li>RAID 5S (SSD parity)</li> <li>RAID 6 (rotating dual parity)</li> <li>RAID 6S (dual SSD parity)</li> <li>Notes:</li> <li>RAID 1+0, also known as RAID 10, is automatically configured when you select RAID 1/1+0 (mirrored) and use an even number of drives, with a minimum of four.</li> <li>For more information on RAID levels, see Appendix C, RAID levels on page 267.</li> <li>RAID 5S and RAID 6S are only available if SSDs are installed.</li> </ul>
Preferred stripe size	Set the stripe size using the drop-down list. <b>128Kbytes</b> is the default and recommended setting, but you can also choose <b>64Kbytes</b> , <b>32Kbytes</b> , or <b>16Kbytes</b> . <b>Note</b> It is strongly recommended that you do not change this setting.
Select array owner	Set which controller will be the "owner" of this array (that is, the one that manages it under most circumstances) using the drop-down list.
Online Create	<ul> <li>The box is checked by default. Do one of the following:</li> <li>Leave it checked if you want to be able to access your volumes right away. This slows down the array creation process, and access to the volumes can be slow during this time.</li> <li>Uncheck the box if you want to speed up the array creation process. This option makes your volumes unavailable until the array creation process is complete.</li> </ul>

Setting	Action						
Enable advanced feature sup- port	The box is checked by default. Note This setting is NOT CHANGEABLE after initial configuration. Do one of the following:						
	• Leave <b>Enable advanced feature support</b> checked if you want advanced features to be enabled for this array. This option creates two hidden volumes per array, one for the snapshot reservation and one for metadata. These count towards the perstorage system maximum of 254 volumes.						
	<ul> <li>Uncheck the box if you want advanced features to be disabled for this array.</li> </ul>						
	Notes:						
	<ul> <li>Each Nexsan Storage System (whether a single Nexsan Storage System or with Nexsan Storage Expansions attached) can contain a maximum of 32 individual arrays.</li> </ul>						
	• For detailed information regarding the snapshots and replication features, see the Nexsan High-Density Storage Snapshots and Replication User Guide.						
Encrypted array	(E-Series only) If there are self-encrypting disks (SEDs) installed in the Nexsan Storage System, apply the <b>Encrypted array</b> option to encrypt the array immediately.						
	Checking this box disables the check boxes below all disks that are not SEDs.						
	Encrypting an array ensures that user data on disks that are removed from the Nexsan Storage System cannot be read without the corresponding encryption key.						
	If this option is selected, you will be prompted to download the encryption key once the array has been created.						
Select disks	Select each disk that you would like to include in the array (click the check box beneath each available disk). You must select a minimum of two disks for RAID 0 or RAID 1/1+0, a minimum of three disks for RAID 4 or RAID 5, or a minimum of four disks for RAID 6.						
	• There is a spectian below the <b>Create DAID Set</b> button that anables you to select a						
	section of disks all at once. Click the check box next to <b>Disk N through N</b> for each group of disks that you wish to select.						
	• If at any time you wish to return the array creation tool to its initial state, click <b>Reset</b> .						
Create RAID Set	Click the Create RAID Set button.						

Setting	Action									
Export Encryption Key	(E-Series only) If you are creating an encrypted array, the <i>Configure Array Encryption</i> page displays. Figure 3-98: <i>Configure Array Encryption</i> confirmation page									
	Confirm that you wish to ENCRYPT the below array									
	Array name : 'Accounting' Array number : 1, Controller 0 RAID level : RAID 0 (striped) Number : 2 Constructing 1.2 TB (1.0 TB)									
	New Encryption Key									
	Key Leaded  That y 1 - Mug2a15 13 440-  Encryption Key File  Export Encryption Key  Export Encryptic  Export Encryption Key  Export Encr									
	Please export a copy of the encryption key, and store that copy in a safe place.									
	ALL DATA ON THE ARRAY MAY BECOME PERMANENTLY INACCESSIBLE IN THE EVENT OF A SYSTEM FAILURE UNLESS THE ENCRYPTION KEY CAN BE PROVIDED									
	Use the 'Export Encryption Key' button above to download a copy of the encryption key. Confirm by clicking the checkbox and then clicking the 'Confirm Encryption' or Cancel by clicking the 'CANCEL Encryption' button.									
	☐ The encryption key has been exported and stored in a safe place.									
	CANCEL Encryption									
	Do the following:									
	a. Click the <b>Export Encryption Key</b> button to save the encryption key to your hard drive.									
	<b>Note</b> When the encryption key for an encrypted array is changed, previous encryption keys cannot be used to restore access to the array. Export the new encryption key file and keep the backup in a secure place. If drives become inaccessible (for example, if they are removed from the chassis), you can restore access to the drives by uploading exported encryption key files. See <u>Restore</u> <u>Encryption Keys on page 212</u> .									
	b. Check the check box next to <b>The encryption key has been exported and stored in a safe place</b> .									
	c. Click the <b>Confirm Encryption</b> button.									

**Note** If you decide that you do not wish to create an encrypted array, click the **CANCEL Encryption** button.

- 4. You are taken to the **Configure Logical Volume** page (see <u>Configured Logical Volumes on page 76</u>). The message Array has been successfully configured displays at the top of the page, along with an additional message:
- 5. If you left the **Online Create** check box checked, the message displayed is *Performance will be degraded until tuning is completed*.
- 6. If you unchecked **Online Create**, the message displayed is *Volumes will not be accessible until initialization is completed*.

# Rename RAID Arrays

#### Clicking Configure RAID > Rename Array takes you to the Rename RAID Arrays page.

Figure 3-99: *Rename RAID Arrays* page

NEXSAN		
Home RAID Information	Add <mark>Rename</mark> Encrypt Delete Array Add Delete Retire Spare Array Lost Rebuild Array Array Array Owner Spare Disk Mode Verify Data Ack	
System Information Configure RAID	Configure RAID Rename RAID Arrays	(7)
Configure Volumes Configure Host Access Power Settings	Array name : 'Array #1 - VMware' Enclosure : 0 Array number : 1, Controller 0 RAID level : RAID 6 (rotating dual parity) Number : 12 Number : 12	
System Admin Configure Network Quick Start	Array name : 'Array #2 - Test ' Enclosure : 0 Array number : 2, Controller 1 RAID level : RAID 5 (rotating parity) Number : 8	
Technical Support Log Off	Array name : 'Array #3 - Backup' Enclosure : 0 Array number : 3, Controller 0 RAID level : RAID 5 (rotating parity) Number of members : 8 Array #3 - Backup Tuning 42.0 TB (38.2 TiB)	
	Save Settings Reset	
	Help 🕡	
	system.	

Each array displays in a separate section, which includes the *Array name*, *Enclosure*, *Array number*, *Controller* number, *RAID level*, *Number of members*, array icon, array status, and array capacity. For information on these items, see RAID Array Information on page 72.

#### To rename one or more arrays:

1. Enter the new name into the field to the right of the icon for the array.

#### Notes:

- If you leave one or more enter new name fields blank, those arrays retain their previous names.
- If at any time you wish to return the *Rename RAID Arrays* page to its initial state, click **Reset**.

#### 2. Click Save Settings.

The arrays are immediately renamed.

# **Configure Array Encryption**

Clicking **Configure RAID > Encrypt Array** takes you to the *Configure Array Encryption* array selection page, where you can encrypt and decrypt arrays.

#### Notes:

- Array encryption is only available on Nexsan E-Series Storage Systems.
- Encrypting an array prevents user data from being read from disks that are removed from the Nexsan Storage System without the corresponding encryption key. Decrypting an array makes its disk drives fully readable after removal from the Nexsan Storage System without the encryption key. Neither encrypting nor decrypting an array alters the data in the array in any way, nor do they require any system down-time.

NEXSAN		FAILURE
Home	Add Rename Encrypt Delete Array Add Delete Retire Spare Array Lost Rebuild	^
RAID Information	Array Array Array Array Owner Spare Disk Mode Verify Data Ack	
System Information	Configure RAID	2
Configure RAID	Configure Array Encryption	•
Configure Volumes		
Configure Host Access	Array number : 1, Controller 0	ENEXT->
Power Settings	Number of members : 7	
System Admin	Array name : '15K-RAID6-1'	
Configure Network	Array number : 2, Controller 0 Fault tolerant RAID level : RAID 6 (rotating dual parity) 235.9 GB (219.7 GiB)	ENEXT >
Quick Start	Number of members : 8	
Technical Support	Array name : 'NL-R6-2' Array number : 3. Controller 0 Fault tolerant	- mark
Log Off	RAID level : RAID 6 (rotating dual parity) Number of members : 7	
	Array name : '15K-R10-2'	
	RAID level : RAID 1 (mirrored disks) Number of members : 8	CNEXT_>
	Array name : 'SAS-R10'	
	RAID level : RAID 1 (mirrored disks) Number of members : 2	
	Array name : '200GB RAID5'	
	RAID level : RAID 5 (rotating parity) Number of members : 4	

Figure 3-100: Configure Array Encryption selection page

Each array listed shows the *Array name*, *Array number*, *Controller*, *RAID level*, *Number of members*, whether the array is fault tolerant, whether the array is encrypted, and its size.

- **b** To display array encryption or decryption information:
- 1. Click **Configure RAID > Encrypt Array**.
- 2. Click the **Next** button for the desired array. The array encryption or decryption page displays:

Figure 3-101: Configure Array Encryption page

Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack	
¢	Configure RAID Configure Array Encryption											(?
Arra Arra RAI Nur	ay name : ' ay number ID level : R nber of me	Accountin : 1, Contr AID 0 (stri mbers : 2	ng' foller 0 iped)								NOT fault tolerant, Encrypted 1.2 TB (1.0 TiB)	
							Агга	у Епсгур	tion			
Enc	cryption Sta Created	atus				E	Encrypted Friday 07-A	ua-2015 1	3:48:59			
Enc	cryption Ke	y File				י [	NexsanKey- Export	NKA-0ed	a119c00020 on Key	)768-18	96.dat	
				Er	ncrypt Array		Decrypt Arr	ау	Change	e Encryp	otion Key	

#### The Array Encryption section displays the following:

Table 3-102: Array Encryption

Setting	Description
Encryption Status	<i>Encrypted</i> , <i>Unencrypted</i> , or <i>Disabled (not supported by disks)</i> . If the array does not support encryption, then all buttons are grayed out and <i>Encryption</i> <i>Status</i> reads <i>Disabled (not supported by disks)</i> .
Key Created	Date and time of key creation in format Day DD-Mon-YYYY HH:MM:SS.
Encryption Key File	The name of the encryption key file and the <b>Export Encryption Key</b> button.

The section also contains the Encrypt Array, Decrypt Array, and Change Encryption Key buttons.

- To encrypt an array:
- 1. On the **Configure Array Encryption** page, click the **Next** button for the desired array.
- 2. Click the Encrypt Array button.

The array encryption confirmation page displays:

Figure 3-103: Array encryption confirmation page

Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack			
	Configure RAID Configure Array Encryption													
	Confirm that you wish to ENCRYPT the below array													
Arra Arra RAI Nur	ay name : ' ay number ID level : R nber of me	Accountir : 1, Contr AID 0 (stri mbers : 2	ng' oller 0 ped)								NOT fault tolerant 1.2 TB (1.0 TiB)			
Key	Created	_	_	_	_	F	New I	Encryption	ı Key 9:27:07	_				
Enc	Encryption Key File NexsanKey-NKA-0eda119c00020768-1897.dat Export Encryption Key													
	Please export a copy of the encryption key, and store that copy in a safe place. ALL DATA ON THE ARRAY MAY BECOME PERMANENTLY INACCESSIBLE IN THE EVENT OF A SYSTEM FAILURE UNLESS THE ENCRYPTION KEY CAN BE PROVIDED													
U	lse the 'E	xport En	cryption clicki	Key' butt ng the 'C	on abov onfirm E	e to down	nload a o n' or Can	copy of th icel by cli	ne encryp icking the	tion ker 'CANC	y. Confirm by clicking the checkbox EL Encryption' button.	and then		
	☐ The encryption key has been exported and stored in a safe place.													
							Cont	firm Encryp	ption					

3. Click the Export Encryption Key button to save the encryption key to a .dat file on your hard drive.

**Note** When the encryption key for an encrypted array is changed, previous encryption keys cannot be used to restore access to the array. Export the new encryption key file and keep the backup in a secure place. If drives become inaccessible (for example, if they are removed from the chassis), you can restore access to the drives by uploading exported encryption key files. See <u>Restore Encryption Keys</u> on page 212.

- 4. Check the check box next to The encryption key has been exported and stored in a safe place.
- 5. Click Confirm Encryption.

A message displays, letting you know that the array has been encrypted.

Note If you change your mind about encrypting the array, click the **CANCEL Encryption** button.

- To decrypt an array:
- 1. On the **Configure Array Encryption** page, click the **Next** button for the desired array.
- 2. Click the **Decrypt Array** button.

The array decryption confirmation page displays:

Figure 3-104: Array decryption confirmation page

Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack	
						(	Con Change A	<mark>figure R</mark> Array En	AID cryption			
			C	onfirn	n that	you	wish	to DE	CRYP	T the	e below array	
Arra Arra RAI Nur	Array name : 'Accounting' Array number : 1, Controller 0 RAID 0 (striped) NUmber of members : 2 NOT fault tolerant, Encrypted 1.2 TB (1.0 TiB)											
C	Confirm by	y clicking	the che	ckbox ar	nd then c	licking t	he 'Confir	m Decry	ption' or	Cancel	by clicking the 'CANCEL Decryption' button.	
							Conf	irm Decryp	otion			
							CANC	CEL Decry	ption			

3. Check the confirmation check box, then click **Confirm Decryption**. A message displays letting you know that the array has been decrypted.

Note If you change your mind about decrypting the array, click the **CANCEL Decryption** button.

# Back Up or Change an Encryption Key

Clicking **Configure RAID > Encrypt Array** takes you to the *Configure Array Encryption* array selection page.

**Note** When the encryption key for an encrypted array is changed, previous encryption keys cannot be used to restore access to the array. Export the new encryption key file and keep the backup in a secure place. If drives become inaccessible (for example, if they are removed from the chassis), you can restore access to the drives by uploading exported encryption key files. See <u>Restore Encryption Keys on page 212</u>.

> To export the encryption key (encrypted arrays only):

• Click the **Export Encryption Key** button to create a backup.

The file is saved according to your browser's usual method.

- **•** To change the encryption key (encrypted arrays only):
- 1. On the **Configure Array Encryption** page, click the **Next** button for the desired array.
- 2. Click the Change Encryption Key button.

The confirmation page displays.

- 3. Click the **Export Encryption Key** button to save the new encryption key to a .dat file on your hard drive.
- 4. Check the check box next to The encryption key has been exported and stored in a safe place.
- 5. Click Confirm Encryption.

A message displays, letting you know that the array has been encrypted.

**Note** If you change your mind about encrypting the array, click the **CANCEL Encryption** button.

Note This only changes the encryption key for this specific array. All other arrays are unaffected.

# Delete a RAID Array

#### Clicking **Configure RAID > Delete Array** takes you to the *Delete a RAID Array* page.

Figure 3-105: Delete a RAID Array page



RAID arrays cannot be deleted if they contain volumes. If you try to delete an array that contains volumes, a message displays, telling you to delete the volumes first. See <u>Delete a Logical Volume on page 156</u>.

**Note** Deleting an encrypted array (see <u>Configure Array Encryption on page 127</u>) cryptographically erases all of its disk drives and then unlocks them.

- To delete an array:
- 1. Select the array you wish to delete by clicking the button next to the array icon.
- 2. Click Delete RAID Array.

A confirmation page displays, asking you to confirm that you wish to delete the array:

Figure 3-106: Array deletion warning and confirmation dialog



To delete the array, click the confirmation check box, then click Confirm Delete Command.
 Note To cancel the delete operation, click CANCEL Delete.

A message displays, informing you of the results of your choice. Click the **Back** button to go to the *Home* page.

# **RAID** Array Ownership

#### Clicking Configure RAID > Array Owner takes you to the RAID Array Ownership page.

Figure 3-107: *RAID Array Ownership* page



Each array displays in a separate section, which includes the *Array name*, *Enclosure*, *Array number*, *Controller* number, *RAID level*, *Number of members*, array icon, array status, and array capacity. For information on these items, see <u>RAID Array Information on page 72</u>.

Each section also displays **Controller** *N* selection buttons. The selected button indicates which controller the array is currently assigned to.

#### > To assign an array to a different controller:

1. Click the selection button next to the desired controller.

#### 2. Click Save Changes.

A message displays, informing you that the settings have been updated. Click the **Back** button to return to the *RAID Array Ownership* page.

## Add Hot Spare

Clicking **Configure RAID > Add Spare** takes you to the *Add Hot Spare* page, which enables you to designate specific disk drives as "spares", which will be used to reconstruct RAID arrays when array disks fail.

If your Nexsan Storage System has an attached Nexsan Storage Expansion, you are first prompted to select which storage system or storage expansion the new spare is in.



Figure 3-108: Add Hot Spare enclosure selection page

• Select the enclosure and click **Next** to be taken to the Add Hot Spare tool.

Once you have selected the desired enclosure, or if your Nexsan Storage System occupies a single enclosure, the *Add Hot Spare* tool displays.



	Add Hot Spare													
						E60 VT 1 Enclosure 0	10.60.41.62 : Nexsan E6	0						
Add on	Enclosure (can be used by any array in this enclosure)     A 12' (Array 1 33-disk RAID 6)													
Auu sp	O B 12 (Array 2, 21-disk RAID 6)													
Dis	s)	Disk2	Disk3	Disk4	Disk1	Disk2	Disk3	Disk4	Disk1	Disk2	Disk3	Disk4		
	5	-	-					-						
A 1	12	A 12	A 12	A 12	A 12	A 12	B 12	B 12	B 12	B 12	B 12	B 12		
(CC Dis	5) 100	(C0) Disk6	(C0) Disk7	(C0) Disk8	(C0) Disk5	(C0) Disk6	(C1) Disk7	(C1) Disk8	(C1) Disk5	(C1) Disk6	(C1) Disk7	(C1) Disk8		
SA	3	SAS	SAS	NE	SAS	SAS	NE	NE	NE	SAS	SAS	SAS		
			-											
A 1 (C)	12	A 12 (C0)	A 12 (C0)	A 12 (C0)	A 12 (C0)	A 12 (C0)	A 12 (C0)	A 12 (C0)	A 12 (C0)	A 12 (C0)		Pool		
Disl	<u>k9</u>	Disk10	Disk11	Disk12	Disk9	Disk10	Disk11	Disk12	Disk9	Disk10	Disk11	Disk12		
	3	NL	NL	NL	NE	NL	NL	NE	NE	NL	NL	NL		
(00	5)	(C0)	(C1)	(C1)	(C1)	(C1)	(C1)	(C1)	(C0)	(C0)	(C0)	(C0)		
Zev	13	Disk14	Disk15	Disk16	Disk13	Disk14	Disk15	Disk16	Disk13	Disk14	Disk15	Disk16		
					-			-						
AI	12	A 12	A 12	A 12	Pool	A 12	A 12	A 12	Pool	B 12	B 12	B 12		
(CC Disk	0) : <u>17</u>	(C0) Disk18	(C0) Disk19	(C0) Disk20	Spare Disk17	(C0) Disk18	(C0) Disk19	(C0) Disk20	Spare Disk17	(C1) Disk18	(C1) Disk19	(C1) Disk20		
SA	3	SAS	SAS	SAS	SAS	SAS	SAS	SAS	SAS	SAS	SAS	SAS		
			_											
B 1 (C1	12	B 12 (C1)	Pool Spare		A 12 (C0)	A 12 (C0)	A 12 (C0)	A 12 (C0)	B 12 (C1)	B 12 (C1)	B 12 (C1)	B 12 (C1)		
						Add Hot Sp	oare Res	et						

The disks in the Nexsan Storage System are represented in a similar fashion to the summary diagram on the *Home* page (see <u>Home page on page 65</u>).

There are two kinds of spare disks that the system uses:

- Pool Spares, which are disks that can be used by any array in the Nexsan Storage System.
- Dedicated Spares, which are disks that are assigned as a spare for a specific array.

Spares can only be used by arrays in the same enclosure.

#### To designate an unused disk as a Pool Spare:

- 1. Next to Add spare disk(s) to, select **Enclosure** (this is the default).
- 2. Select the check box beneath each disk that you wish to designate as a Pool Spare.

#### Notes:

- Pool Spares that are not self-encrypting disks (SEDs) cannot be used to rebuild an encrypted array. Pool Spares that are SEDs can be used to rebuilt both encrypted and unencrypted arrays
- If at any time you wish to return the Add Hot Spare page to its initial state, click Reset.

#### 3. Click the Add Hot Spare button.

A message displays, informing you that the new Pool Spares have been added. Click the **Back** button to return to the *Add Hot Spare* page.

#### **b** To designate an unused disk as a Dedicated Spare:

- 1. Next to Add spare disk(s) to, select the Array Name.
- 2. Select the check box beneath each disk that you wish to designate as a Dedicated Spare for that array. **Notes:** 
  - All disks selected will be added to the same array, as selected in step 1. To add disks to multiple arrays, you must repeat steps 1 and 2 for each.
  - Disks that are not self-encrypting disks (SEDs) cannot be added as Dedicated Spares to an encrypted array. Self-encrypting disks can be added as Dedicated Spares to either encrypted or unencrypted arrays.
  - If at any time you wish to return the Add Hot Spare page to its initial state, click **Reset**.
- 3. Click the Add Hot Spare button.

A message displays, informing you that the new Dedicated Spares have been added. Click the **Back** button to return to the *Add Hot Spare* page.

# **Delete Hot Spare**

Clicking **Configure RAID > Delete Spare** takes you to the Delete Hot Spares page, which enables you to remove the "spare" designation from a disk and return it to unused status.

If your Nexsan Storage System has an attached Nexsan Storage Expansion, you are first prompted to select which storage system the spare is in.

NEXSAN		ALL OK
Home RAID Information System Information Configure RAID	Add     Rename     Encrypt     Delete     Array     Add     Delete     Relire     Spare     Array     Mode     Verify     Data     Rebuild       Array     Array     Array     Array     Owner     Spare     Spare     Disk     Mode     Verify     Data     Ack	()
Configure Volumes Configure Host Access Power Settings System Admin Configure Network Quick Start Technical Support	Enclosure number : 0 Enclosure name : Nexsan E60#2 10G Enclosure number : E60VT Enclosure number : 1 Enclosure name : Nexsan_E60X Enclosure type : E60X No spare (or failed) drives Enclosure type : E60X	
Log Off	Help Select the enclosure you wish to delete a spare from then click the 'Next>>' button.	

Figure 3-110: Delete Hot Spare enclosure selection page

• Select the enclosure and click **Next** to be taken to the *Delete Hot Spares* tool.

# Once you have selected the desired enclosure, or if your Nexsan Storage System is a single storage system, the *Delete Hot Spares* tool displays.



Figure 3-111: Delete Hot Spare tool page (example)

The disks in the Nexsan Storage System are represented in a similar fashion to the summary diagram on the *Home* page (see Home page on page 65).

#### To delete one or more spares:

1. Click the check box below the spare or spares that you wish to return to the unused state.

Note If at any time you wish to return the Delete Hot Spare page to its initial state, click Reset.

#### 2. Click Delete Hot Spare.

A message displays, informing you that the spares have been deleted and are now unassigned. Click the **Back** button to return to the *Delete Hot Spares* page.

#### **Retire Disk**

Clicking **Configure RAID > Retire Disk** takes you to the *Retire Disk* page, which enables you to manually take an array disk out of service while maintaining full redundancy. The disk's data is rebuilt onto a dedicated spare or pool spare (see <u>Add Hot Spare on page 134</u>), and the disk is not taken offline until the data has been completely rebuilt onto the spare. This function enables you to remove a troublesome disk from the Nexsan Storage System without compromising data integrity.

#### Notes:

- Retiring a disk from an encrypted array (see <u>Configure Array Encryption on page 127</u>) does not decrypt the user data on the disk. Reading or writing to the disk requires the exported encryption key.
- The **Disk retirement setting** on the *Configure Rebuild Options* page (see <u>Configure Rebuild Priority on</u> page 206) affects how disks are retired and how information is rebuilt.

• If your Nexsan Storage System has an attached Nexsan Storage Expansion, you are first prompted to select the storage system containing the disk you want to retire.

Figure 3-112: Retire Disk enclosure selection page



Select the enclosure by clicking its selection button, then click Next. The disk selection page displays.

Figure 3-113: *Retire Disk* disk selection page



The disks in the Nexsan Storage System are represented in a similar fashion to the summary diagram on the *Home* page (see <u>Home page on page 65</u>).

#### To retire a disk:

1. Select one or more disks to retire by clicking their check boxes.

#### Notes:

- Only disks that are part of an array can be retired. Spare disks and unassigned disks cannot.
- A disk can only be retired if there is a spare disk available to the array (see <u>Add Hot Spare on</u> <u>page 134</u>). This is true for each disk retired. For example, if you wish to retire three disks, then three spares must be available.

#### 2. Click Retire Disk.

A warning dialog displays.



Confirm that you wish to RETIRE the below disks
<u>Array #1 - Enclosure 1</u>
Disk 4 pod 0 encl 1
Confirm by clicking the checkbox and then clicking the 'Confirm Retire Command' or Cancel by clicking the 'CANCEL Retire' button.
Confirm Retire Command
CANCEL Retire

3. To retire the disk, click the confirmation check box and then click Confirm Retire Command.

A message displays, confirming that the disk is being retired. Click the **Back** button to return to the *Retire Disk* page. The disk's icon now displays an "emptying" status bar and the caption "retiring disk".

When the retirement process is complete, the disk icon displays a flashing red status bar and an event log message is generated.

Note To cancel the disk retirement, click the CANCEL Retire button.

A message displays, stating that the operation has been canceled. Click the **Back** button to return to the *Retire Disk* page.

4. When the disk retirement process is complete, remove the disk from the Nexsan Storage System and replace it with a suitable replacement disk (see the *Nexsan FRU Removal and Replacement Guide* for your storage system).

# Configure Hot Spare Mode

#### Clicking **Configure RAID > Spare Mode** takes you to the *Configure Hot Spare Mode* page.

Figure 3-115: Configure Hot Spare Mode page

NEXSAN		-												<mark>√</mark> аll ок
Home RAID Information	Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack		
System Information								Con	figure R					2
Configure RAID							Co	onfigure	Hot Spa	are Mod	e			•
Configure Volumes	1							S	oare Mode	2				
Configure Host Access	Ins	serted disks automatically used as hot spares												
Power Settings	Ins	erted disks	must be r	nanually	configure	d as hot s	pares				0			
System Admin							Se	t Snare M	ode					
Configure Network								it opare iv	008					
Quick Start														
Technical Support														
Log Off								ł	lelp					
		Inserted disks automatically used as hot spares - An inserted disk will be used as a hot pool spare / rebuild disk. Note that for a hot spare disk to be of use it must be at least the same capacity of the smallest RAID array member. Inserted disks must be manually configured as hot spares - Any newly inserted disk will not be used as a rebuild disk. The disk must be configured as hot spare the disk can be used to rebuild a degraded / critical array.												

#### To change the Hot Spare Mode setting:

- 1. Select one of the two options:
  - Inserted disks automatically used as hot spares: This is the default setting. New disk drives, when inserted into a drive slot and recognized by the system, are automatically configured as pool spares.
  - Inserted disks must be manually configured as hot spares: When this setting is active, new disk drives are configured as unused disks which are available for use in a RAID array or as either pool or dedicated spares.

Note If at any time you wish to return the *Configure Hot Spare Mode* page to its initial state, click **Reset**.

#### 2. Click Set Spare Mode.

A message displays, informing you that the setting has been updated. Click the **Back** button to return to the *Configure Hot Spare Mode* page.

# Verify RAID Array

Clicking **Configure RAID > Array Verify** takes you to the *Verify RAID Array* page, which enables you to configure the method and frequency of RAID array verification.

NEXSAN												
Home RAID Information	Add Rename Array Array	Encrypt De Array A	elete Array Array Owner	Add De Spare Sp	elete Retire bare Disk	Spare Mode	Array Lost Verify Data	Rebuild Ack				
System Information Configure RAID					Cor	figure RAI ify RAID Ar	D ray			(?)		
Configure Volumes				_	Defeult	V:						
Configure Host Access	Select veri	ify utility to use	e	C Surfac	e scan 🔘 Pa	rity scrub	None					
Power Settings	Verify Inte	rval		I weel	k 🔘 2 weeks	Ø 4 weeks						
System Admin	Verify Sch	edule		Alway	s start verificati	on on Sunday	/ 🔻 at 03	• 00:				
Configure Network	Verify Prio	rity		Favou	ir IO over Surfa ir IO over Parity	e Scan Scrub						
Quick Start	Verify Rate	э		○ Highest ○ High ○ Medium ○ Low								
Technical Support	Verify Criti	cal Schedule		Paus	e Verify during	ritical hours						
Log Oi	Verify Criti	ical hours		Chitean no More We Thu Fric Sat	nday sday dnesday rsday lay urday nday	10 00.00	on					
			Custom Schedu	led Settings	VeniyA	ay specific	Imm	ediate Control				
	Аггау		Days	Critical Start/End	Custom		Surface		Parity	Options		
	R_0	WIVIF	Defau	t Scan Sc Reconstructing : Verify Not Allowed						Customize		
	R_1		Defau	ılt			Start	-	Start	Customize		
	R_2		Defau	ılt			Start		Start	Customize		
	R_3	T	1	4:45/15:00	Scan		Start		Start	Customize		
	R /		Defa	ılt			Start		Start	Customize		

Figure 3-116: Verify RAID Array page

# Schedule Default RAID Array Verification

Use the Default Verify Configuration section to set up the default RAID array verification schedule.

#### **•** To schedule default RAID array verification:

1. Use the following table for help with scheduling default RAID array verification:

Table 3-117: Verification utilities

Setting	Action
Select verify utility to	<b>Surface scan:</b> Reads all blocks on each disk drive in the array to ensure their integrity. If it encounters a bad block, it will quarantine that block and rebuild it using mirrored data (for RAID 1 or 10) or parity data (for RAID 4, 5 or 6).
	<b>Parity scrub</b> : Reads all array data and ensures that the parity data is intact. If it encounters a parity inconsistency, it will correct the inconsistency. Parity scrub also rebuilds bad data blocks in a similar fashion to <b>Surface scan</b> .
	None: If you do not wish RAID array verification to be scheduled, select None.
	<b>Note</b> If you choose <b>None</b> , it is still recommended that, at a minimum, you perform a <b>Surface Scan</b> on a regular basis. See <u>Start or stop RAID array verification</u> <u>immediately on the facing page</u> .
Verify Interval	Select one of the options: <b>1 week</b> (the default), <b>2 weeks</b> , or <b>4 weeks</b> .
Verify schedule	Check the <b>Always start verification on</b> check box, then select a day of the week and a time of day using the drop-down lists.
Verify Priority	Check one or both of the check boxes if you want I/O operations to be favored over RAID array verification by the system. You can select either <b>Favour IO over Surface Scan</b> or <b>Favour IO over Parity Scrub</b> , or both.
Verify Rate	Select the preferred verification rate by clicking its selection button. The default is
	<b>Note</b> When there is high host activity, less spare I/O time is available, which can result in longer verification times. In this situation, it may become necessary to increase the verification rate so that arrays are verified more quickly.
Verify Critical Schedule	Check the <b>Pause verify during critical hours</b> check box to have the Nexsan Storage System pause any verification that is in progress during times when the extra I/O and CPU load would be undesirable.
Pause verify during critical hours	If checked, use the <i>Verify Critical hours</i> drop-down lists and check boxes to indicate the times and days of the week that are "critical", so that verification is paused during these times.

2. Click Save Settings.

3

A message displays, informing you that the settings have been updated. Click the **Back** button to return to the *Home* page.

When a verification utility is running, you can check its progress on the *RAID Array Utility Progress* page (see <u>RAID Array Utility Progress</u> on page 75).

# Start or stop RAID array verification immediately

Each array is listed in the *Verify Array Specific Settings* section. Each row contains the *Array name*, the *Custom Schedule Settings* (which displays *Default* when no custom settings are set), **Start** buttons for surface scan and parity scrub, and a **Customize** link.

#### **•** To manually start RAID array verification:

- 1. Find the row for the array you wish to verify.
- 2. Click the Start button in either the Surface Scan or Parity Scrub column.

A message displays, informing you that the verification has begun. Click the **Back** button to return to the *Verify RAID Array* page.

Progress can monitored on the *RAID Array Utility Progress* page (see <u>RAID Array Utility Progress</u> on page 75).

#### **•** To manually stop RAID array verification:

- 1. Find the row for the array that you wish to stop verification for (for instance, if it is negatively impacting host I/O performance).
- 2. Click the **Stop Verify** button.

A message displays, informing you that the verification has stopped. Click the **Back** button to return to the *Verify RAID Array* page.

Schedule verification for specific arrays

- **b** To set a custom verification schedule for a particular array:
- 1. In the *Verify Array Specific Settings* section, find the row for the array you wish to schedule verification for and click the **Customize** link. You are taken to the *Verify Customization* page.

Figure 3-118:	Verify	Customization	scheduling	page
J	- /		J	1 0

NEXSAN		ALL OK
Home RAID Information	Add Rename Encrypt Delete Array Add Delete Retire Spare Array Lost Rebuild Array Array Array Array Owner Spare Disk Mode Verify Data Ack	
System Information	Configure RAID Verify Customization	
Configure Volumes	Verify Settings for Array #1	
Configure Host Access	Verify Itility	
Power Settings	Verify Schedule         Disable Verify during critical hours	
System Admin Configure Network	Critical hours are 00:00 v to 00:00 v on Monday	
Quick Start	Critical hours	
Log Off	☐ Friday ☐ Saturday ☐ Sunday	
	Revert to Default Settings Save Custom Settings	

- 2. For Verify Utility, select the utility you wish to use on this array: Surface Scan, Parity Scrub, or None.
- 3. For *Verify Schedule*, to have the Nexsan Storage System pause any verification that is in progress during times when the extra I/O and CPU load would be undesirable, check the **Disable Verify during critical hours** check box.
  - a. If **Disable Verify during critical hours** is checked, use the *Critical hours* drop-down lists and check boxes to indicate the times and days of the week that are "critical", so that verification is paused during these times.

#### 4. Click Save Custom Settings.

A message displays, informing you that the settings have been updated. Click the **Back** button to return to the *Home* page.

**Note** To undo the custom settings for any array, click the **Customize** link, then click the **Revert to Default Settings** button.
## Lost Data/Bad Blocks

Clicking **Configure RAID > Lost Data** takes you to the *Lost Data/Bad Blocks* page. In RAID 0 arrays, data is lost if any of the component disks fail or develop errors. In RAID 1, RAID 4, and RAID 5 arrays, data is only lost if two or more component disks fail or develop errors simultaneously. In RAID 6 arrays, data is only lost if three or more component disks fail or develop errors simultaneously. See Appendix C, <u>RAID levels on page 267</u> for more information.

Normally, the Lost Data/Bad Blocks page looks like this:

Figure 3-119: Lost Data/Bad Blocks page with no error message



When there is a lost data warning, the Lost Data/Bad Blocks page looks like this:

Figure 3-120: Lost Data/Bad Blocks page with bad data blocks message

Add Array	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack	
							Conf Lost Dat	f <mark>igure R/</mark> a / Bad I	AID Blocks			(?
Агга	y 1 ('Sas5'	) has som	e unrecov	erable dat	ta blocks		Acknow	ledge Los	t Data			
					[	Ac	knowledg:	e Lost Dat	a Warning			

Click the **Acknowledge Lost Data Warning** button to acknowledge the warning. A message displays, confirming the acknowledgment. Click the **Back** button to return to the *Lost Data/Bad Blocks* page.

### Recommended follow-up actions

After acknowledging lost data, it is STRONGLY RECOMMENDED that you run

- 1. An array verification immediately, and
- 2. A host-side scan of the file system to determine if the lost data has caused any corruption.

### See Verify RAID Array on page 141 for instructions.

Lost data warnings also appear on the *Home* page and can be acknowledged from there (see <u>Home page</u> on page 65).

### Acknowledge Rebuild

Clicking **Configure RAID > Rebuild Ack** takes you to the *Acknowledge Rebuild* page. When a RAID array has been rebuilt after a component disk failure, this page displays a warning and enables you to acknowledge that you have seen it.

When no recent RAID array rebuilds have taken place, the Acknowledge Rebuild page looks like this:

Figure 3-121: Acknowledge Rebuild page with no rebuild message

NEXSAN			Jall ok
Home	Add Rename Encrypt Delete Array Add Delete Array Array Array Array Owner Spare Spare	Retire Spare Array Lost <b>Rebuild</b> Disk Mode Verify Data Ack	
RAID Information			
System Information		Configure RAID	(?)
Configure RAID	,	teknowledge Rebuild	
Configure Volumes		Acknowledge Rebuild	
Configure Host Access	Acknow	ledge RAID Array Reconstruction	
Power Settings			
System Admin	Reau	ire Rebuild Acknowledgement	
Configure Network	Array rebuilds must be manually acknowledged		
Quick Start	Array rebuilds do not require acknowledgement	۲	
Technical Support		at Asknowledgement Made	
Log Off	13	er Acknowledgement mode	

When a RAID array has been recently rebuilt, the Acknowledge Rebuild page looks like this:

Figure 3-122: Acknowledge Rebuild page with rebuild message

dd ray	Rename Array	Encrypt Array	Delete Array	Array Owner	Add Spare	Delete Spare	Retire Disk	Spare Mode	Array Verify	Lost Data	Rebuild Ack	
							Co Ackno	nfigure owledge	<mark>RAID</mark> Rebuild			?
							Ackr	owledge	Rebuild			
Апа	y z nas be	en recons	structed									
						Acki	nowledge	RAID Arra	y Reconstr	uction		
						R	equire Re	build Ack	nowledgen	nent		
Arra	y rebuilds	must be	manually	acknowle	dged					۲		
Arra	y rebuilds	do not re	quire ack	nowledge	ment					0		
							Set Ack	nowledgen	nent Mode	]		

#### To acknowledge RAID array reconstruction:

 Click the Acknowledge RAID Array Reconstruction button to acknowledge the rebuild. A message displays, confirming the acknowledgment. Click the Back button to return to the Acknowledge Rebuild page.

**Note** RAID array reconstruction warnings also appear on the *Home* page and can be acknowledged from there (see <u>Home page on page 65</u>).

The *Require Rebuild Acknowledgment* section enables you to set the rebuild acknowledgment mode.

• When **Array rebuilds must be manually acknowledged** is selected (the default), array rebuild notifications will appear on the Home page and on the *Acknowledge Rebuild* page, and the **Acknowledge RAID Array Reconstruction** button must be pressed to clear the message.

• When *Array rebuilds do not require acknowledgment* is selected, array rebuild notifications do not appear on the Home page or the *Acknowledge Rebuild* page and only appear in the Event Log.

Select the option that you prefer and press the **Set Acknowledgement Mode** button.

# **Configure Volumes**

Clicking **Configure Volumes** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-123: Configure Volumes navigation bar

Add	Expand	Delete	Rename	Map	Volume	Volume	Migrate
Volume	Volume	Volume	Volume	Volume	Snapshot	Replicate	Volume

Refer to Table 3-124 for help with the Nexsan E-Series/BEAST volume configuration firmware:

Table 3-124: Volume configuration pages

Nav bar button	GUI pages and documentation links
Add Volume	Create a Logical Volume on the facing page
Expand Volume	Expand a Logical Volume on page 154
Delete Volume	Delete a Logical Volume on page 156
Rename Volume	Rename Logical Volumes on page 157
Map Volume	Map Logical Volumes on page 158
Volume Snapshot	Configure Volume Snapshots on page 161
Volume Replicate	Replicate Logical Volumes on page 164
Migrate Volume	Migrate Logical Volumes on page 169

# Create a Logical Volume

Clicking **Configure Volume** takes you to the *Create a Logical Volume* page, which enables you to create logical volumes that act like disk partitions on RAID arrays in your system.

Figure 3-125: Create a Logical Volume array selection page

NEXSAN		
Home RAID Information	Add Expand Delete Rename Map Volume Volume Migrate Volume Volume Volume Volume Volume Snapshot Replicate Volume	
System Information Configure RAID	Configure Volumes Create a Logical Volume	•
Configure Volumes Configure Host Access Power Settings	Array name : 'Array #1' Enclosure : 0 Array number : 1, Controller 0 Fault tolerant	E
System Admin	KAID level : KAID 3 (rotating parity) Number of members : 11 Array name : Array #2'	
Quick Start	Array number : 2, Controller 1 RAID level : RAID 5 (rotating parity) Number : 16	
Log Off	Nex>> Reset	

### To open the volume creation tool:

• Select which RAID array you want to create volumes on by clicking its selection button, then click **Create Volume** to open the volume creation tool.

If the selected array has no volumes on it, the volume creation tool looks like this:

Figure 3-126: Create a Logical Volume tool page (no volumes in selected array)

NEXSAN		
Home RAID Information	Add Expand Delete Rename Map Volume Volume Migrate Volume Volume Volume Volume Volume Snapshot Replicate Volume	
System Information Configure RAID	Configure Volu Create a Logical V	mes /olume
Configure Volumes	Array#2 selected, Controller 1, RA	D5, 15.0 TB (13.6 TiB)
Power Settings	Volume name Volume size (Giga bytes (GB) to one decimal place)	13349.0 GB
System Admin Configure Network	Limit volume size to less than 2TB Enable snapshots	
Quick Start	Reserve for snapshots (Giga bytes (GB) to one decimal place)	GB
Log Off	Create Volume	Reset
	© MB ● GB ○ % © MiB ◎	GiB Change Units
	Configured Volume In	nformation
	Free space on Array #2 Array 2, Controller 1, Enclosure 1 Total capacity 15.0 TB (13.6 TIB)	
	Free Area         Size in MB           Total         13349938 MB           1         13349938 MB	Size in GB         % of Array           13349.9 GB         0           13349.9 GB         0
	Below bar represents the size and posit	ion of the free space areas 100%

If the selected array already has one or more logical volumes configured, the volume creation tool looks like this:



Figure 3-127: Create a Logical Volume tool page (one or more volumes in selected array)

#### **b** To add volumes to a RAID array:

#### 1. Enter the following information:

Table 3-128: Adding volumes to a RAID array

Setting	Action
Volume Name	Enter a name for the volume. Volume names can be up to 63 characters long. If this is the first volume configured for this array, the name defaults to the name of the array. If there are already volumes on the array, then the <b>Volume Name</b> field is blank.

Setting	Action
Volume Size (X to one decimal place)	Enter the desired size of the new volume. The value of this field defaults to all of the remaining space left on the array. The Nexsan Storage System defaults to true gigabytes (GB), but this can be changed using the unit type selection buttons and <b>Change Units</b> button (located below the <b>Create Volume</b> and <b>Reset</b> buttons).
Limit volume size to less than 2TB	This option is unchecked by default. If your hosts do not support volumes of more than 2 terabytes (TB) in size, check this option. <b>Note</b> If you select this option, the value entered in <b>Volume Size (X to one decimal place)</b> must not exceed 2 TB, or else the volume will not be built and an error message will appear.
Enable snapshots	<ul> <li>To enable snapshots (and replication) for this volume, leave this box checked. To disable snapshots for this volume, uncheck the box.</li> <li>On arrays that have advanced feature support enabled, (see <u>Create a new</u> <u>RAID array on page 122</u>), this option is checked by default.</li> <li>Notes:</li> <li>If you disable snapshots for this volume, you can enable them later on the <i>Configure Volume Snapshots</i> page (see <u>Configure Volume Snapshots on page 161</u>).</li> <li>For detailed information regarding the snapshots and replication features, see the <i>Nexsan High-Density Storage Snapshots and Replication User Guide</i>.</li> </ul>
Reserve for snapshots (X to one decimal place)	Enter the desired size of the snapshot reserve. When <b>Enable snapshots</b> is checked, the value of this field defaults to approximately 25% of the value of <b>Volume Size (X to one decimal place)</b> . <b>Note</b> It is recommended that the snapshot reservation be set to approximately 25% of the volume size. See the <i>Nexsan High-Density Storage Snapshots and Replication User Guide</i> for more information.

Note If at any time you wish to return the Create a Logical Volume page to its initial state, click Reset.

2. When you have entered all of the required information, click Create Volume.

A message is displayed, informing you that the volume as been created, and you are prompted to assign the logical unit numbers (LUNs) and host port access:



Figure 3-129: Volume mapping tool

- 3. In the *Volume LUN Mapping* section, assign a logical unit number (LUN) for each port that the volume will be accessed through. Check the **Use same LUN for all ports of the same type** check box to have all Fibre Channel, SAS-to-Host, and 10Ge or 1Ge iSCSI ports use the same LUN mapping.
- 4. Set the Default Access (applied to new or unknown hosts) by selecting Deny, Read, or R/W:

Table 3-130: Setting default access

Setting	Action
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

5. If at least one host group has been created (see <u>Manage Host Groups on page 182</u>), set the **Group Default** by checking or unchecking the box in the *Use Default* column:

Setting	Action
Use Default	This is the default setting, and is the same as <b>Default Access</b> .
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

Table 3-131: Setting group default access

6. Set access privileges for individual hosts by checking or unchecking the box in the *Use Default* column: Table 3-132: Setting access privileges for individual hosts

Setting	Action
Use Default	When selected, the host or host group will use the <b>Group Default</b> setting (if the host is part of a group) or the <b>Default Access</b> setting (if the host is not part of a group). This is the default setting.
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

Note If at any time you wish to return the Map Logical Volumes page to its initial state, click Reset.

7. When you have finished assigning host access privileges, click **Apply Changes**. A message displays, indicating that the settings have been saved.

Note For more information about host access, see Configure Host Access on page 172.

# Expand a Logical Volume

Clicking **Configure Volumes > Expand Volume** takes you to the *Expand a Logical Volume* page. This page lists each array in the system and all volumes in each array. Scroll down to see all arrays and volumes.

Figure 3-133	Expand a Logica	<i>I Volume</i> page
--------------	-----------------	----------------------

NEXSAN		<mark>√all ok</mark>
Home	Add Evened Delate Research Mars Volume Minute	
RAID Information	Volume Volume Volume Volume Volume Snapshot Replicate Volume	
System Information	Configure Volumes	2
Configure RAID	Expand a Logical Volume	•
Configure Volumes	(1) · · · · · · · · · · · · · · · · · · ·	
Configure Host Access	Free space on 'Training' Array 1, Controller 0, Enclosure 0	E
Power Settings	Total capacity 3.0 TB (2.7 TIB)	
System Admin	Free Area Size in MB Size in GB % of Array	
Configure Network	1 801412 MB 801.4 GB 26	
Quick Start	Below bar represents the size and position of the free space areas	
Technical Support	0%	
Log Off		
	Volume ID (2) on 'Training' (Array 1)	
	Volume capacity 2199000 MB, 2199.0 GB (2047.9 GiB)	
	% of total array used 73% Number of bad blocks 0	
	LUN mapping <u>Click to view</u>	
	Volume serial number 3FTH153H Volume created Thursday 21-Jul-2011 11:28:46	
	GB Expand Volume	
	Existing on array 1, controller 0	
	Maximum: 3000413 MB, 3000.4 GB (2794.3 GiB)	
	Below bar represents the size and position of the above volume	
	0%	
		-

The array information section lists the array name, array number, array owner, enclosure, and total capacity. See <u>RAID Array Information on page 72</u> for more information. If there is free space on the array, this section displays the total amount of space taken up by existing volumes, plus the percentage of the array's total capacity used.

If there is no space on the array, the array information section looks like this:

Free space on 'Training' Array 1, Controller 0, Enclo Total capacity 3.0 TB (2.7 T	sure 0 iB)							
Free Area	Size in MB	Size in GB	% of Array					
There are no free space areas, all of the array capacity is used								

Each volume's information section lists the volume ID, array name, volume name, volume capacity, the percentage of the array that the volume uses, the number of bad blocks, a link to the logical unit number (LUN) mapping information, the volume serial number, and the date that the volume was created (see Detailed Volume Layout on page 79).

The darker area below the listed items displays the **GB** text field, the **Expand Volume** button, the name of the array that the volume belongs to, the controller number, the *Capacity*, and the *Maximum* size that the volume can be expanded to.

The bottom area contains a bar which represents the percentage of the array's capacity that the volume uses, as well as the volume's relative position within the array.

Figure 3-134: Message indicating no free space on array

### To expand a volume:

- 1. Click **Configure Volumes > Expand Volume**. The *Expand a Logical Volume* page opens (see Figure 3-133).
- 2. Before you commit the changes, we recommend that you check the new volume size shown at the top of the confirmation screen to ensure that you have enough free space to proceed.
- 3. If you have space to proceed, enter a new volume size in true gigabytes (GB) in the GB field.
- 4. Click **Expand Volume**. A confirmation screen displays:



5. To proceed with the volume expansion, check the confirmation check box and click **Confirm Expand Command**. A message displays, confirming that the volume has been expanded. Click the **Back** button to return to the *Expand a Logical Volume* page.

Note To cancel the volume expansion, click CANCEL Expand.

A message displays, stating that the operation has been canceled. Click the **Back** button to return to the *Expand a Logical Volume* page.

## Delete a Logical Volume

Clicking **Configure Volume > Delete Volume** takes you to the *Delete a Logical Volume* page. This page lists each array in the system and all volumes in each array. Scroll down to see all arrays and volumes.

NEXSAN		<mark>√</mark> <u>all ok</u>
Home RAID Information System Information Configure RAID Configure Volumes Configure Volumes System Admin Configure Network Quick Start Technical Support Log Off	Add Volume       Delete       Rename       Map       Volume       Volume       Map       Volume       Volume       Volume       Volume       Delete       Volume       Delete       Volume       Delete       Volume       Map       Volume       Volume       Volume	
	Volume ID (3) on 'Training' (Array 1)           Volume name         Training 2           Volume capacity         801413 MB, 801.4 GB (746.3 GiB)           % of total array used         25%           Number of bad blocks         0           LUN mapping         Click to view	

Figure 3-136: Delete a Logical Volume page

The array information section lists the array name, array number, array owner, enclosure, and total capacity. See <u>RAID Array Information on page 72</u> for more information. If there is free space on the array, this section displays the total amount of space taken up by existing volumes, plus the percentage of the array's total capacity used.

Each volume's information section lists the volume ID, array name, volume name, volume capacity, the percentage of the array that the volume uses, the number of bad blocks, a link to the logical unit number (LUN) mapping information, the volume serial number, and the date that the volume was created (see Detailed Volume Layout on page 79).

- To delete a volume:
- 1. Click the **Delete Volume** button in the volume's information area.
  - A confirmation screen displays.

Figure 3-137: Volume deletion warning and confirmation dialog

Confirm that y	ou wish to DELETE th	e below Volume
3: 'Training 2' Array: 'Training', ( Capacity: 801.4 GE	Controller 0, Enclosure 0 3 (746.3 GiB)	
<u>Controller 0 Ports</u> Fibre - Host 0, LUN Fibre - Host 1, LUN	12 12	<u>Controller 1 Ports</u> Fibre - Host 0, LUN 2 Fibre - Host 1, LUN 2
Confirm by clicking the checkbox and then click	ing the 'Confirm Delete Command' o	r Cancel by clicking the 'CANCEL Delete' button.
	Confirm Delete Command	
	CANCEL Delete	

2. To delete the volume, click the confirmation check box and then click **Confirm Delete Command**. A message displays, confirming that the volume has been deleted. Click the **Back** button to return to the *Delete a Logical Volume* page.

**Note** To cancel the volume deletion, click the **CANCEL Delete** button. A message displays, stating that the operation has been canceled. Click the **Back** button to return to the *Delete a Logical Volume* page.

### **Rename Logical Volumes**

Clicking **Configure Volume > Rename Volume** takes you to the *Rename Logical Volumes* page.

Figure 3-138: Rename Logical Volumes page

NEXSAN		ALL OK
Home RAID Information	Add Expand Delete <b>Rename</b> Map Volume Volume Migrate Volume Volume Volume Volume Volume Snapshot Replicate Volume	^
System Information Configure RAID	Configure Volumes Rename Logical Volumes	0
Configure Volumes Configure Host Access	Volume Details	New Name
Power Settings	Array 'Array #1 - VMware', Controller 0, End	closure 0
System Admin Configure Network	1: '2012 VM Data Store' 47.5 TB (44255.2 GiB)	2012 VM DataStore
Quick Start	Arrav 'Arrav #2 - Test '. Controller 1. Enclo	osure 0
Technical Support Log Off	2: 'Test1' 3.3 TB (3129.8 GiB)	Test1
	3: 'Test2' 3.3 TB (3129.8 GiB)	Test2
	4: 'Test3' 3.3 TB (3129.8 GiB)	Test3
	Array 'Array #3 - Backup', Controller 0, Enc	losure 0
	5: 'Store-A' 17.4 TB (16275.0 GiB)	Store-A
	6: 'Store-B'	

Each volume information section lists the volume number, current volume name, the array the volume belongs to, the controller that the array is assigned to, the enclosure, and the volume's capacity (see Configured Logical Volumes on page 76).

### To change the name of a volume:

1. Enter the new volume name in the **New Name** field (default is the current volume name).

Note If at any time you wish to return the *Rename Logical Volumes* page to its initial state, click **Reset**.

2. Click Save Settings.

A message displays, confirming that the name setting has been changed. Click the **Back** button to return to the *Rename Logical Volumes* page.

### Map Logical Volumes

Clicking **Configure Volumes > Map Volume** takes you to the *Map Logical Volumes* page.

Figure 3-139: Map Logical Volumes page

<b>EXSAN</b>																
Home RAID Information	Add Volume	Expand Volume	Delete Volume	Rename Volume	Map Volume	Volume Snapsho	Volume t Replicate	Migrate Volume								
System Information Configure RAID								Config Map Log	u <mark>re Volur</mark> gical Volu	mes umes						()
Configure Volumes Configure Host Access			Volum	9	1	0 Host 0	9 Host 1	Fil Host 2	bre Ø Host 3	Host 4	• Host 5	• Net 0	1Ge Ø Net 1	ISCSI INet 2	• Net 3	
Power Settings						An	ay 'Array	#1 - VMwa	re', Contro	oller 0, End	losure 0					
System Admin Configure Network		1: '20 47.5	0 <b>12 VM D</b> a TB (4425	taStore' 5.2 GiB)	C0	LUN 0	LUN 0	LUN 0		LUN 0	LUN 0					ENEXT >
Quick Start Technical Support					1-1	20110	rrav 'Arra	v #2 - Test	'. Controll	er 1. Enclo	osure 0					
Log Off		2: 'Te 3.3 T	est1' B (3129.8	GiB)	C0	-						LUN 0	LUN 0	LUN 0	LUN 0	
		3: 'Te	est2'	,	C0		LUN 1									
		3.3 T	B (3129.8	GiB)	C1		LUN 1									
		4: 'Te 3.3 T	est3' B (3129.8	GiB)	00		LONZ									E NEXT

Each volume information section lists the volume number, current volume name, the array the volume belongs to, the controller that the array is assigned to, the enclosure (if there is more than storage system or storage expansion), the volume's capacity, and the volume's host port assignments (see <u>Configure volumes</u> on a RAID array on page 53).

### To map a volume to a logical unit number (LUN):

 Click the **Next** button next to the volume you wish to map. The volume mapping tools are displayed:

Figure 3-140: Volume mapping tools

NEXSAN											
Home RAID Information	Add Expand Volume Volume	I Delete Rename Volume Volume	Map Volume S	Volume Snapshot F	Volume Migra Replicate Volu	ate me					
System Information Configure RAID	¢				Con Map i	f <mark>igure Volu</mark> Logical Vo	imes lumes			(?	
Configure Volumes	< Previous									<u>Next &gt;</u>	
Configure Host Access					Т	est1' (Volume	2)				
Power Settings	Volume name				Test1		,				
System Admin	Volume capaci Array	ty			3360621 I 'Array #2	MB, 3360.6 G ? - Test ' (Arra	B (3129.8 GiB) y 2), Controller	1, Enclosure 0			
Configure Network											
Quick Start	Volume LUN	Mapping 9 Host 0	9 Host	1 0 F	Fibre	ost 3 0 H	ost 4 9 Hos	t5 ONet0	1Ge iSCSI	et 2 🕘 Net 3	
Technical Support Log Off	2: 'Ter 3.3 TE (3129	t1' C0 ► C1 ► C1 ► V Use same	LUN for all	✓ ✓ ports of the	✓ ✓ e same type	×	× ×	V LUNO V	LUN 0 V LUN 0 LUN 0 V LUN 0	V LUN 0 V	
	Туре		н	lost				Ac	cess		
	.,,,,,,						Use Default	Deny	Read	R/W	
		Default Access						۲	0	0	
	⊘ iSCSI	Host #1 (iSCSI) iqnc	m.microsoft	t:jpsmith5.	derbylab.nexsa	in.com	✓	۲	0	0	
	⊘ iSCSI	Host #2 (iSCSI) iqn.19	91-05.com.	microsoft:y	yellowserver10		✓	۲	0	0	
	○ iSCSI	Host #3 (iSCSI) iqn.19	91-05.com.	microsoft:y	yellowserver9		✓	۲	0	0	
	Fibre	Host #4 (Fibre) WWPI	V: 20-01-00-	-0E-1E-C3-	-0D-5C		✓	۲	0	0	
	Fibre	Host #5 (Fibre) WWPI	N: 21-00-00-	-0E-1E-11-4	4B-80		✓	۲	0	0	
	Fibre	Host #6 (Fibre) WWPI	V: 21-00-00-	-0E-1E-11-4	4B-81		✓	۲	0	0	

- 2. In the *Volume LUN Mapping* section, assign a logical unit number (LUN) for each port that the volume will be accessed through. Check the **Use same LUN for all ports of the same type** check box to have all Fibre Channel, SAS-to-Host, and 10Ge or 1Ge iSCSI ports use the same LUN mapping.
- 3. Set the Default Access (applied to new or unknown hosts) by selecting Deny, Read, or R/W:

Table 3-141: Setting default access

Setting	Action
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

### 4. If at least one host group has been created (see <u>Manage Host Groups on page 182</u>), set the **Group Default** by checking or unchecking the box in the *Use Default* column:

Table 3-142: Setting group default access

Setting	Action
Use Default	This is the default setting, and is the same as <b>Default Access</b> .
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

5. Set access privileges for individual hosts by checking or unchecking the box in the *Use Default* column: Table 3-143: Setting access privileges for individual hosts

Setting	Action
Use Default	When selected, the host or host group will use the <b>Group Default</b> setting (if the host is part of a group) or the <b>Default Access</b> setting (if the host is not part of a group). This is the default setting.
Deny	Select to prevent all new or unknown hosts from accessing the volume. This is the default setting.
	<b>Note</b> It is recommended to leave the <b>Default Access</b> setting as <b>Deny</b> and then grant access to specific hosts as necessary. This prevents unconfigured hosts from modifying existing data.
Read	Select to allow read-only access to the volume for all new or unknown hosts.
R/W	Select to allow read/write access to the volume for all new or unknown hosts.

Note If at any time you wish to return the *Map Logical Volumes* page to its initial state, click **Reset**.

6. When you have finished assigning host access privileges, click **Apply Changes**. A message displays, indicating that the settings have been saved.

Note For more information about host access, see Configure Host Access on page 172.

# **Configure Volume Snapshots**

Clicking **Configure Volumes > Volume Snapshot** takes you to the *Volume Snapshots* page, where you can take snapshots and configure snapshot settings for individual volumes.

For detailed instructions on how to configure, create, and manage snapshots, see the Nexsan High-Density Storage Snapshots and Replication User Guide.



Figure 3-144: Volume Snapshots page

Table 3-145: Volume Snapshots

Section	Description
Volume Details	Lists the volume number, current volume name, the array that the volume belongs to, the Controller that the RAID set is assigned to, the enclosure, and the volume's capacity.
Snapshot Status	Displays the number of snapshots, the amount of hard disk space used by snapshots, and the date and time of the latest snapshot.

#### Clicking a volume's **Next** button takes you to the volume's snapshot management tools page.

Figure 3-146: Configure Volume Snapshots page



Table 3-147: Configure Volume Snapshots

Section	Description
Volume Details	Displays the volume number, current volume name, the array that the volume belongs to, the Controller that the array is assigned to, the volume's capacity, and the volume's host port assignments (see <u>Configured Logical Volumes on page 76</u> ).
Snapshot Information	Displays whether snapshots are enabled for the volume. If they are, then it also shows the number of snapshots, the amount of hard disk space used by existing snapshots, and the amount of space available for additional snapshots.
Snapshot Con- figuration	Enables you to configure the snapshot settings for this volume, including <b>Snapshot</b> <b>Support</b> , <b>Snapshot Reservation (GB)</b> , <b>Creation Schedule</b> , and <b>Retention Policy</b> . For more information on configuring snapshots, see the <i>Nexsan High-Density Storage</i> <i>Snapshots and Replication User Guide</i> .

Section	Description
Snapshot Details (See <u>Figure 3-148</u> )	Displays the date and time of each snapshot that has been made of that volume, plus its LUN mapping status. It also contains buttons for creating a snapshot, restoring the volume from a snapshot, cloning a snapshot, unmapping all mapped snapshots, and deleting all snapshots.

Tigure 5-146. Shapshot Details section of Configure Volume	Shapshots page
Figure 3 1/8: Spanshot Details section of Configure Volume	Snanchate nada

	Snapshot Details	LUN Mapping	Delete
	09-Dec-2011 15:15:00	Map Offline	Delete
	08-Dec-2011 15:15:00	Map Offline	Delete
	4: 'Snapshot #4' 07-Dec-2011 15:15:00	Map Offline	Delete
	5: 'Snapshot #5' 06-Dec-2011 15:15:00	Map Offline	Delete
L	05-Dec-2011 15:15:00	Map Offline	Delete
	02-Dec-2011 15:15:00	Map Offline	Delete
	Create Snapshot Restore Volume Clone Snapshot Offline All	Delete All	

**Note** Snapshots created through the GUI may not contain information that is still in the host's internal cache and not written to the RAID array, which may cause data to become corrupted. For this reason, it is strongly recommended that all host I/O be halted when taking a volume snapshot through the GUI.

Snapshots can be used to restore the volume to a previous state, create a new volume based on this volume's previous state, be mapped to a LUN so that hosts can access it, or can be deleted if they are no longer needed. For details on how to perform these tasks, see the *Nexsan High-Density Storage Snapshots and Replication User Guide*.

## **Replicate Logical Volumes**

Clicking **Configure Volumes > Volume Replicate** takes you to the *Replicate Logical Volumes* page, where you can set up, manage, and view details about volume replications.

For detailed instructions on how to configure, create, and manage replication between Nexsan Storage Systems, see the Nexsan High-Density Storage Snapshots and Replication User Guide.





## **Outbound replication**

The Outbound Replication section contains the same information as can be found on the Replication Information page. See Replication Information on page 97.

Clicking the **Next** button for a volume that is not yet configured for replication takes you to the *Create Replication - Select Partner* page. For instructions on how to set up replication between Nexsan Storage Systems, see the *Nexsan High-Density Storage Snapshots and Replication User Guide*.

Clicking the **Next** button for a volume that has replication configured takes you to the *Configure Replication* page.

NEXSAN		Jall ok
Home RAID Information	Add Expand Delete Rename Map Volume Volume Migrate Volume Volume Volume Volume Snapshot Replicate Volume	
System Information Configure RAID	Configure Volumes Configure Replication	?
Configure Volumes Configure Host Access Power Settings System Admin Configure Network Quick Start Technical Support Log Off	Outbound Replication Details           1: 'Volume #1' Array: 'ARRAY_0', Controller 0 Capacity: 2.0 TB (1862.6 GIB)           Current status         Idle           When to start replication         Manual           Replication partner         E48-187           Replica serial number         7668319F           Latest recovery point         -           Recovery point in progress         -           StartNow         Pause	
	Replication Options         Manual         When a new snapshot is taken         On a schedule:         Replicate automatically once         starting [23:00 v] until [23:00 v] on:         Monday       Saturday         Tuesday       Sunday         Wednesday         Thursday         Friday	
	Preferred source ports              ☑ 1Ge iSCSI - Net 0             ☑ 1Ge iSCSI - Net 1               ☑ F48.187	
	Replication partner System ID 03BC402E (10.50.40.187, 10.50.40.188)	

Figure 3-150: Configure Replication page for outbound replication

The Outbound Replication Details section displays the following information:

Table 3-151: Outbound Replication Details

Setting	Description
Volume name	The user-defined name of the volume.
Array	The user-defined name of the array that the volume is on, the con- troller which controls that array, and (if the Nexsan Storage System has attached Nexsan Storage Expansions) the enclosure on which the volume resides.

3

Setting	Description
Capacity	Displays the total data storage space of the volume, in terabytes (TB) and binary gigabytes (GiB).
Current status	Displays the current replication status. Possible values are <i>Created</i> , <i>Idle</i> , <i>Running</i> , <i>Aborted</i> , and <i>Reference Snapshot is Missing</i> .
When to start replication	Displays when replication is performed: <i>Manual</i> , <i>On Snapshot</i> , or the schedule that is configured in <i>Replication Options</i> .
Replication partner	Displays a link to the Nexsan Storage System that the volume is being replicated to.
Replica serial number	Displays the unique serial number of the volume replica.
Latest recovery point	Displays the date and time of the latest recovery point, formatted as "Day of Week DD-Mon-YYYY HH:MM". If no replications have yet been made, this field displays a single dash (-).
Recovery point in progress	Displays the date and time of the replication that is currently in pro- gress, formatted as "Day of Week DD-Mon-YYYY HH:MM". If there is no replication currently in progress, this field displays a single dash (-).

The section also contains four action buttons: Start Now, Pause, Resume, and Abort.

Table 3-152: Action buttons

Button	Description
Start Now	When the replication status is <i>Idle</i> or <i>Aborted</i> , clicking <b>Start Now</b> begins replication.
Pause	When a replication is in progress, clicking <b>Pause</b> pauses the replication.
Resume	When a replication is paused, clicking <b>Resume</b> resumes the replication.
Abort	When a replication is running, clicking <b>Abort</b> stops the replication.

The *Replication Options* section enables you to configure replication settings for this replication pair, including **When to start replication**, **Preferred source ports**, and **Replication partner**. For instructions on how to configure replication, see the *Nexsan High-Density Storage Snapshots and Replication User Guide*.

The *Modify Replication* section displays buttons for performing various actions on the replication pair, including breaking replication, deleting replication, promoting the replica, restoring from the replica (after promotion), and reversing replication.

Figure 3-153: Modify Replication section of Configure Replication page for outbound replication

Modify Replication	
Break Replication Delete Replica Promote Replica Reverse Replic	ation

For instructions on how to perform these tasks, see the Nexsan High-Density Storage Snapshots and Replication User Guide.

## Inbound replication

The *Inbound Replication* section contains the same information as can be found on the *Replication Information* page. See <u>Replication Information on page 97</u>.

Clicking the **Next** button for a replica takes you to the *Configure Replication* page.

Figure 3-154: Configure Replication page for inbound replication

dd ume	Expand Volume	Delete Volume	Rename Volume	Map Volume	Volume Snapshot	Volume Replicate	Migrate Volume
							Configure Volumes Configure Replication
	•	2: 'Med	iaData1'				Inbound Replication Details
G	K.	Array: ' Capaci	Array #1', ty: 2.0 TB	Controlle (1862.6 G	r 0, Enclo iiB)	sure 0	
Curr	ent status					le	dle
Repl	lication pa	rtner				E	<u>E48.187</u>
Sour	rce volum	e serial n	umber			1	1646E527
Repl	lica snaps	hot space	e used			0	0 MB (0.0 GiB)
Repl	lica snaps	hot space	e free			4	499.9 GB (465.6 GiB)
Repl	lica snaps	hots (reco	overy poin	ts)		3	3
Late	est recover	y point				0	01-Jul-2013 09:38:15
-							Dealine Configuration
						5	Replica Configuration
кері	lica name					I	MediaData I
						4	499.9 GB (21788.1 GB maximum)
Snapshot Reservation (GB)						[	Warn when snapshot space free falls below 20%
						[	Expand automatically when snapshot space free falls below 20%
Deplication portnor						E	<u>E48.187</u>
Replication partner System						S	System ID 10B21058 (10.50.40.187, 10.50.40.188)
					_		
						Save Sett	tings Reassociate Partner
						Save Sett	Ings Reassociate Partner
	_	_				Save Sett	Modify Replication

### The Inbound Replication Details section displays the following information:

Table 3-155: Inbound Replication Details

Setting	Description
Replica name	The user-defined name of the replica.
Array	The user-defined name of the array that the replica is on, the con- troller which controls that array, and the enclosure where the rep- lica resides.
Capacity	Displays the total data storage space of the replica, in terabytes (TB) and binary gigabytes (GiB).
Current status	Displays the current replication status. Possible values are <i>Created</i> , <i>Idle</i> , <i>Running</i> , <i>Aborted</i> , and <i>Reference Snapshot is Miss-ing</i> .

Setting	Description
Replication partner	Displays a link to the Nexsan Storage System that houses the source volume.
Source volume serial number	Displays the unique serial number of the source volume.
Replica snapshot space used	The amount of the replica's snapshot reservation that is being used by existing snapshots, in megabytes (MB) and binary gigabytes (GiB).
Replica snapshot space free	The amount of the replica's snapshot reservation that is empty, in gigabytes (GB) and binary gigabytes (GiB)
Replica snapshots (recovery points)	The number of snapshots in the replica's snapshot reservation.
Latest recovery point	Displays the date and time of the latest recovery point, formatted as "Day of Week DD-Mon-YYYY HH:MM". If no replications have yet been made, this field displays a single dash (-).

The *Replication Configuration* section enables you to configure replication settings for this replication pair, including **Replica name**, **Snapshot Reservation**, and **Replication partner**. For instructions on how to configure replication, see the *Nexsan High-Density Storage Snapshots and Replication User Guide*.

The *Manage Replication* section displays buttons for performing various actions on the replication pair, including breaking replication, deleting replication, promoting the replica, restoring from the replica (after promotion), and reversing replication.

Figure 3-156: Modify Replication section of Configure Replication page for inbound replication

	Modif	y Replication		
Break Replication	Delete Replica	Promote Replica	Reverse Replication	

For instructions on how to perform these tasks, see the *Nexsan High-Density Storage Snapshots and Replication User Guide*.

## Migrate Logical Volumes

Clicking **Configure Volumes > Migrate Volume** takes you to the *Migrate Logical Volumes* page. This page enables you to move a live volume from one RAID array to another. It lists each array in the system and all volumes in each array. Scroll down to see all arrays and volumes.

**Note** The volume migration feature *moves* a volume from one array to another. It does NOT make a *copy* of the volume.



Figure 3-157: Migrate Logical Volumes page

The array information section lists the array name, array number, array owner, enclosure, and total capacity. See <u>RAID Array Information on page 72</u> for more information. If there is free space on the array, this section displays the total amount of space taken up by existing volumes, plus the percentage of the array's total capacity used.

If there is no space on the array, the array information section looks like this:

Figure 3-158: Message indicating no free space on array



Each volume's information section lists the volume ID, array name, volume name, volume capacity, the percentage of the array that the volume uses, the number of bad blocks, a link to the logical unit number (LUN) mapping information, the volume serial number, and the date that the volume was created (see Detailed Volume Layout on page 79).

The darker area below the listed items displays the **Migrate Volume** button, the name of the array that the volume belongs to, the controller number, and the volume capacity.

The bottom area contains a bar which represents the percentage of the array's capacity that the volume uses, as well as the volume's relative position within the array.

To migrate a volume from one array to another:

1. For the volume you wish to move, click the **Migrate Volume** button. The *Volume Migrate* page displays.

NEXSAN		
Home RAID Information	Add Expand Delete Rename Map Volume Volume Migrate	-
System Information		
Configure RAID	Volume Migrate	0
Configure Volumes	Migrate Volume	
Configure Host Access	Volume name BFS-ESXI5.1U1	
Power Settings	Volume (2) 20000 MB, 2000 GB (100.2 GB) Volume ID 1 Amore Access #1	
System Admin	Viray Aliay #1 % of total array 2%	
Configure Network	Volume serial number 7EC991CE Volume serial number Wednesday 04.Sen.2013 09:35:03	
Technical Support	Existing on array 1, controller 0	
Log Off	200000 MB, 200.0 GB (186.2 GiB)	
	Select Destination array	
	Array name : 'Array #1'     O       Array number : 1, Controller 0     7.0 TB available       RAID level : RAID 5 (rotating parity)     Fault tolerant       Number of members : 5     8.0 TB (7.2 TiB)	
	Array name : 'Array #2'     O       Array number : 2, Controller 1     As TB available       RAID level : RAID 5 (rotating parity)     Fault tolerant       Number of members : 4     6.0 TB (5.4 TIB)	
	Migrate Volume	

Figure 3-159: Volume Migrate page

- 2. In the *Select Destination array* section, click the selection button for the array that you want to send the volume to.
- 3. Click Migrate Volume. A confirmation screen displays:

Figure 3-160: Volume migration warning and confirmation dialog

Confirm that you wish to MIGRATE the below Volume
This will migrate the volume to the chosen array. Performance may be degraded until the migration is complete.
Migrate Volume
4: 'E SXi4.1U3-Data1' Array: 'Array #2', Controller 0 Capacity: 200.0 GB (186.2 GiB)
Controller 0 Ports         Controller 1 Ports           Fibre - Host 0, LUN 10         Fibre - Host 0, LUN 10           Fibre - Host 1, LUN 10         Fibre - Host 1, LUN 10
Destination array Array name : Array #1 Array number : 1
RAID level : RAID 5 (rotating parity) Number of members : 5 Array capacity : 8.0 TB (7.2 TiB) Stripe size : 128 (bytes Created : Wednesday 04-Sep-2013 09:33:58
Confirm by clicking the checkbox and then clicking the 'Confirm Migration' or Cancel by clicking the 'CANCEL Migration' button.
CANCEL Migration

4. To proceed with the volume migration, check the confirmation check box and click **Confirm Migration**. A message displays, saying that the volume migration has started.

**Note** To cancel the volume migration, click **CANCEL Migration**. A message displays, stating that the operation has been canceled. Click the **Back** button to return to the *Migrate Logical Volume* page.

5. If you selected **Confirm Migration** in the previous step, click the **Back** button to see the volume migration progress.

NEXSAN		<mark>√all ok</mark>
Home	Add Expand Delete Rename Map Volume Volume Migrate	^
RAID Information	Volume Volume Volume Volume Snapshot Replicate Volume	
System Information	Configure Volumes	2
Configure RAID	Migrate Logical Volumes	•
Configure Volumes	Volume ID (/) on Array #1	
Configure Host Access	Volume name ESXi4.1U3-Data1 (Migrating)	
Power Settings	Volume capacity 200000 MB, 200.0 GB (186.2 GiB) % of total array 2%	
System Admin	Number of bad blocks 0 I UN manning Click to view	
Configure Network	Volume serial number 7EBDA874 Volume created Monday 07-Oct-2013 14:38:53	
Quick Start	Abort Migration	
Technical Support	Existing on array 1, controller 0 200000 MB, 200.0 GB (186.2 GiB)	
Log Off	Below bar represents the size and position of the above volume	
	0% 100%	
		~

Figure 3-161: Volume migration progress

The volume name has the status *Migrating*, and the button has changed to **Abort Migration**.

#### To abort the volume migration:

1. Click the Abort Migration button. A confirmation screen displays:

Figure 3-162: Volume migration abort warning and confirmation dialog

Confirm that you wish to	ABORT the below Volume MIGRATION
This will abort migration of the volume to the	e chosen array. The migration destination volume will be deleted.
	Migrate Volume
5: 'BFS-W2K12-Data1' (Fina Array: 'Array #1', Controller Capacity: 150.0 GB (139.6 (	lizing migration - 0%) 0 FIB)
<u>Controller 0 Ports</u> Fibre - Host 0, LUN 20 Fibre - Host 1, LUN 20	<u>Controller 1 Ports</u> Fibre - Host 0, LUN 20 Fibre - Host 1, LUN 20
Migra	ation Destination volume
4: 'Migration of BFS-W2K12 Array: 'Array #2', Controller Capacity: 150.0 GB (139.6 (	-Data1' 1 589)
<u>Controller 0 Ports</u> 	<u>Controller 1 Ports</u> 
Confirm by clicking the checkbox and then clickin	ing the 'Confirm Abort' or Cancel by clicking the 'CANCEL Abort' button.
	Confirm Abort CANCEL Abort

2. To abort the volume migration, check the confirmation check box and click **Confirm Abort**. A message displays, saying that the volume migration has been aborted. Click the **Back** button to return to the *Migrate Logical Volume* page.

**Note** To cancel the abort, click **CANCEL Abort**. A message displays, stating that the operation has been canceled. Click the **Back** button to return to the *Migrate Logical Volume* page.

# **Configure Host Access**

Clicking **Configure Host Access** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-163: Configure Host Access navigation bar (Fibre Channel)



For SAS and 10Ge variants of the Host Access navigation bar, see <u>For SAS and 10Ge Storage Systems</u> below.

Refer to Table 3-164 for help with the Nexsan E-Series/BEAST host access firmware:

Table 3-164: Host access configuration pages

Nav bar button	GUI pages and documentation links
Fibre	Configure Fibre on the facing page
1Ge	Configure 1Ge iSCSI on page 178
Groups	Manage Host Groups on page 182
Hosts	Manage Hosts on page 184
Access	Host Access on page 185

For SAS and 10Ge Storage Systems

On Nexsan Storage Systems configured for SAS-to-Host, the **Fibre** tab is replaced by a **SAS** tab, which links to <u>Configure SAS</u>.

Figure 3-165: Configure Host Access navigation bar (SAS)

SAS 10

1Ge Groups

On Nexsan Storage Systems configured for 10Gb Ethernet iSCSI, the **Fibre** tab is replaced by a **10Ge** tab which links to <u>Configure 10Ge iSCSI</u>.

Figure 3-166: Configure Host Access navigation bar (10Ge iSCSI)



# **Configure Fibre**

If your system is configured for Fibre Channel, clicking **Configure Host Access** takes you to the *Configure Fibre* page, which enables you to change settings for each Fibre Channel host port on each RAID Controller.

Home	Fibre 1Ge Hosts Grou	ps Access			
AID Information					
em Information			Configure Host Acces	S	
Configure RAID			Contigure Fibre		
figure Volumes	Controller 0	Fibre - Host 0	Fibre - Host 1	Fibre - Host 2	Fibre - Host 3
e Host Access	Port status	Link up at 16Gbit (P2P)	Link up at 16Gbit (P2P)	Link Down	Link Down
01100011000000	Topology	AUTO V	AUTO V	AUTO V	AUTO V
Power Settings	Loop ID	AUTO 🗸	AUTO 🗸	AUTO 🗸	AUTO 🗸
System Admin	Link speed	AUTO 🗸	AUTO 🗸	AUTO 🗸	AUTO 🗸
figure Network	Frame size	2112 🗸	2112 🗸	2112 🗸	2112 🗸
Quick Start	Host port cleanup	Yes 🗸	Yes 🗸	Yes 🗸	Yes 🗸
hnical Support	Controller 1	Fibre - Host 0	Fibre - Host 1	Fibre - Host 2	Fibre - Host 3
Log Off	Port status	Link up at 16Gbit (P2P)	Link up at 16Gbit (P2P)	Link Down	Link Down
LUG OII	Topology	AUTO 🗸	AUTO 🗸	AUTO 🗸	AUTO 🗸
	Loop ID	AUTO 🗸	AUTO 🗸	AUTO 🗸	AUTO 🗸
	Link speed	AUTO 🗸	AUTO 🗸	AUTO 🗸	AUTO 🗸
	Frame size	2112 🗸	2112 🗸	2112 🗸	2112 🗸
	Host port cleanup	Yes 🗸	Yes 🗸	Yes 🗸	Yes 🗸

The information is arranged by Controller and then by host port. The *Current Status* row shows the link status, speed, and topology.

- **•** To change Fibre Channel host configuration:
- 1. For each Fibre Channel host port, configure the following settings:

Table 3-168: Fibre Channel host port configuration

Setting	Action
Topology	Select Loop, Point-to-point, or AUTO (the default) from the drop-down list.
Loop ID	Select an ID number from <b>0</b> to <b>126</b> , or <b>AUTO</b> (the default), from the drop-down list.
Link speed:	Select <b>2Gbit</b> , <b>4Gbit</b> , <b>8Gbit</b> , <b>16Gbit</b> , <b>32Gbit</b> , or <b>AUTO</b> (the default) from the drop- down list. <b>Note</b> The available link speed options may vary by model.
Frame size	Select <b>512</b> , <b>1024</b> , <b>2048</b> , or <b>2112</b> from the drop-down list.
Host port cleanup	This option is only used in full-fabric topologies where RSCN notification is enabled on the connected Fibre switch. RSCN notification is a switch function which can inform other devices on the FC fabric that a host has been disconnected without logging off. Select <b>No</b> if you are not using a full-fabric topology or if RSCN notification is disabled. Select <b>Yes</b> if you are using a full-fabric topology with RSCN notification.

Note If at any time you wish to return the *Configure Fibre* page to its initial state, click **Reset**.

- 2. When you have selected the desired new settings, do one of the following:
  - Click **Save Configuration**. The settings are saved and are applied after the system is restarted (see Reboot System on page 203).
  - Click Save and Apply Changes. The settings are saved and applied immediately.

### **Configure SAS**

If your Nexsan Storage System is configured for SAS-to-Host connectivity, clicking **Configure Host Access** takes you to the *Configure SAS* page.

On Nexsan Storage Systems with four SAS ports per controller, the Configure SAS page looks like this:

NEXSAN						
Home RAID Information	SAS 1Ge Groups Hosts	Access				
System Information Configure RAID			Configure Host Access Configure SAS			
Configure Volumes	Controller 0	Host Port 0	Host Port 1	Host Port 2	Host Port 3	
Configure Host Access	Current status	6Gbit (4 lanes)	6Gbit (4 lanes)	6Gbit (4 lanes)	6Gbit (4 lanes)	
Power Settings	Wide port link speed	AUTO -	AUTO -	AUTO -	AUTO -	
System Admin	Controller 1 Current status	Host Port 0 Host (4 lanes)	Host Port 1 6Gbit (4 lanes)	Host Port 2 6Gbit (4 lanes)	Host Port 3 6Gbit (4 lanes)	
Configure Network	Wide port link speed	AUTO -	AUTO -	AUTO -	AUTO -	
Quick Start			Save Configuration Res	et	Г	
Log Off						

Figure 3-169: Configure SAS page (four ports per controller)

Current status displays the current status of the link, its speed, and the number of active lanes.

### **To change SAS-to-Host configuration:**

1. Using the **Wide port link speed** drop-down list, select the maximum link speed for the host connection: **1.5Gbit**, **3Gbit**, **6Gbit**, **12Gbit**, or **AUTO** (the default).

Selecting **AUTO** tells the Nexsan Storage System to discover and select the data rate of the attached host or SAS device.

The available link speed options may vary by model.

If at any time you wish to return the *Configure SAS* page to its initial state, click **Reset**.

2. Click Save Configuration to update the settings.

A message displays, indicating that the settings have been updated. Click the **Back** button to return to the *Configure SAS* page.

**Note** New SAS settings don't take effect until the RAID Controller has been rebooted (see <u>Reboot System</u> on page 203).

# Configure 10Ge iSCSI

If your Nexsan Storage System is configured for 10Gb Ethernet iSCSI connectivity, clicking **Configure Host Access** takes you to the *Configure 10Ge iSCSI* page.

The Configure 10Ge iSCSI page looks like this:

Figure 3-170:	Configure	10Ge	iSCSI	page	(four	ports	per	controll	er)
				P - 9 -	(		P		,

Home mation mation e RAID olumes Access Access Acting Settings Admin Flow control Flow control	Groups Access	Configure Host A Configure 10Ge	Access ISCSI	
mmation mmation e RAID olumes Port status Port setting Controller 0 Port status Port setting flow control Fu Liberth	10Ge-ISCSI - Host 0 Link up at 10Gbit Full Duplex	Configure Host A Configure 10Ge	Access	
mation e RAID Polumes Access Access Acting Flow control Flow control Controller 0 Port status Port setting Flow control Fu Controller 0 Port status Port setting Fu Controller 0 Port status Port setting Fu Controller 0 Port status Port setting Fu Controller 0 Port status Port setting Fu Controller 0 Port setting Fu Controller 0 Port setting Fu Controller 0 Fu Controller 0 Port setting Fu Controller 0 Port setting Fu Controller 0 Fu Controller 0 Fu Fu Controller 0 Fu Fu Fu Fu Fu Fu Fu Fu Fu Fu	10Ge-iSCSI - Host 0 Link up at 10Gbit Full Duplex	Configure Host / Configure 10Ge	Access	
e RAID olumes Nacosss Settings Admin Flow control	10Ge-iSCSI - Host 0 Link up at 10Gbit Full Duplex	Configure 10Ge	ISCSI	
Access Controller 0 Port status 0 L Port setting 10 Flow control Fu	10Ge-ISCSI - Host 0 Link up at 10Gbit Full Duplex			
Admin	Link up at 10Gbit Full Duplex	10Ge-iSCSI - Host 1	10Ge-iSCSI - Host 2	10Ge-iSCSI - Host 3
Port setting 10 ngs Flow control	Chit Full Duploy M	Link Down	Link Down	Link Down
Flow control	robit i ul Duplex 👻	10Gbit Full Duplex V	10Gbit Full Duplex V	10Gbit Full Duplex V
n 🗌	ull Flow Control 🗸	Full Flow Control V	Full Flow Control V	Full Flow Control V
	Use Jumbo Frames	Use Jumbo Frames	Use Jumbo Frames	Use Jumbo Frames
Replication settings	Enable Incoming	Enable Incoming	Enable Incoming	Enable Incoming
Hostnama NY	Enable Outgoing	Enable Outgoing	Enable Outgoing	Enable Outgoing
IDud mode	totic ID	Statio ID M	Statio ID M	Statio ID at
IP address 10	11 11 45	10 11 11 46	10 11 11 47	10 11 50 48
Subnet mask 25	55 255 255 0	255 255 255 0	255 255 255 0	255 255 255 0
Gatoway	0.200.200.0	200.200.200.0	200.200.200.0	200.200.200.0
IPv6 mode	icabled M	Disabled	Dicabled	Disabled w
IP vo mode Dis	sabled ¥	Disabled	Disabled	Disabled V
Drefin length				
Prenx lengui				
Gateway				
Controller 1	10Ge-iSCSI - Host 0	10Ge-iSCSI - Host 1	10Ge-iSCSI - Host 2	10Ge-iSCSI - Host 3
Port status	Link up at 10Gbit Full Duplex	Link Down	Link Down	Link Down
Port setting 10	)Gbit Full Duplex 🗸	10Gbit Full Duplex 🗸	10Gbit Full Duplex 🗸	10Gbit Full Duplex 🗸
Fu	ull Flow Control 🗸	Full Flow Control 🗸	Full Flow Control 🗸	Full Flow Control ¥
Flow control				T diff four control -
Flow control	Use Jumbo Frames	Use Jumbo Frames	Use Jumbo Frames	Use Jumbo Frames
Replication settings	Use Jumbo Frames Enable Incoming Enable Outgoing	Use Jumbo Frames Enable Incoming Enable Quitoping	Use Jumbo Frames	Use Jumbo Frames
Replication settings	Use Jumbo Frames Enable Incoming Enable Outgoing KS-0109304D-1	Use Jumbo Frames Enable Incoming Enable Outgoing NXS-0109304D-1	Use Jumbo Frames  Enable Incoming Enable Outgoing  NXS-0109304D-1 H2	Use Jumbo Frames  Enable Incoming  Enable Outgoing  NXS-0109304D-1 H3
How control	Use Jumbo Frames Enable Incoming Enable Outgoing XS-0109304D-1 atic IP	Use Jumbo Frames Enable Incoming Enable Outgoing NXS-0109304D-1 Static IP	Use Jumbo Frames C Enable Incoming C Enable Outgoing NXS-0109304D-1 H2 Static IP	Use Jumbo Frames Enable Incoming Enable Outgoing NXS-0109304D-1 H3 Static IP
Flow control       Replication settings       V       Hostname       IPv4 mode       Stt       IP address	Use Jumbo Frames Enable Incoming Enable Outgoing KS-0109304D-1 ⊒itic IP ✓ 111.10.49	Use Jumbo Frames Enable Incoming Enable Outgoing NXS-0109304D-1 -H1 Static IP • 10.11.10.50	Use Jumbo Frames Enable Incoming Enable Outgoing NXS-0109304D-1 -H2 Static IP • 10.11.10.51	Use Jumbo Frames  Enable Outgoing  NXS-0109304D-1 -H3  Static IP  10.11.50.52
Flow control Replication settings Hostname IP address Subnet mask 255	Use Jumbo Frames Enable Incoming Enable Outgoing KS-0109304D-1H0 tatic IP v 11110.49 15 255 255 0	Use Jumbo Frames Enable Incoming Enable Outgoing NXS-0109304D-1 H1 Static IP 10.11.10.50 255.255.50	Use Jumbo Frames C Enable Incoming Enable Outgoing NXS-0109304D-1 H2 Static IP 10 11.10.51 255 255 255 0	Class Jumbo Frames     Class Jumbo Frame     Class Jumbo Frames     Class Jumbo Frames     Class Jumbo Frames     Class Jumbo Frames     Class Jumbo Frame     Class Jumbo Framoo     Class Jumbo Framoo     Class Jumb
Plow control Replication settings Hostname NX IPv4 mode IP address ID Subnet mask Z55 Gateway	Use Jumbo Frames E Rabie Incoming E Rabie Incoming E Rabie Outgoing XS-0109304D-1 _H0 Intil CIP	Use Jumbo Frames           ✓ Enable Incoming           ✓ Enable Outgoing           NXS-0109304D-1           H1           Static IP ✓           10.11.10.50           2255.255.255.0	Use Jumbo Frames           ✓ Enable Incoming           ✓ Enable Outgoing           NXS-0109304D-1           H2           Static IP           10.11.10.51           255.255.255.0	Los Jumbo Franes     Enable Incoming     Enable Outgoing     NXS-0109340-1     H3     Static IP ✓     10.1150 52     255 255 0
Plow control Replication settings Hostname NX IPv4 mode Sta IP address ID Subnet mask Z55 Gateway IPv6 mode IPv6	Use Jumbo Frames Enable Incoming Enable Outgoing Ko-100304D-1 -H0 tatic IP v 11.10.49 t5 255.255.0 sabled v	Use Jumbo Frames           ✓ Enable Incoming           ✓ Enable Notyping           NXS-0109304D-1           H1           Static IP           10 11.10.50           255.255.255.0           Disabled	Use Jumbo Frames           ✓ Enable Incoming           ✓ Enable Outgoing           NXS-0109304D-1           H2           Static IP           10.11.10.51           255.255.255.0           Disabled	Class Jumbo Frames     Enable Incoming     Enable Incoming     Enable Outgoing     NXS-0109040D-1     H3     Static IP ▼     10.11.50.52     255.255.0     Disabled ▼
Plow control Replication settings Hostname NX IPv4 mode Stt IP address ID Subnet mask Z5 Gateway IPv6 mode Dit IP address IP address	U Uso Jumbo Frames Enable Incoming Enable Outgoing KS-0109304D-1	Use Jumbo Frames	Use Jumbo Frames           ✓ Enable Incoming           ✓ Enable Outgoing           NXS-0109304D-1           H2           Static IP ♥           10.11.10.51           2255.255.255           ●           ●           ●	Class Jumbo Frames     Class Jumbo Frames     Class Jumbo Frames     NXS-0109304D-1 H3     Static IP ▼     10.11.50.52     255.255.50     Disabled ▼
Flow control Replication settings Hostname NX IPv4 mode Stt IP address Gateway IPv6 mode Die IP address Prefix length	U Uso Jumbo Frames Enable Incoming Enable Outgoing KS-0109304D-1	Use Jumbo Frames	Use Jumbo Frames           ✓ Enable Incoming           ✓ Enable Nutgoing           NXS-0109304D-1           H2           Static IP ∨           10 11.10.51           255.255.255.0           Disabled ∨	Comparison of the system

The information is arranged by Controller and then by host port.

### **•** To change 10Ge Ethernet iSCSI port configuration:

1. In the **Port Setting** section, do the following:

Table 3-171: Configure 10Ge iSCSI

Setting	Action
Port status	Displays the link up or link down status and setting.
Port setting	Displays the port setting: <b>10Gbit Full Duplex</b> The port speed is fixed at <b>10Gbit Ethernet</b> .
Flow Control	<ul> <li>Do the following:</li> <li>Configure Flow Control. The options are Full Flow Control or No Flow Control.</li> <li>Check the Jumbo Frames check box if you wish to enable jumbo frames (9000 bytes, including all header information) for the 10Gb Ethernet port.</li> </ul>
Replication Settings	Check or uncheck the boxes next to <b>Enable Incoming</b> and <b>Enable Outgoing</b> for each port to enable or disable incoming and outgoing replication for that port. Note If at any time you wish to return the <i>Configure 10Ge iSCSI</i> page to its initial state, click <b>Reset</b> .
Host name	Displays the current host name.
IPv4mode	<ul> <li>Select Automatic, Static IP to enable IPv4 for both controllers on the Nexsan Storage System. If you are not using IPv4 mode, select Disable to disable it.</li> <li>If you select Automatic, then the system will use DHCP and no other configuration is needed.</li> <li>Note To use automatic IP assignment, your network must be configured for DHCP. If it is not, you MUST use a static IP address.</li> <li>If you select Static IP, then you must fill in the IP Address and Subnet Mask.</li> </ul>
IPv6mode	<ul> <li>Select Automatic, Static IP to enable IPv6 for both controllers on the Nexsan Storage System. If you are not using IPv6 mode, select Disable to disable it.</li> <li>If you select Automatic, then no other configuration is needed. IPv6 will be configured automatically from router advertisements (SLAAC), and a fixed linklocal IPv6 address will be assigned.</li> <li>Note To use automatic IP assignment, your network must be configured SLAAC. If not, you MUST use a static IP address.</li> <li>If you select Static IP, then you must fill in the Static IP Address and Prefix length.</li> </ul>

- 2. Do one of the following:
  - Click **Save Configuration**. The settings are saved and are applied after the system is restarted (see <u>Reboot System on page 203</u>).
  - Click Save and Apply Changes. The settings are saved and applied immediately.

The *Host Name* list shows the hosts which are currently logged in and have previously logged in (unless the list has been manually cleared). Any hosts which are not logged in will not be listed. If a host's name is gray, the host is offline. Only the settings of offline hosts and for **Default** can be changed. The *Host Name* section also contains a field for manually adding new hosts.

Each entry has an **Allow Access** check box (to allow or deny host access to this system) and an **Advanced** link (for setting host authentication settings; see <u>Configure 10Ge iSCSI on page 175</u>).

### To change host access:

1. Check or uncheck the **Allow Access** check box to either permit or prevent access to the Nexsan Storage System from this host. This box is checked by default.

**Note** New iSCSI hosts are detected automatically by the Nexsan Storage System and added to the host list the first time they attempt to log in.

### 2. Click Apply Settings.

### To manually add an iSCSI host:

**Note** New hosts are detected automatically by the Nexsan Storage System and added to the host list, and iSCSI hosts are detected the first time they attempt to log in. Hosts may be added manually, but this is not generally required for normal operation.

- 1. Enter the host name into the text field. The name should be entered in full "eui" or "iqn" format, exactly as it is configured on the host.
- 2. Click the Add button.

3

# Configure 1Ge iSCSI

Clicking **Configure Host Access > 1Ge** takes you to the *Configure iSCSI* page, which enables you to change settings for each host attached to your Nexsan Storage System via 1Ge iSCSI. The tools on this page differ depending on the Nexsan Storage System configuration.

The Configure 1Ge iSCSI page looks like this:

10Ge 1Ge H	osts Groups Access				
Controller 0					
Controller 0		Configure Heat	A		
Controller 0		Configure 1Ge	ISCSI		
Controller 0	4C- 10C01 N-+0	40-10001 N-44	40-1000L N-+3	40-1000	N-4 3
Port status	Unk up at 1Gbit Full Duplex	Unk Down	Unk Down	1Ge-ISCS	- Net 3
Port setting	Auto Speed/Duplex V	Auto Speed/Duplex V	Auto Speed/Duplex 🗸	Auto Speed/Duplex	~
	No Flow Control 🗸	No Flow Control 🗸	No Flow Control 🗸	No Flow Control V	
Flow control	No TCP Scaling V	No TCP Scaling 🖌	No TCP Scaling 🖌	No TCP Scaling 🗸	
	Use Jumbo Frames	Use Jumbo Frames	Use Jumbo Frames	Use Jumbo Frame	s
Replication settings	Enable Incoming	Enable Incoming	Enable Incoming	Enable Incoming	
	Enable Outgoing	Enable Outgoing	Enable Outgoing	Enable Outgoing	
Hostname	NXS-0109304D-0 -N0	NXS-0109304D-0 -N1	NXS-0109304D-0 -N2	NXS-0109304D-0	-N3
IPv4 mode	Static IP V	Static IP V	Static IP V	Static IP V	-
F address	255 255 0.0	255 255 0.0	255 255 0.0	1/2.1/.119.114	-
Subnet mask	200.200.0.0	205.255.0.0	200.200.0	255.255.0.0	-
Gateway	District of	District and	District of	Distriction	_
ID address	Disabled V	Disabled	Disabled	Disabled V	
Deefin le meth					
Prenx length					
Catoway					
Gateway					
Gateway Controller 1	1Ge-iSCSI - Net 0	1Ge-iSCSI - Net 1	1Ge-iSCSI - Net 2	1Ge-iSCS	I - Net 3
Gateway Controller 1 Port status	1Ge-iSCSI - Net 0 I Link up at 1Gbit Full Duplex	1Ge-iSCSI - Net 1	1Ge-iSCSI - Net 2 Ulink Down	1Ge-iSCS Ulink Down	I - Net 3
Gateway Controller 1 Port status Port setting	1Ge-iSCSI - Net 0 Link up at 1Gbit Full Duplex Auto Speed/Duplex	1Ge-iSCSI - Net 1 ● Link Down Auto Speed/Duplex	1Ge-ISCSI - Net 2 ● Link Down Auto Speed/Duplex	1Ge-iSCS Link Down Auto Speed/Duplex	l - Net 3 V
Gateway Controller 1 Port status Port setting	1Ge-iSCSI - Net 0 U Link up at 16bil Full Duplex Auto Speed/Duplex No Flow Control	IGe-iSCSI - Net 1 ● Link Down Auto Speed/Duplex No Flow Control	IGe-ISC SI - Net 2       ● Link Down       Auto Speed/Duplex       No Flow Control	1Ge-iSCS Link Down Auto Speed/Duplex No Flow Control	I - Net 3 V
Gateway Controller 1 Port status Port setting Flow control	1Ge-iSCSI - Net 0 ● Link up at 1Gbit Full Duplex Auto Speed/Duplex ▼ No Flow Control ▼ No TCP Scaling ▼	IGe-iSCSI - Net 1 Uink Down Auto Speed/Duplex v No Flow Control v No TCP Scaling v	IGe-ISCSI - Net 2 Ulink Down Auto Speed/Duplex v No Flow Control v No TCP Scaling v	IGe:ISCS Link Down Auto Speed/Duplex No Flow Control V No TCP Scaling V	- Net 3
Gateway Controller 1 Port status Port setting Flow control	IGe:ISCSI - Net 0         I Link up at 1Gbit Full Duplex         Auto Speed/Duplex         No Flow Control          No TCP Scaling          Us Jumbo Frames	1Ge-iSCSI - Net 1       ● Link Down       Auto Speed/Duplex       No Flow Control ▼       No TCP Scaling ▼       Use Jumbo Frames	IGe-ISCSI - Net 2       ● Link Down       Auto Speed/Duplex       No Flow Control       No TCP Scaling       Use Jumbo Frames	IGe-ISCS ● Link Down Auto Speed/Duplex No FiDw Control ♥ No TCP Scaling ♥ Use Jumbo Frame	I - Net 3 ▼
Gateway Controller 1 Port status Port setting Flow control Replication settings	IGe:ISCSI-Net 0         ● Link up at 1Gbit Full Duplex         Auto Speed/Duplex         No Flow Control ~         No TCP Scaling ~         □ Use Jumbo Frames         ○ Enable Incoming         ○ Enable Incoming         ○ Enable Incoming	IGe-iSCSI - Net 1       ● Link Down       Auto Speed/Duplex       No Flow Control ▼       No TCP Scaling ▼       Use Jumbo Frames       ♥ Enable Incoming       ♥ Enable Outgrape	IGe-ISC SI - Net 2       ● Link Down       Auto Speed/Duplex       No Flow Control ▼       No Flow Control ▼       O Link Down       ● Display       ● Link Down       ● Link Down       ● Display       ● Enable Incoming       ● Enable Incoming	IGe-ISCS           ● Link Down           Auto Speed/Duplex           No Flow Control ♥           No TCP Scaling ♥           ● Link Down           ✓ Enable Incoming           ✓ Enable Incoming           ✓ Enable Incoming	I - Net 3 V
Gateway Controller 1 Port status Port setting Flow control Replication settings Hostname	IGe:ISCSI - Net 0       ● Link up at 1Gbit Full Duplex       Auto Speed/Duplex       No Flow Control マ       No TCP Scaling マ       Use Jumbo Frames       ♥ Enable Incoming       ♥ Enable Outgoing       № Stafla020-1	IGe-iSCSI - Net 1         ● Link Down         Auto Speed/Duplex         No Flow Control ▼         No TCP Scaling ▼         Use Jumbo Frames         ☑ Enable Incoming         ☑ Enable Incoming         ☑ Enable Incoming	IGe-ISC SI - Net 2       ● Link Down       Auto Speed/Duplex       No Flow Control ▼       No TCP Scaling ▼       □ Use Jumbo Frames       ☑ Enable Incoming       ☑ Enable Incoming       ☑ Enable Outgoing       NX5-0109304D-1	ICe-ISCS Ulink Down Auto Speed/Duplex No Flow Control V No TCP Scaling V Use Jumbo Frame Enable Incoming Enable Incoming NSS-0109304D-1	s
Gateway Controller 1 Port status Port setting Flow control Replication settings Hostname IPv4 mode	1Ge-ISCSI - Net 0       ① Link up at 16bit Full Duplex       Auto Speed/Duplex       ✓       No Flow Control ✓       No Flow Control ✓       © Use Jumbo Frames       ④ Enable Coutgoing       NX3-0109304D-1       N0       Static IP ✓	IGe-iSCSi - Net 1       ● Link Down       Auto Speed/Duplex       No Flow Control       No TCP Scaling       ○ Use Jumbo Frames       ☑ Enable Dutgoing       NXS-0109304D-1       N1       Static IP	IGe-ISC SI - Net 2         ● Link Down       Auto Speed/Duplex       ▼         No Flow Control ▼       No TCP Scaling ▼       Use Jumbo Frames         ● Link Down       Vise Jumbo Frames       ●         ● Enable Incoming       ● Enable Outgoing       NXS-0109304D-1       -N2         Static IP       ▼	IGe:ISCS ● Link Dom Auto Speed/Duplex No Flow Control ♥ No TCP Scaling ♥ Use Jumbo Frame ● Enable Incoming ● Enable Incoming ● Enable Outgoing NXS-0109304D-1 Static IP ♥	I - Net 3
Gateway Controller 1 Port status Port status Flow control Replication settings Hostname IPv4 mode IP address	1Ge-ISCSI-Net 0       Uick up at 15bit Full Duplex       Auto Speed/Duplex       Auto Speed/Duplex       No Flow Control ▼       No Flow Control ▼       No Flow Control ▼       Be Jumbo Frames	1Ge:ISCSI - Net 1         ● Link Down         Auto Speed/Duplex         No FIDew Control ▼         No TCP Scaling ▼         ● Link Down Control ▼         No TCP Scaling ▼         ● Link Down Control ▼         No TCP Scaling ▼         ● Link Down Control ▼         No TCP Scaling ▼         ● Link Down Control ▼         ● Link Incoming         ● Enable Outgoing         NXS-0109304D-1         N1         Static IP ▼         172.17.19.116	IGe-ISCSI - Net 2       ● Link Down       Auto Speed/Duplex       No Flow Control       No TCP Scaling       Use Jumbo Frames       ● Enable Incoming       ● Enable Outgoing       NXS-0109304D-1       NZ       Static IP       1727/21/19117	IGe-ISCS ● Link Down Auto Speed/Duplex No Flow Control ▼ No TCP Scaling ▼ □ Use Jumbo Frame ● Enable Incoming ■ Enable Dutgoing NXS-0109304D-1 Static IP ▼ 172.17.119.118	I- Net 3
Gateway Controller 1 Port status Port setting Flow control Replication settings Hostname IPv4 mode IP address Subnet mask	IGe-ISCSI - Net 0           Uhk up at 1Gbit Full Duplex           Auto Speed/Duplex           No Flow Control ∨           No TCP Scaling ∨           Use Jumbo Frames           2 Enable Incoming           2 Enable Incoming           3 Enable Incoming           172.17.119.115           255.255.0	IGe-iSCSI - Net 1         ● Link Down       Auto Speed/Duplex       ▼         No Flow Control ▼       No       No         No TCP Scaling ▼       □       Use Jumbo Frames         ● Enable Outgoing       NXS-0109304D-1       N1         Static IP ▼       172.17.119.116       255.50.0	IGe-ISC SI - Net 2         ● Link Down       Auto Speed/Upulex       ▼         No Flow Control ▼       No       No         No TCP Scaling ▼       Use Jumbo Frames       ●         ● Enable Incoming       ● Enable Outgoing       NXS-0109304D-1       -N2         Static IP ▼       172.17.119.117       255.25.0       ●	Incelses         ● Link Down         Auto Speed/Duplex         No Flow Control ♥         No TCP Scaling ♥         □ Use Jumbo Frame         ● Enable Incoming         ● Enable Incoming         ● Enable Outgoing         NXS-0109304D-1         Static IP ♥         172.17.119.118         25 255.0.0	I - Net 3
Gateway Controller 1 Port status Port status Port setting Flow control Replication settings Hostname IPv4 mode IP address Subnet mask Gateway	IGe:ISCSI-Net 0         ● Link up at 1Gbit Full Duplex         Auto Speed/Duplex         No Flow Control         No TCP Scaling         ● Lable Incoming         ● Enable Incoming         ● Enable Udging         NXS-0109304D-1         NO         Static IP         172 17.119.115         255 255 0.0	IGe-iSCSI - Net 1           ● Link Down           Auto Speed/Duplex           No Flow Control ▼           No TCP Scaling ▼           □ Use Jumbo Frames           ♥ Enable Incoming           ♥ Enable Outgoing           NX5-0109304D-1           N11           Static IP ▼           172.17.119.116           255 255.0	IGe-ISC SI - Net 2           ● Link Down         Auto Speed/Duplex         ▼           No Flow Control ▼         No         No           No Top Scaling ▼         □         Use Jumbo Frames           ● Enable Incoming         ● Enable Notoning         ■           ● Enable Doutgoing         NX5-0109304D-1         NN2           Static IP ▼         172.17.119.117         255 255.0.0	ICe-ISCS           ● Link Down           Auto Speed/Duplex           No Flow Control ▼           No TCP Scaling ▼           □ Use Jumbo Frame           ② Enable Incoming           ③ Enable Outgoing           NX5-0109304D-1           Static IP ▼           172.17.119.118           255 255 0.0	I - Net 3
Gateway Controller 1 Port status Port status Flow control Replication settings Hostname IPv4 mode IP address Subnet mask Gateway IPv5 mode	IGe: ISCSI - Net 0         ● Link up at 1Gbit Full Duplex         Auto Speed/Duplex         No Flow Control ~         No Flow Control ~         No TCP Scaling ~         □ Use Jumbo Frames         ● Enable Incoming         ● Enable Notgoing         NXS-0109304D-1         N0         Static IP ~         172.17.119.115         255 256.0         □	IGe-iSCSI - Net 1         ● Link Down       Auto Speed/Duplex       ▼         Auto Speed/Duplex       ▼       No Flow Control ▼         No TCP Scaling       ▼          Use Jumbo Frames       ✓       Enable Outgoing         NX5-D109304D-1       N1       N1         Static IP       ▼          172.17.119.116       255 255 0.0          Disabled       ▼	IGe-ISC SI - Net 2         ● Link Down       Auto Speed/Duplex       ▼         No Flow Control ▼       No TCP Scaling ▼       ■         O Use Jumbo Frames       2       Enable Incoming         2       Enable Outgoing       NX50109304D-1       NZ         NX50109304D-1       NZ       Static IP ▼       1172.17.119.117         255 255 0.0       □       □       □         Disabled ▼       □       ■       ■		I - Net 3
Gateway Controller 1 Port status Port status Flow control Replication settings Hostname IPv4 mode IP address Subnet mask Gateway IPv6 mode IP address	1Ge-iSCSI - Net 0           Uick up at 15bit Full Duplex           Auto Speed/Duplex           Auto Speed/Duplex           No Flow Control ♥           No Flow Control ♥           No Flow Control ♥           Speed/Duplex           Yet           Use Jumbo Frames           ♥ Enable locoming           ■ Enable Outgoing           NX3-0109304D-1           N0           Static IP ♥           172.17.119.115           256.255.0.0           Disabled ♥	1Ge-iSCSI - Net 1         ● Link Down       Auto Speed/Duplex       ▼         No FLow Control ▼       No TCP Scaling ▼       ■         ● Use Jumbo Frames       ●       Enable Incoming         ● Enable Outgoing       N1       Static IP ▼         172.17.119.116       255.255.0.0       ■         ● Disabled ▼       ■       ■	IGe-ISC SI - Net 2         ● Link Down       Auto Speed/Duplex       ▼         No Flow Control ▼       No TCP Scaling ▼       No TCP Scaling ▼         ● Use Jumbo Frames       ●       Enable Incoming         ● Enable Incoming       ● Enable Outgoing       NX5-0109304D-1         NX5-0109304D-1       -N2       Static IP ▼         172.17.119.117       255.255.0.0       □         □ Disabled ▼       □       □	IGe:ISCS         ● Link Down         Auto Speed/Duplex         No Flow Control ♥         No TCP Scaling ♥         □ Use Jumbo Frame         ● Enable Incoming         ● Enable Incoming         ● Enable Outgoing         NXS-0109304D-1         Static IP ♥         172.17.119.118         255.255.0.0         □         □         □         □         □         □         □         □         □         □         □         □         □         □         □         □	I - Net 3
Gateway Controller 1 Port status Port satting Flow control Replication settings Hostname IPv4 mode IPv4 mode IP address Subnet mask Gateway IPv6 mode IP address Prefix length	IGe-ISCSI - Net 0         Uick up at 1Gbit Full Duplex         Auto Speed/Duplex         No Flow Control ▼         Static IP ▼         172.17.119.115         255.255.00         Disabled ▼	IGe-iSCSI - Net 1         ● Link Down       Auto Speed/Duplex       ▼         No Flow Control ▼       No       No         No TCP Scaling ▼       ●       ●         □ Use Jumbo Frames       ●       Enable Outgoing         NXS-0109304D-1       N1       Static IP ▼         172.17.119.116       255.255.0.0       ●         □ Disabled ▼       ●       ●	IGe-ISC SI - Net 2         ● Link Down       Auto Speed/Upulex       ▼         No Flow Control ▼       No       No         No TCP Scaling ▼       Use Jumbo Frames       ●         ● Enable Incoming       ● Enable Outgoing       NXS-0109304D-1       •N2         NXS-0109304D-1       •N2       Static IP ▼       172.17.119.117         255 250.0       ●       ●       ●         Disabled ▼       ●       ●       ●	Ide:ISCS         ● Link Down         Auto Speed/Duplex         No Flow Control ♥         No TCP Scaling ♥         □ Use Jumbo Frame         ♥ Enable Incoming         ■ Enable Outgoing         NXS-0109304D-1         Static IP ♥         172.17.119.118         255 255.0.0         □         □         □         □         □         □         □         □         □         □         □         □         □         □         □         □	I - Net 3

Figure 3-172: Configure 1Ge iSCSI page

The information is arranged by Controller and then by host port. *Current Status* lists the link status (up or down), link speed, and topology.

### To configure 1Ge iSCSI:

1. Use the following table for help with configuring 1Ge iSCSI:

Table 3-173: Configure 1Ge iSCSI

Setting	Action
Port status	Displays the link up or link down status and setting.
Port setting	Note For most iSCSI networks, the default setting of Auto Speed/Duplex is recommended. However, if your switch doesn't support auto-negotiation, you can "force" one or both settings. Select the port speed using the drop-down list. The possible selections are: Auto Speed/Duplex (the default) Auto Speed, Full Duplex Auto Speed, Half Duplex 1Gbit Full Duplex 100Mbit Full Duplex 10Mbit Full Duplex 10Mbit Half Duplex
Flow Control	<ul> <li>Manages the flow of packets between the source and target ports. The source and target ports use pause frames to pause and control the rate of packet transmission, which ensures the target is not saturated or overwhelmed by network traffic.</li> <li>The options are: <ul> <li>No Flow Control</li> <li>TX Flow Control</li> <li>RX Flow Control</li> <li>Full Flow Control</li> </ul> </li> </ul>
	<ul> <li>TCP scaling increases the receive window size so that more data can be sent between the source and target ports before an acknowledgement is returned.</li> <li>The options are: <ul> <li>No TCP Scaling</li> <li>TX TCP Scaling</li> <li>RX TCP Scaling</li> </ul> </li> <li>Full TCP Scaling</li> <li>Check the Use Jumbo Frames check box to enable jumbo frames for the iSCSI port. Jumbo frames are typically used to boost performance of iSCSI traffic.</li> <li>Normal frames can contain data up to 1,500 bytes in length. Jumbo frames can contain larger data payloads (up to 9,000 bytes on Nexsan Storage Systems), and are supported on 1Gb/s and 10Gb/s Ethernet (10GbE) networks.</li> </ul>

Setting	Action
Replication Settings	Check or uncheck the boxes next to <b>Enable Incoming</b> and <b>Enable Outgoing</b> for each port to enable or disable incoming and outgoing replication for that port. Note If at any time you wish to return the <i>Configure 10Ge iSCSI</i> page to its initial state, click <b>Reset</b> .
Host name	Displays the current host name.
IPv4mode	<ul> <li>Select Automatic, Static IP to enable IPv4 for both controllers on the Nexsan Storage System. If you are not using IPv4 mode, select Disable to disable it.</li> <li>If you select Automatic, then the system will use DHCP and no other configuration is needed.</li> <li>Note To use automatic IP assignment, your network must be configured for DHCP. If it is not, you MUST use a static IP address.</li> <li>If you select Static IP, then you must fill in the IP Address and Subnet Mask.</li> </ul>
IPv6mode	<ul> <li>Select Automatic, Static IP to enable IPv6 for both controllers on the Nexsan Storage System. If you are not using IPv6 mode, select Disable to disable it.</li> <li>If you select Automatic, then no other configuration is needed. IPv6 will be configured automatically from router advertisements (SLAAC), and a fixed linklocal IPv6 address will be assigned.</li> <li>Note To use automatic IP assignment, your network must be configured SLAAC. If not, you MUST use a static IP address.</li> <li>If you select Static IP, then you must fill in the Static IP Address and Prefix length.</li> </ul>

- 2. Do one of the following:
  - Click **Save Configuration**. The settings are saved and are applied after the system is restarted (see Reboot System on page 203).
  - Click Save and Apply Changes. The settings are saved and applied immediately.

**Note** Saving and applying these changes will restart the network services, which may cause hosts to disconnect and then reconnect.

The *Host Name* list shows the hosts which are currently logged in and have previously logged in (unless the list has been manually cleared). Any hosts which are not logged in will not be listed. If a host's name is gray, the host is offline. Only the settings of offline hosts and for **Default** can be changed. The *Host Name* section also contains a field for manually adding new hosts.

Each entry has an **Allow Access** check box (to allow or deny host access to this Nexsan Storage System) and an **Advanced** link (for setting host authentication settings; see <u>Host authentication settings on the facing page</u>).

### To change host access:

1. Check or uncheck the **Allow Access** check box to either permit or prevent access to the Nexsan Storage System from this host. This box is checked by default.
**Note** New iSCSI hosts are detected automatically by the Nexsan Storage System and added to the host list the first time they attempt to log in.

2. Click Apply Settings.

#### To manually add an iSCSI host:

**Note** New hosts are detected automatically by the Nexsan Storage System and added to the host list, and iSCSI hosts are detected the first time they attempt to log in. Hosts may be added manually, but this is not generally required for normal operation.

- 1. Enter the host name into the text field. The name should be entered in full "eui" or "iqn" format, exactly as it is configured on the host.
- 2. Click the Add button.

### Host authentication settings

Clicking **Advanced** for an entry in the *Host Name* list takes you to the *Host Configuration* page, which enables you to set host authentication settings.

NEXSAN			ALL OK
Home RAID Information	10Ge 1Ge Groups Hosts Access		
System Information Configure RAID	¢	Configure Host Access Configure 1Ge iSCSI	(?)
Configure Volumes		Host Configuration	-
Configure Host Access	Identity	iqn.1991-05.com.microsoft:limnic	
Power Settings	Status	Offline	
System Admin	Access	Allowed	
Configure Network	Digest	<ul> <li>Header Digest required</li> <li>Data Digest required</li> </ul>	
Quick Start		None	
Technical Support	CHAP authentication	<ul> <li>Target</li> <li>Mutual</li> </ul>	
Log Off	CHAP secret	<ul> <li>Use default host secrets</li> <li>Use host unique secrets</li> </ul>	
	Unique target secret		
	Unique host secret		
		Apply Settings Reset	

Figure 3-174: Configure 1Ge iSCSI

### To require CRC32 digests:

1. Check Header Digest required or Data Digest required, or both.

**Note** This setting requires that the host support the appropriate CRC32 digests. If it doesn't, the target rejects the login.

- 2. Click Apply Settings.
- **To require CHAP authentication:**
- 1. Select the CHAP authentication mode (Target or Mutual; None is the default).
- 2. Select the CHAP secret mode (Use default host secrets or Use host unique secrets).

3

If you select **Use host unique secrets**, enter a **Unique target secret** and a **Unique host secret**. Each must be 12–32 characters long. The same host and target secrets must also be configured on the host interface prior to iSCSI login.

**Note** This setting requires that the host support the appropriate CHAP authentication mode. If it doesn't, the target rejects the login.

Note If at any time you wish to return the Host Configuration page to its initial state, click Reset.

- 3. Click Apply Settings.
- 4. Click the gray arrow to return to the *Configure 1Ge iSCSI* page.

## Manage Host Groups

Clicking **Configure Host Access > Groups** takes you to the *Manage Groups* page, which enables you to create access control groups. Access control groups provide a set of hosts with common access rights.

NEXSAN		ALL OK
Home RAID Information	Fibre 1Ge Groups Hosts Access	
System Information Configure RAID	Configure Host Access Manage Groups	?
Configure Volumes Configure Host Access Power Settings System Admin	Remove     Group Name     Details       (Default Access)     6 hosts       Apply changes     Add Group	
Quick Start Technical Support	Help	
Lug Un	This page allows the user to configure access control groups. An access control group can be used to provide a number of hosts with a set of common access rights. The 'Add Group' button creates a new group with a default name. The group may be renamed by editing the 'Group Name' text and pressing 'Apply Changes'. Any unused group may be removed by selecting the appropriate 'Remove' checkbox and pressing 'Apply Changes'. Hosts can be added to or removed from the group by selecting the 'edit list' link.	

Figure 3-175: Manage Groups page

### To add a group:

1. Click the **Add Group** button. The new group displays as a new line in the group list:

Figure 3-176: Manage Groups group list page

NEXSAN		ALL OK
Home		
RAID Information	Fibre 1Ge Groups Hosts Access	
System Information	Configure Host Access	(2)
Configure RAID	Manage Groups	•
Configure Volumes	Remove Group Name	Details
Configure Host Access	(Default Access) 6 hosts	
Power Settings	Group #1 0 hosts Edit list	
System Admin		
Configure Network	Apply changes Add Group Reset	
Quick Start		
Technical Support		
Log Off	Help	
	This page allows the user to configure access control groups.	
	An access control group can be used to provide a number of hosts with a set of common access rights.	
	The 'Add Group' button creates a new group with a default name. The group may be renamed by editing the 'Group Changes'. Any unused group may be removed by selecting the appropriate 'Remove' checkbox and pressing 'Apply	Name' text and pressing 'Apply y Changes'.
	Hosts can be added to or removed from the group by selecting the 'edit list' link.	

- 2. Under Group Name, edit the default name if you wish, then click Apply changes.
- To edit a group's hosts:
- 1. Click the Edit list link. A list of hosts displays:



NEXSAN					<mark>√</mark> all ok
Home RAID Information	Fibre	1Ge	Groups Hos	ts Access	
System Information Configure RAID	Ŷ			Configure Host Access Manage Groups	?
Configure Volumes				Group #1	
Configure Host Access		Include	Туре	Host Name	
Power Settings			IGe iSCSI	Host 'LIMNIC iqn.1991-05.com.microsoft:limnic'	
System Admin			IGe iSCSI	Host #1 (1Ge iSCSI) iqn. 1991-05.com.microsoft:fibertest8	
Configuro Notwork			IGe iSCSI	Host #2 (1Ge iSCSI) iqn.1991-05.com.microsoft:raghuwin200332bit	
Conligure Network			<ul> <li>Fibre</li> </ul>	Host 'MAC Port-1 10-00-06-2B-1A-8A-F8'	
Quick Start			Fibre	Host #5 (Fibre) WWPN: 21-FD-00-05-1E-0E-EA-B9	
Technical Support			Fibre	Host #6 (Fibre) WWPN: 21-FD-00-05-1E-0F-07-67	
Log Off				Apply changes Reset	
		This p For ea	age configures wh ach host select to	Help () iich hosts are a member of this group. include in this group or not and press 'Apply changes'.	

- For each host you want to include in the group, click the Include check box.
   Note If at any time you wish to return the *Manage Groups* page to its initial state, click Reset.
- 3. Click Apply changes.

A message displays, informing you that the host group settings have been updated. Click the **Back** button to return to the *Manage Groups* page.

### Manage Hosts

Clicking **Configure Host Access > Hosts** takes you to the *Manage Hosts* page, which enables you to add, rename, remove, and configure settings for host groups and individual hosts.

NEXSAN			
Home			
RAID Information	Fibre 1Ge Groups Ho	sts Access	
System Information		Configure Host Access	2
Configure RAID		Manage Hosts	$\bigcirc$
Configure Volumes	Remove Type	Host Name	Dotails
Configure Host Access			ocuno
Power Settings		Group #1	
System Admin	Fibre	Host #5 (Fibre) WWPN: 21-FD-00-05-1E-0E-EA-B9	Details
Configure Network		Other Hosts	
Quick Start	Generation Interpretended	LIMNIC iqn.1991-05.com.microsoftlimnic	Details
Technical Support	Generation International In	Host #1 (1Ge iSCSI) iqn.1991-05.com.microsoft.fibertest8	Details
Log Off	Generation International In	Host #2 (1Ge iSCSI) iqn.1991-05.com.microsoftraghuwin200332bit	Details
	Generation     Fibre	MAC Port-1 10-00-00-06-2B-1A-8A-F8	Details
	Generation Fibre	Host #6 (Fibre) WWPN: 21-FD-00-05-1E-0F-07-67	Details
		Apply changes Reset	
	<ul> <li>Fibre</li> <li>IGe iSCSI</li> </ul>	WWPN, iqn or eui	
		Add Host	

Figure 3-178: Manage Hosts page

The Host Name field, which defaults to the host's address, can be edited to give the host a "friendly" name.

- To change the name of a host:
- 1. Enter the desired name in the **Host Name** field.
- 2. Click Apply changes.

The **Remove** check box can be checked to remove unconnected hosts (designated by a gray icon under *Type*) that are no longer relevant.

### To remove an unconnected host:

- 1. Check the host's **Remove** check box.
- 2. Click Apply changes.

### Further information about each host is available by clicking the **Details** link:

Figure 3-179: Manage Hosts detail page

NEXSAN				
Home				
RAID Information	Fibre 1Ge Grou	ips Hosts	Access	
System Information	Ġ		Configure Host Access	2
Configure RAID			Manage Hosts	•
Configure Volumes			Host #6 (Fibre) WWPN: 21-FD-00-05-1F-0F-07-67	
Configure Host Access	Туре		Fibre	
Power Settings	Identity		WWPN: 21-FD-00-05-1E-0F-07-67	
System Admin	Status		Online Port ID: FF-FC-1F	
Configure Network	Connection		Controller 1 Fibre - Host 1	
Quick Start			Group Membership	
	Include		Group Name	
recnnical Support	۲	(Default Acce	ss)	
Log Off	0	Group #1		
			Apply Changes Reset	

The upper section lists the host's name, its *Type* (Fibre, SAS, iSCSI), its *Identity* (usually a WorldWide Port Name), it's *Status* (whether online or offline, and the port ID), and the *Connection* that it is liked to.

The host's group membership can be changed in the Group Membership section.

### To change a host's group membership:

- 1. Select the **Include** selection button next to the group that you wish the host to be a part of.
- 2. Click Apply Changes.

### Host Access

Clicking **Configure Host Access > Access** takes you to the *Host Access* page, which enables you to configure volume access to specific hosts. It also enables you to set the default host access and the default group host access.

NEXSAN				
Home RAID Information	Fibre 1Ge	Groups Hosts Access		
System Information Configure RAID			Configure Host Access Host Access	(?)
Configure Volumes	Туре		Host Name	Access
Power Settings		Default Access		Access
System Admin			Group #1	
Configure Network		Group Default	·	Access
Quick Start	Fibre	Host #5 (Fibre) WWPN: 21-FD-00	-05-1E-0E-EA-B9	Access
Technical Support			Other Hosts	
Log Off	IGe iSCSI	Host 'LIMNIC iqn.1991-05.com.mi	crosoft:limnic'	Access
	IGe iSCSI	Host #1 (1Ge iSCSI) iqn.1991-05.	com.microsoft:fibertest8	Access
	IGe iSCSI	Host #2 (1Ge iSCSI) iqn.1991-05.	com.microsoft:raghuwin200332bit	Access
	<ul> <li>Fibre</li> </ul>	Host 'MAC Port-1 10-00-00-06-2B-	-1A-8A-F8'	Access
	Fibre	Host #6 (Fibre) WWPN: 21-FD-00	-05-1E-0F-07-67	Access



The host access links are arranged in order, starting with *Default Access*, then each *Group Default*, then each host within each group, and then any hosts that are not in a group. Each **Access** link takes you to the host access configuration page for that host or category.

If you click the **Access** link for *Default Access* or for *Group Default* under a group name, the host access configuration page looks like this:

NEXSAN					
Home RAID Information	10Ge 1Ge Groups Hosts Access				
System Information Configure RAID	Configure Host Access Host Access				()
Configure Volumes Configure Host Access	Default Access		Access		
Power Settings	Volume	Deny	Read	R/W	Manage
System Admin	1: 'Array #1' Array: 'Array #1', Controller 0, Enclosure 0 Capacity: 500.0 GB (465.6 GIB)	۲	0	O	
Quick Start	2: 'tachi1' Array: 'tachi1', Controller 0, Enclosure 1 Capacity: 52.4 GB (48.8 GiB)	۲	O	O	
Log Off	3: 'tachi2' Array: 'Array #3', Controller 0, Enclosure 1 Capacity: 52.4 GB (48.8 GiB)	۲	O	O	
	Apply Changes Reset	]			

Figure 3-181: Manage Hosts, Default Access page

The *Default Access* setting controls access by new or unknown hosts. The *Group Default* setting overrides the *Default Access* setting.

If you click the **Access** link for a specific host, the host access configuration page looks like this:

Figure 3-182: *Host Access Details* page

NEXSAN						
Home RAID Information	Fibre 1Ge Groups Hosts Access					
System Information Configure RAID	Configue Host	<mark>ire Host Access</mark> Access Details				?
Configure Volumes Configure Host Access Power Settings System Admin Configure Network	Host #1 (ISCSI) iqn.1991           Type         iSCSI           Identity         iqn.1991-05.com.microsoft           Status         Online           Connection         Controller 0 1Ge-iSCSI - N           Controller 1 1Ge-iSCSI - N         Controller 1 1Ge-iSCSI - N	-05.com.microsoft:tr test-142.cert.lab et 0 et 0	est-142.cert.la	b		
Quick Start	Volume	Dofault	Ac	cess Poad	DAM	Manage
Technical Support Log Off	1: Volume #1' Array: 'Array #1', Controller 0 Capacity: 21.4 GB (20.0 GiB)	<ul> <li>Default</li> <li>Deny</li> </ul>	©	©	©	
	3: 'Volume #3' Array: 'Array #3', Controller 0 Capacity: 21.4 GB (20.0 GiB)	Image: Image: Open set of the	O	O	O	
	5: 'Volume #5' Array: 'Array #5', Controller 0 Capacity: 21.4 GB (20.0 GiB)	Image: Image: Open series of the series o	©	O	O	
	2: 'Volume #2' Array: 'Array #2', Controller 1 Capacity: 21.4 GB (20.0 GiB)	Oeny	O	©	O	
	4: 'Volume #4' Array: 'Array #4', Controller 1 Capacity: 21.4 GB (20.0 GiB)	Oeny	0	O	O	
	Capacity: 21.4 GB (20.0 GiB)	Changes Reset				

Settings for individual hosts override the *Default Access* and *Group Default* settings.

### **b** To set host access privileges for Default Access, Group Default, or individual hosts:

- 1. For each listed *Volume*, select **Default** (for a specific host), **Deny**, **Read**, or **R/W** access.
- 2. For each listed *Volume*, check **Manage** to allow this host to send in-band SCSI NMP (Nexsan Management Protocol) commands to the target ports that it is mapped to. Uncheck it to have the target ports ignore NMP commands sent by this host. Refer to <u>SSL Configuration on page 230</u> and the *Nexsan Storage Tools Guide*, available at https://helper.nexsansupport.com/esr\_downloads.html.

Note If at any time you wish to return the Host Access page to its initial state, click Reset.

3. Click Apply Changes.

A message displays, informing you that the settings have been updated. Click the **Back** button to return to the *Host Access* page.

# **Power Settings**

Clicking **Power Settings** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-183: Power Settings navigation bar

AutoMAID Stats Config

Refer to <u>Table 3-184</u> for help with the Nexsan E-Series/BEAST power settings firmware:

Table 3-184: Power Settings pages

Nav bar button	GUI pages and documentation links
AutoMAID	A brief overview of the AutoMAID power saving feature. See <u>AutoMAID on the facing</u> page
AutoMAID Stats	AutoMAID Statistics on page 190
AutoMAID Con- fig	Configure AutoMAID Settings on page 192

## AutoMAID

AutoMAID is Nexsan's HDD and SSD power management system, that can provide up to 87% energy savings. MAID stands for Massive Array of Idle Disks. When drives are not in use, AutoMAID enables you to automatically put them into one of several power saving states. The drives are still accessible, however, and are automatically brought back up to full power levels when data needs to be accessed.

### Notes:

- Not all disk drives support all levels of AutoMAID. Disks that do not support a specific AutoMAID level will stay at a previous, usable level until the system reaches an AutoMAID level that the disk supports (see Configure AutoMAID Settings on page 192).
- If any drives are set to use AutoMAID Level 3 or 4, host timeout values should be set to a default of between 120 and 150 seconds to avoid the host requests timing out before the disk drives can power on and spin up to full speed.

Use the following table for a breakdown of the differences in the AutoMAID levels:

Table 3-185: AutoMAID levels

AutoMAID Level	Description
Level 1	The read/write heads of hard disk drives are parked. If access to an HDD is reques- ted when it is at AutoMAID level 1, the HDD will be fully powered and data access- ible in under a second. AutoMAID level 1 provides a 15–20% energy savings.
Level 2	The read/write heads of hard disk drives remain parked, and disk rotation slows down. If access to an HDD is requested when it is at AutoMAID level 2, the HDD will be fully powered and data accessible in approximately 15 seconds. AutoMAID level 2 provides a 35–45% energy savings.
Level 3	The read/write heads of the hard disk drives remain parked, and disk rotation stops. If access to an HDD is requested when it is at AutoMAID level 3, the HDD will be fully powered and data available in approximately 30–45 seconds. AutoMAID level 3 provides a 60–70% energy savings.
Level 4	The electronics in HDDs and SSDs are powered off. If access to an HDD or SSD is requested when it is at AutoMAID level 4, the disks will be fully powered and data available in approximately 45–60 seconds. AutoMAID level 4 provides up to an 87% energy savings.
Level 5	The Nexsan Storage Expansion powers down, except for the power supplies, which go into standby mode. For AutoMAID level 5 to occur, all disks in the storage expansion must first be at AutoMAID level 4 for a period of time. If access to a disk is requested when the storage expansion is at AutoMAID level 5, the disk will be fully powered and data available in approximately 50–70 seconds.

## AutoMAID Statistics

Clicking **Power Settings** takes you to the *AutoMAID Statistics* page, which shows you details about the disk drives' AutoMAID power savings. For more information about AutoMAID, see <u>AutoMAID on the previous</u> page.



Figure 3-186: AutoMAID Statistics page

The *AutoMAID Statistics* page reports power savings since the **Clear Statistics** button was last clicked. The exact reporting period is shown above the **Clear Statistics** button. Statistics are listed first by enclosure and then by array. The statistical categories are listed in Table 3-187: "AutoMAID statistics" on the facing page.

Setting	Description
Array name	The name of each array in the Nexsan Storage System, plus a row for unused and spare disks. There is also a <i>Total</i> line that summarizes statistics across all disk drives.
	This list can include names of arrays that no longer exist, but did exist at any time during the reporting period.
Time at MAID	The percentage of time during the reporting period that the drives in each array or category have been at the specified AutoMAID level:
Level	• Active: The percentage of time that the drives have been active and at full power.
	<ul> <li>Idle: The percentage of time that the drives' read/write heads have been parked (AutoMAID level 1).</li> </ul>
	• <i>Slow</i> : The percentage of time that the drives' disk platters have been spun down to a slower speed (AutoMAID level 2).
	• <i>Stopped</i> : The percentage of time that the drives' disk platters have been spun down completely (AutoMAID level 3).
	• Off: The percentage of time that the drives' electronics have been completely powered down (AutoMAID level 4).
	• Standby: The percentage of time that the Nexsan Storage Expansions attached to the Nexsan Storage System have been completely powered down (AutoMAID level 5).
	Notes:
	<ul> <li>Not all disk drives support AutoMAID levels 1, 2, or 4.</li> </ul>
	<ul> <li>AutoMAID 5 settings apply only to the Nexsan BEAST BT60X, Nexsan E48X and Nexsan E60X Storage Expansions. The Nexsan E18X and Nexsan E32X Storage Expansions do not have AutoMAID 5 capability.</li> </ul>

#### Table 3-187: AutoMAID statistics

You can clear the statistics for the reporting period by clicking the **Clear Statistics** button. The AutoMAID statistics are cleared, and new statistics are recorded beginning immediately.

# Configure AutoMAID Settings

Clicking **Power Settings > AutoMAID Config** takes you to the *Configure AutoMAID Settings* page, which enables you to specify when HDDs and SSDs should enter each AutoMAID level. The page also enables you to specify times and days of the week when AutoMAID is disabled, maximizing data accessibility. AutoMAID power levels 1 to 3 do not apply for SSDs. For more information about AutoMAID, see <u>AutoMAID</u> on page 189.



Figure 3-188: Configure AutoMAID Settings page

The AutoMAID configuration settings page includes the following subsections:

- Default RAID Array AutoMAID Settings
- Default Pool Spares/Unassigned AutoMAID Settings
- RAID Array Specific Settings
- AutoMAID 5 Settings

# Default RAID Array AutoMAID Settings

This section of the AutoMAID settings page provides the following controls for the default settings for disk drives assigned as RAID array members or dedicated array spares.

Table 3-189: Default RAID Array AutoMAID settings

Setting	Description		
Power Level	Displays each AutoMAID power level:		
	<ul> <li>Level 1: park heads after</li> </ul>		
	Level 2: reduce disk speed after		
	Level 3: stop disk spinning after		
	Level 4: Power Off Disk		
	The default is Never for all levels, so power savings are turned off until you enable them.		
	For AutoMAID 5 settings, see AutoMAID 5 Settings on page 195.		
Current Set- ting	Displays the current <i>Power Level</i> setting.		
New Setting	Displays drop-down lists with the available settings for each AutoMAID power level:		
	Level 1: Never, 2 mins, or 5 mins.		
	Level 2: Never, 10 mins, 20 mins, 30 mins, 40 mins, 50 mins, 60 mins.		
	Level 3: Never, 15 mins, 30 mins, 1 hr, 1.5 hrs, or 2 hrs.		
	Level 4: Never, 20 mins, 30 mins, 1 hr, 1.5 hrs, or 2 hrs.		
Supported	Displays the number of disk drives out of the total that support each AutoMAID level.		
by	<b>Note</b> Disk drives that do not support a specific AutoMAID level will stay at a previous, usable level until the system reaches an AutoMAID level that the drive supports.		

### **To configure AutoMAID power level settings:**

- For each AutoMAID power level, use the drop-down list under *New Setting* to select the amount of time that a disk must be inactive before that AutoMAID level is activated. For details, refer to <u>Table 3-189</u>.
   Notes:
  - Any AutoMAID levels set to **never** will be ignored by the system.
  - NL-SAS drives are not compatible with AutoMAID Level 4. Arrays with NL-SAS drives set to use AutoMAID Level 4 will remain at AutoMAID Level 3.
  - If any drives are set to use AutoMAID Level 3 or 4, host timeout values (set for the host HBA either through the HBA BIOS or a management application) should be set to a default of between 120 and 150 seconds to avoid the host requests timing out before the disk drives can power on and spin up to full speed.

### 2. Click Save Level 1-4 Settings.

A message displays, informing you that the settings have been changed. Click the **Back** button to return to the *Configure AutoMAID Settings* page. For AutoMAID 5 settings, see <u>AutoMAID 5 Settings on page 195</u>.

### **•** To deactivate AutoMAID during critical hours:

1. Check the **Disable AutoMAID during critical hours** check box.

### 2. Click Save Level 1-4 Settings.

A message displays, informing you that the settings have been changed. Click the **Back** button to return to the *Configure AutoMAID Settings* page.

#### To define the critical hours schedule:

- 1. Use the drop-down lists to specify the daily start and end times for critical hours, so that power saving is paused during these hours.
- 2. Use the radio buttons next to the days of the week to specify the days where critical hours will be specified.

#### 3. Click Save Level 1-4 Settings.

A message displays, informing you that the settings have been changed. Click the **Back** button to return to the *Configure AutoMAID Settings* page. For AutoMAID 5 settings, see <u>AutoMAID 5 Settings</u> on the facing page.

### Default Pool Spares/Unassigned AutoMAID Settings

*Default Pool Spares/Unassigned AutoMAID Settings* controls the AutoMAID settings for all pool spare (but not dedicated spare) disks and all disks that are currently unassigned as either spares or array members.

### To set AutoMAID settings for pool spares and unassigned disks:

1. Use the **Pool Spares/Unassigned** drop-down list to select the AutoMAID level you wish pool spares and unassigned disks to go to:

Setting	Description
Never	The default setting.
Level 1	Park heads after 2 minutes.
Level 2	Reduce disk speed after 10 minutes.
Level 3	Stop disks spinning after 15 minutes.
Level 4	Power off disks after 20 minutes.

Table 3-190: AutoMAID settings for pool spares and unassigned disks

#### 2. Click Save Level 1-4 Settings.

A message displays, informing you that the settings have been changed. Click the **Back** button to return to the *Configure AutoMAID Settings* page.

**Note** NL-SAS drives are not compatible with AutoMAID Level 4. Pool spare or unassigned NL-SAS drives set to use AutoMAID Level 4 will remain at AutoMAID Level 3.

# **RAID Array Specific settings**

In the *RAID Array Specific Settings* section, the default Power Level setting is *Never*. Power savings are turned off until you enable them.

				-	
RAID Array Specific Settings					
Аггау	Level 1 Level 2 Level 3 Level 4 Options				
Training	Default Customize			Customize	
Operations	Default Customize			Customize	

Figure 3-191:	RAID Ar	ray Specifi	c Settings
---------------	---------	-------------	------------

Click the **Customize** link to open the *Configure AutoMAID* Settings page for a specific RAID array:

Figure 3-192: Configure AutoMAID Settings page for a specific RAID array

NEXSAN					
Home	AutoMAID AutoMAID				
RAID Information	Stats Config				
System Information	6	Power Settings			
Configure RAID	*-	Configure AutoMAID Settings			
Configure Volumes		AutoMAID Settings for Training			
Configure Host Access	Power Level	Current Setting	New Setting	Supported By	7
Power Settings	Level 1 - park heads after	5 mins	5 mins 👻	4 of 4	
System Admin	Level 2 - reduce disk speed after	40 mins	40 mins 💌	4 of 4	
Configure Network	Level 3 - stop disk spinning after	1.5 hrs	1.5 hrs 🔹	4 of 4	
Quick Start	Level 4 - Power Disk Off	2 hrs	2 hrs 🔹	0 of 4	
Technical Support	AutoMAID Schedule	Disable AutoMAID during	critical hours		
Log Off	Critical hours	Critical hours are 08:00 Ø Monday Ø Tuesday Ø Wednesday Ø Thursday Ø Friday Saturday Sunday	to 17:00 • on		
	Reve	Int to Default Settings Save Cust	om Settings		

Choose the settings in this section exactly as you would in the *Default RAID Array AutoMAID Settings* section, then click **Save Current Settings**. A message displays, informing you that the new power settings have been saved.

If you wish to return an array to default settings, click **Reset Default Settings**. A message displays, informing you that the new power settings have been saved.

### AutoMAID 5 Settings

The *AutoMAID 5 Settings* section controls how soon the Nexsan Storage Expansions power completely down after all disks in the storage expansion are at AutoMAID level 4.

AutoMAID level 5 is only available if all disks in the Nexsan Storage Expansion are configured to go to AutoMAID 4. If some of the disks are not configured for AutoMAID level 4, a warning appears:

# Incompatible AutoMAID levels

AutoMAID 5 settings apply only to the Nexsan BEAST BT60X, Nexsan E48X and Nexsan E60X Storage Expansions. The Nexsan E18X and Nexsan E32X Storage Expansions do not have AutoMAID 5 capability.

There is one row for each Nexsan Storage Expansion and four columns per row.

Table 3-193: AutoMAID 5 Settings

Label	Description
Enclosure Name	Lists the "friendly" name of the Nexsan Storage Expansion.
Current Set- ting	Displays the amount of time that the system is currently set to wait before activating AutoMAID level 5.
New Setting	Displays a drop-down list with possible settings for AutoMAID level 5.
All levels compatible	Displays the message if all disks in the enclosure are configured to go to AutoMAID level 4. It displays the message <b>Incompatible AutoMAID levels</b> if any disks in the enclosure are not configured for AutoMAID level 4.

### **•** To set the AutoMAID 5 settings for a Nexsan Storage Expansion:

- 1. Using the New Setting drop-down list, select one of the following:
  - never (the default)
  - All disks in level 4 + 5 mins
  - All disks in level 4 + 30 mins
  - All disks in level 4 + 1 hr
- 2. Click the Save Level 5 Settings button.

A message displays, informing you that the settings have been changed. Click the **Back** button to return to the *Configure AutoMAID Settings* page.

# System Administration

Clicking **System Admin** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-194: System Administration navigation bar

Cache	Alarm	Enclosure Config	Reboot	Rebuild Config	System Mode	Settings	Update Firmware	Factory Settings
-------	-------	---------------------	--------	-------------------	----------------	----------	--------------------	---------------------

Refer to  $\underline{\text{Table 3-195}}$  for help with the Nexsan E-Series/BEAST RAID system administration firmware:

Table 3-195: System Administration pages

Nav bar button	GUI pages and documentation links
Cache	Configure Cache on the next page
Alarm	Audible Alarm on page 201
Enclosure Config	Configure Enclosures on page 202
Reboot	Reboot System on page 203
Rebuild Config	Configure Rebuild Priority on page 206
System Mode (not in E48P and E60P)	System Mode on page 207
Settings	Download & Upload System Settings on page 210
Update Firmware	Update Firmware on page 213
Factory Settings	Reset to Factory Defaults on page 215

# **Configure Cache**

Clicking **System Admin** takes you to the *Configure Cache* page, which enables you to configure settings for the Nexsan Storage System's cache memory.

Cache memory holds data that is being written to one or more disks, which enables the RAID Controller to confirm that a command has been completed before the data has been written to disk. The cache is also used to temporarily store data for replying to read requests, which will help to improve performance and reduce the number of times the drives are accessed.

In the event of a power interruption, when the power is restored to the Nexsan Storage System the RAID Controller will automatically complete any write operations using the data held in the cache.

NEXSAN		Jall ok
Home RAID Information System Information Configure RAID	Cache Alarm Enclosure Reboot Rebuild System Settings Update Factory Config Mode Settings Settings Settings System Admit Configure Cac	n he
Configure Volumes Configure Host Access	Cache Configurat Current write cache state Current write cache state	ion J. Mirrored, Streaming mode (Write and read), FUA ignored - (C0) 3840 ) 3840 MB
Power Settings System Admin	Manually override current write cache status For Desired write cache state En Dis	ce write cache to Disabledabledabledabledabled
Quick Start	Allow attached host to override write cache configuration       Image: Configuration         Ignore force unit access (FUA) bit       Image: Configuration         Enable cache mirroring       Image: Configuration	
Log Off	Write cache streaming mode     Image: Comparison of the streaming mode       Read cache streaming mode     Image: Comparison of the stream of	
	Generate warnings from drive heuristics	
	Cache optimization setting	icon access guential access stom
	Save Settings R	eset

Figure 3-196: Configure Cache page

The *Configure Cache* page displays the current cache settings and enables you to configure them, as described in the following table:

Table 3-197: Cache settings

Setting	Description
Current write cache state	Shows whether the cache is currently enabled or disabled, mirrored, and in streaming mode, plus its "force unit access" (FUA) status and the size of the cache in megabytes (MB) for each RAID Controller.
Manually override current write cache status	Normally, when the user enables or disables the cache, the Nexsan Storage System must be rebooted for it to take effect. Using this check box, you can force the cache to become <i>Enabled</i> (if it is disabled) or <i>Disabled</i> (if it is enabled) without rebooting the system.
Desired write cache state	By default, this is <b>Enabled</b> .

Setting	Description
Allow attached host to over- ride write cache con- figuration	Some hosts can issue commands that force the cache to not be used. When this box is unchecked (the default), the system does not allow this.
lgnore force unit access (FUA) bit	Some SCSI commands contain an FUA bit, which forces the Nexsan Storage System to bypass cache memory and perform read and write operations directly from and to the disks. When this box is checked, the storage system ignores the FUA bit and always uses the cache memory for command execution.
Enable cache mirroring	On Nexsan Storage Systems in a dual-controller active-active failover or APAL mode (see <u>System Mode on page 207</u> ), this setting is on by default. It tells the system to duplicate the contents of the cache of one RAID Controller to the other, thus ensuring that cache contents are not lost in the event of a controller failure.
Write/Read cache stream- ing mode	When the cache streaming mode is active, the system continuously flushes the cache memory, which provides maximum cache buffering to protect against delayed command responses. When the streaming mode is not active, the system runs with a full cache, which helps reduce disk access and maximizes random I/O performance.
Preemptive write-before- read flushing	When preemptive write-before-read flushing is active, the system automatically flushes all outstanding write commands from the cache to the disks prior to reading data.
Generate warn- ings from drive heuristics	When this setting is enabled, the system will raise a warning-level log message and beacon any drive passing a preset threshold level based on the rate of media retries, the drive I/O response time, and other key drive metrics.
SCSI third- party copy extensions (requires reboot)	This setting enables support for the SCSI (LID1) third-party copy extensions, and the WRITE SAME and COMPARE AND WRITE commands. If supported, these can be used by the host operating system to accelerate some storage functions (for example, migrating data within an array or zeroing blocks). Changing this setting requires a system reboot (see <u>Reboot System on page 203</u> ).
Cache optim- ization setting	This setting tells the write cache how best to access data for your particular data usage. There are three settings:
	<b>Random access</b> : This setting is best for systems that access a large number of files or many different areas of its volumes, such as systems with many individual users or that house frequently accessed databases.
	<b>Mixed sequential/random</b> (default): This setting is best for systems that are "mixed use", sometimes accessing many smaller files and sometimes accessing a few larger files.
	<b>Sequential access</b> : This setting is best for systems that access a small number of large files sequentially, such as an archive of manuscripts or videos.
	<b>Note</b> The <b>Cache optimization setting</b> settings can be changed in real-time. We encourage you to experiment with this setting to determine which configuration works best for your environment.

#### To configure the write cache:

#### 1. Use the following table for help with configuring the write cache:

Table 3-198: Write cache settings

Setting	Actions	
Write cache state	Enable or disable <b>Desired write cache state</b> .	
<b>Note</b> To force the write cache into the desired state without having to reboot the system, use the <b>Manually override current write cache status</b> check box.		
Host override of cache con- figuration	To enable hosts to issue commands that prevent the write cache from being used, check <b>Allow attached host to override write cache configuration</b> .	
	To prevent hosts from issuing commands that force the write cache to not be used, uncheck <b>Allow attached host to override write cache configuration</b> .	
Forced unit access (FUA) cache bypass	To enable FUA commands to bypass the cache, uncheck the <b>Ignore</b> force unit access (FUA) bit check box.	
	To prevent FUA commands from bypassing the cache, check <b>Ignore force unit access (FUA) bit</b> .	
Cache mirroring	Check or uncheck Enable cache mirroring.	

**CAUTION:** If cache mirroring is turned off, data stored in the write cache may be lost if a RAID Controller fails. It is therefore NOT RECOMMENDED that you disable cache mirroring.

Read/write ache streaming	Check or uncheck Write/Read cache streaming mode.
Preemptive write-before-read flushing	Check or uncheck Preemptive write-before-read flushing.
Warnings for drive heuristics	Check or uncheck Generate warnings from drive heuristics.
Third-party SCSI copy exten- sions	Check or uncheck SCSI third-party copy extensions (requires reboot).

**Note** If you change this setting, you will need to reboot the system after clicking the **Save Settings** button. See Reboot System on page 203.

Cache optimization	Select thesetting that is most appropriate for your installation:
	Random access
	• Mixed sequential/random, or
	Sequential access.

**Note** This setting can be changed in real-time. We encourage you to experiment with this setting to determine which configuration works best for your environment.

### 2. Click the Save Settings button.

A message displays, informing you that the settings have been updated. Click the **Back** button to be returned to the *Configure Cache* page.

**Note** Some settings require the Nexsan Storage System to be rebooted before they take effect. See Reboot System on page 203.

### Audible Alarm

Clicking **System Admin > Alarm** takes you to the *Audible Alarm* page, which enables you to silence or sound the audible alarm on the Nexsan Storage System.

Figure 3-199: Audible Alarm page

NEXSAN		
Home RAID Information	Cache Alarm Enclosure Reboot Rebuild System Settings Update Factory Config Mode	
System Information Configure RAID	System Admin Audible Alarm	?
Configure Volumes Configure Host Access Power Settings	Audible Alarm Silence The Audible Alarm	
System Admin Configure Network Quick Start	Re - Sound The Audible Alarm	
Technical Support Log Off	Audible Alarm Settings       Audible Alarm Volume <ul> <li>Off</li> <li>Off</li></ul>	
	Save Settings	

If the alarm is sounding, click **Silence the Audible Alarm** to silence the alarm. (To find out why the alarm is sounding, click the notification in the upper right corner to be taken to the *Problem Summary* page. See <u>Summary of System Problems on page 111</u> for more information.)

Note If further problems occur, the audible alarm will sound again.

If the alarm is not sounding, click **Re-Sound the Audible Alarm** to sound the alarm (if a problem is present—see <u>Summary of System Problems on page 111</u>).

Audible alarms can be turned off entirely in the *Audible Alarm Settings* section. This may be useful if, for instance, the Nexsan Storage System is installed in an environment where an alarm would not be heard.

### To activate or deactivate audible alarms:

1. In the Audible Alarm Settings section, select either High or Off for the Audible Alarm Volume.

**Note** If the **Audible Alarm Volume** is set to **Off**, alarm indications in the graphical user interface are still displayed, but no sound will be heard from the Nexsan Storage System.

#### 2. Click Save Settings.

A message appears, letting you know that the setting has been saved. Click the **Back** button to return to the *Audible Alarm* page.

# **Configure Enclosures**

Clicking **System Admin > Enclosures Config** takes you to the *Configure Enclosures* page, which enables you to name each enclosure in your Nexsan Storage System. If you have a single-enclosure Nexsan Storage System, this page looks like this:



NEXSAN		ALL OK
Home	Carba Alarm Enclosure Rehoot Rebuild System Settions Update Factory	
RAID Information	Config Config Mode Firmware Settings	
System Information	System Admin	2
Configure RAID	Configure Enclosures	
Configure Volumes	Enclosure Friendly Name Beacon/Remov	e Unioad
Configure Host Access		c omodu
Power Settings	Main RAID enclosure E48-187 Beacon	Unload
System Admin		
Configure Network	Submit	
Quick Start		
Technical Support		
Log Off	Help	
	The RAID system friendly name is a symbolic name that aids the RAID F - alerts to be identified, this is useful when you have more than one	

If you have a two- or three-enclosure Nexsan Storage System, there are rows for each of the enclosures in the system:

Figure 3-201: Configure Enclosures page, multiple enclosure (example)

NEXSAN		JALL OF
Home RAID Information	Cache Alarm <mark>Enclosure</mark> Reboot Rebuild System Update Factory Config Mode Firmware Settings	
System Information Configure RAID	System Admin Configure Enclosures	•
Configure Volumes	Enclosure Friendly Name	Beacon/Remove Unload
Configure Host Access		
Power Settings	Main RAID enclosure E60- R3u4	Beacon Unload
System Admin		
Configure Network	Expansion enclosure 1 E60x- R3u8	Beacon Unload
Quick Start		
Technical Support	Submit	
Log Off	Subinit	
	Help The RAID system friendly name is a symbolic name that aids the RAID E - alerts to be identifie	ed this is useful when you have more than one

To change the name of an enclosure, enter the new name in the **Friendly Name** field and click **Submit**. A message displays, informing you that the new name is saved. Click the **Back** button to return to the *Configure Enclosures* page.

Clicking the **Beacon** button causes the LEDs on the front of the enclosure and the SAS expansion port LEDs on the back of the expansion to flash for one minute. This can help in locating a specific enclosure in a large installation where multiple Nexsan Storage Systems are located.

Clicking the **Unload** button unloads all the RAID sets on this Nexsan Storage System. This takes all volumes on those RAID sets offline—they are no longer accessible by connected hosts.

Note It is advised that you stop any host activity to all affected volumes before unloading the enclosure.

When a Nexsan Storage Expansion is offline, the **Beacon** button is replaced by a **Remove** button. Clicking **Remove** deletes this Nexsan Storage Expansion from the current configuration. Only offline storage expansions can be removed. The Nexsan Storage System must be restarted for this setting to take effect. See <u>Reboot System</u> below.

# Reboot System

Clicking **System Admin > Reboot** takes you to the *Reboot System* page, which enables you to restart or shut down the system.

NEXSAN		ALL OK
Home RAID Information	Cache Alarm Enclosure Rebuild System Settings Update Factory Config Mode	
System Information Configure RAID	System Admin Reboot System	?
Configure Volumes	Reboot RAID System	
Configure Nos Access Power Settings System Admin Configure Network Quick Start Technical Support Log Off	<ul> <li>Rolling Restart</li> <li>System Reboot</li> <li>System Shutdown</li> <li>Check I to confirm</li> <li>Execute NOW</li> </ul>	E
	Power Restoration Policy	- 1
	After AC power fails	
	Controller Maintenance	
	<ul> <li>○ Kill controller 0 (current)</li> <li>○ Kill controller 1</li> </ul>	
	Check 🔲 to confirm Execute NOW	

Figure 3-202: Reboot System page

For single-controller Nexsan Storage Systems, the *Controller Maintenance* section is not displayed, and the **Hot Restart Rolling Restart** option is grayed out.

All hosts need to have a storage path through each controller to avoid losing connectivity.

# Reboot RAID System

## The Reboot RAID System section has four options:

Table 3-203: System reboot options

Restart option	Description
Hot Restart	For dual-controller storage systems with certain configurations, this enables you to restart the RAID Controllers without losing host connectivity or data transfer capability. During a hot restart, each RAID Controller reboots individually.
	For a hot restart to be performed, both RAID Controllers must be fully operational and have the same firmware version (see <u>Update Firmware on page 213</u> ), and the storage system must be in a mode that supports controller failover ( <b>Active-Active</b> or <b>All Ports All LUNs</b> —see <u>System Mode on page 207</u> ).
	If one or more of these conditions is not met, and on single-controller storage systems, the <b>Hot Restart</b> option is grayed out.
	Note System settings requiring a reboot will not be applied by a hot restart.
Rolling Restart	For dual-controller storage systems with certain configurations, this enables you to restart the RAID Controllers with only a brief loss of host connectivity and data transfer capability. During a rolling restart, each RAID Controller reboots individually.
	For a rolling restart to be performed, both RAID Controllers must be fully operational and have the same firmware version (see <u>Update Firmware on page 213</u> ), and the storage system must be in a mode that supports controller failover ( <b>Active-Active</b> or <b>All Ports All LUNs</b> —see <u>System Mode on page 207</u> ). If one or more of these conditions is not met, and on single-controller storage systems, the <b>Rolling Restart</b> option is grayed out.
	<b>Note</b> To avoid host connection timeout during a rolling restart, disk timeouts for all hardware and virtual servers should be set to 150 seconds or more.
System Reboot (default)	This option executes a full restart of the storage system. While the storage system is rebooting, the system is offline, and arrays and volumes are inaccessible. Therefore, hosts should be safely shut down or disconnected before performing a <b>System Reboot</b> . After the system has finished rebooting, the arrays and volumes are once again accessible and hosts can be restarted or reconnected.
System Shutdown	This option flushes the cache data to the disks and shuts down the system. Therefore, hosts should be safely shut down or disconnected before performing a <b>System Shutdown</b> . <b>System Shutdown</b> does NOT turn the system completely off; the power supply units (PSUs) are still active, and fans may still run. To completely power off the system, or to bring the system back on line after a shutdown, follow the instructions in the system's <i>Installation Guide</i> .

### To perform a reboot or shutdown:

- 1. Select the desired option: Hot Restart (if available), Rolling Restart (if available), System Reboot, or System Shutdown.
- 2. Check the confirmation check box.
- 3. Click **Execute NOW** to reboot the system.

A message displays, informing you that the reboot or shutdown sequence is in progress. Once the Nexsan Storage System is back online, click the **Back** button to return to the *Reboot System* page.

**Note** While a rolling restart or reboot operation is in progress, the system status icon may indicate a FAILURE. The FAILURE message will clear once the system is fully restarted.

### **Power Restoration Policy**

The *Power Restoration Policy* section controls how the Nexsan Storage System behaves after A/C power has been restored after an interruption (due to power failure or the removal of the power cords).

Note This setting is not used by E-Series P models, which automatically boot when power is restored.

These are the options:

Table 3-204: Power restoration policies

Setting	Description
Boot immediately after power is restored	After power is restored, the Nexsan Storage System automatically starts up. This is the default setting
Remain unpowered until the controller push-switch (SW0) is pressed	After power is restored, the Nexsan Storage System will not start up until the <b>SW0</b> switch on either RAID Controller is pressed. This switch must be pressed for approximately 4 seconds to start the storage system, then released as soon as the storage system begins to power up.

### To set the power restoration policy:

- 1. Select the desired power restoration policy by clicking its selection button.
- 2. Click Save Configuration.

A message displays, informing you that the settings has been saved. Click the **Back** button to return to the *Reboot System* page.

### **Controller Maintenance**

The *Controller Maintenance* section enables you to take a RAID Controller offline for maintenance or diagnostic purposes. It also enables you to test failover settings (see <u>System Mode on page 207</u>) before deploying the system into your production environment. The RAID Controller that is currently being used to access the Nexsan Storage System GUI is noted by the text (*current*) after it.

**Note** Taking the "current" RAID Controller offline can cause the GUI to become unresponsive for up to a minute as the host connections are passed to the other controller.

### **To take a RAID Controller offline:**

- 1. Select the RAID Controller to be taken offline.
- 2. Check the confirmation box.

#### 3. Click Execute NOW.

The selected RAID Controller is taken offline, and control of the arrays is passed to the other RAID Controller (if the Nexsan Storage System has two controllers and is in an **Active-Active** or **All Ports All LUNs** mode—see <u>System Mode on the facing page</u>). Click the **Back** button to be returned to the *Reboot System* page.

#### **To re-enable the RAID Controller:**

- 1. Click the selection button next to Re-enable controller N.
- 2. Check the confirmation check box.

#### 3. Click Execute NOW

The RAID Controller is brought back on line. Click the **Back** button to return to the *Reboot System* page.

### **Configure Rebuild Priority**

Clicking **System Admin > Rebuild Config** takes you to the *Configure Rebuild Priority* page, which enables you to customize the amount of system time dedicated to rebuilding critical arrays and set the disk retirement scheme.

NEXSAN		
Home RAID Information	Cache Alarm Enclosure Reboot Rebuild System Settings Update Factory Config Mode Settings	
System Information Configure RAID	System Admin Configure Rebuild Options	?
Configure Volumes	Rebuild Configuration	
Configure Host Access	O Highest	
Power Settings	Select rebuild rate	
System Admin	○ Low	
Configure Network	Rebuild IO priority   Favour IO over Rebuild	
Quick Start		
Technical Support	Disk retirement scheme Default (copy SSD disks, rebuild others) 🔻	
Log Off	Save Settings	

Figure 3-205: Configure Rebuild Priority page

There are five rebuild rates, arranged from Lowest to Highest. The default setting is Medium.

Checking the **Favour IO over Rebuild** check box causes the storage system to perform only I/O operations during I/O activity. This can significantly delay a rebuild in a busy environment.

**Note** When there is high host activity, less spare system time is available, which can result in longer rebuild times. In this situation, it may become necessary to increase the rebuild priority so that arrays are rebuilt more quickly.

The *Disk retirement scheme* drop-down list contains three options: **Copy disks** (which copies a retiring disk's data to a pool spare), **Rebuild disks** (which uses parity data to reconstruction the disk's data), and **Default (copy SSD disks, rebuild others)**.

### To set the rebuild options:

- 1. Select the desired rebuild priority: Lowest, Low, Medium, High, or Highest.
- 2. Check or uncheck the Favour IO over Rebuild check box, according to your preference.
- 3. Select a *Disk retirement scheme* from the drop-down list.

#### 4. Click Save Settings.

A message displays, informing you that the settings have been saved. Click the **Back** button to return to the *Configure Rebuild Options* page.

### System Mode

Clicking **System Admin > System Mode** takes you to the *System Mode* page, where you can configure the failover mode for the Nexsan Storage System.

**Note** 'P' models use Single Controller mode for single controller installations and All Ports All LUNs for dual controller installations. Consequently they do not have a System Mode page.

NEXSAN		
Home RAID Information	Cache Alarm Enclosure Rebuild Rebuild System Settings Update Factory Config Mode	
System Information Configure RAID	System Admin System Mode	•
Configure Volumes	System Mode	
Configure Host Access	Single Controller mode	
Power Settings	Dual Controller Non-Redundant mode (DCNR)	
System Admin	2-port Active-Active mode (2 ports active)	
Configure Network	4-port Active-Active mode (4 ports active)	
Quick Start	All Ports All LUNs mode (4 ports active)	
Technical Support	Save System Mode	
Log Off		

Figure 3-206: System Mode page

"Failover" is the term used for when one RAID Controller takes over the host connections and array control of the other RAID Controller when that controller fails. There are several ways to implement failover, depending on whether the storage area network (SAN) uses switches, multiple host ports, and/or host-based multipathing software.



**CAUTION**: If the Nexsan Storage System is in **Single Controller** or **Dual Controller Non-Redundant (DCNR)** mode, or if cache mirroring is not enabled (see <u>Configure Cache on</u> page 198), data stored in the write cache may be lost if a RAID Controller fails.

**Note** If the *System Mode* is changed, volumes may become temporarily inaccessible. If this occurs, you must remap them (see <u>Map Logical Volumes on page 158</u>).

The possible settings for System Mode are:

Table 3-207: System mode settings

Setting	Description
Single Con- troller mode	In this mode, only one RAID Controller is active, and failure of this controller makes all arrays and volumes inaccessible. This is the only possible setting on single-controller Nexsan Storage Systems, but it is possible to set a dual-controller Nexsan Storage System to <b>Single Controller</b> mode.

Setting	Description	
Dual Con- troller Non- Redundant mode (DCNR)	In this mode, both controllers are active, but each controller operates as an independent node, and all ports are independent from each other. Volumes can only be mapped to ports on the controller that owns the array. They become inaccessible if the controller fails. Note Although DCNR mode does not allow failover, overall system performance may	
	increase slightly.	
2-port Act- ive-Active mode (2 ports active)	<ul> <li>In this mode, each controller operates as an independent node, but only one port is active on each controller. The second port operates in passive mode. Port <b>0</b> is active on controller 0, and port <b>1</b> is active on controller 1. Volumes are mapped to the active port on their owning controller. When one controller fails, the passive port on the other controller activates and takes over the host port functions of the failed controller. In a switched environment, failover is completely transparent to the hosts. This mode is suitable for customers who want to be able to handle controller failover, but do not have multipathing software.</li> <li>Note For failover to occur, hosts must be connected to the same numbered port on both</li> </ul>	
	<b>CAUTION</b> : iSCSI connections (1Gb/s and 10Gb/s) do not failover in this mode. Should a controller fail, volumes accessed through an iSCSI network will become inaccessible. To configure failover for iSCSI, use <b>All Ports All LUNs mode</b> .	
4-port Act- ive-Active mode (4 ports active)	In this mode, each controller operates as an independent node, and all ports are active. Port <b>0</b> is the primary port on controller 0, and port <b>1</b> is the primary port on controller 1. Volumes must be mapped to at least one port on its owning controller and to the secondary port on the other controller. When one controller fails, the secondary port on the other controller takes on the host address of the primary port on the failed controller, allowing host I/O to continue; the host sees the storage become active through its second path. <b>Notes:</b>	
	• For failover to occur, hosts to be connected to both ports on their owning controller and to the secondary port on the other controller.	
	<ul> <li>If a host is connected to both ports on any one controller, the host must be running multipathing software.</li> </ul>	
	<b>CAUTION</b> : iSCSI connections (1Gb/s and 10Gb/s) do not failover in this mode. Should a controller fail, volumes accessed through an iSCSI network will become inaccessible. To configure failover for iSCSI, use <b>All Ports All LUNs</b> <b>mode</b> .	

Setting	Description
All Ports All LUNs mode (all ports active)	In this mode, the entire system operates as a single node. Volumes can be mapped to any or all ports on both controllers. When a controller fails, the ports on that controller become inaccessible. However, if the volumes are mapped to ports on the other controller as well, they remain accessible to the host, which sees the storage become active through its second path.
	Notes:
	• For hosts to continue to have access to the LUNs after a controller failure or during a rolling restart, each volume should be mapped to at least one port on each controller (see <u>Map Logical Volumes on page 158</u> ) and each host must have an active path to at least one port on each controller. Volumes mapped to only one controller become inaccessible if that controller fails or if a rolling restart is executed.
	<ul> <li>Because this mode presents up to eight paths to configured volumes, the host must be running multipathing software.</li> </ul>
	• This is the only mode in which redundancy is available for all network types (Fibre Channel, SAS, 10Ge iSCSI, and 1Ge iSCSI).

### To set the system mode:

- 1. Select the desired mode by clicking its selection button.
- 2. Click Save System Mode.

A message displays, informing you that the setting has been saved, but the new mode does not take effect until the Nexsan Storage System is rebooted.

3. Click System Admin > Reboot and perform a System Reboot (see <u>Reboot System on page 203</u>).

### Notes:

- If the **System Mode** is changed, volume mappings may also change. Always check the volume mappings (see <u>Configured Logical Volumes on page 76</u>) after changing the **System Mode**.
- For more information about failover ports, click the link in the *Help* section.

# Download & Upload System Settings

Clicking **System Admin > Settings** takes you to the *Download & Upload System Settings* page, where you can download a file with the current controller settings or upload a new controller settings file to the system.

The Upload System Settings functionality can also be used to restore encryption keys to an encrypted system. See <u>Restore Encryption Keys on page 212</u>.



Figure 3-208: Download & Upload System Settings page

- To download the current settings.dat file:
- 1. Click the Click to download controller settings link.
- 2. Save the file to your computer according to the method of your operating system.
- To upload a new settings.dat file to the system:



**CAUTION**: Because improper or incorrect settings in the settings file can prevent the Nexsan Storage System from being accessible on the network,

ALWAYS verify the contents of a settings.dat file—both manually (by opening it as a text file) and by using the **Verify Settings File** button—before uploading and installing it.

- 1. Click Browse.
- 2. Navigate to the file according to the method of your operating system.

Note If you select a wrong file, click Clear Selection and try again.

3. Click Verify Settings File to validate the settings.dat file.

Note If you wish to see more detail, check the Advanced debugging mode check box before clicking Verify Settings File.

#### A Settings File Processing Report displays. Errors are shown in red text.

Figure 3-209: Settings file processing report

#### Settings File Processing Report - Test-mode Uploading Settings File: File contains 15 sections Processing section "PowerConfig"... -- Section contains 4 key/value pairs -- Error: Invalid or missing value for key MaxSpareLevel = 4 {1,0} (skipped) -- Section processing failed with 1 errors Processing section "Security"... -- Section contains 4 key/value pairs -- Section processed OK Processing section "ActiveActive"... -- Section contains 1 key/value pairs -- Section processed OK Processing section "GUISettings"... -- Section contains 7 key/value pairs -- Section processed OK Processing section "Davtime"... -- Section contains 5 key/value pairs -- Section processed OK Processing section "Network"... -- Section contains 36 key/value pairs -- Section processed OK Processing section "iSCSI"... - Section contains 7 key/value pairs -- Section processed OK Processing section "FIBRE"...

- 4. If there are errors, fix them in the settings.dat file and repeat steps 1-3.
- 5. Click **Upload and Install Settings**. The settings.dat file is automatically installed, although some settings will only take effect after a system restart (see Reboot System on page 203).

# **Restore Encryption Keys**

Clicking **System Admin > Settings** takes you to the *Download & Upload System Settings* page, which is used to restore encryption keys to a system if the drives become inaccessible. See also <u>Configure Array</u> Encryption on page 127 and <u>Disks are locked and data is inaccessible</u> on page 244.

Figure 3-2	210: Download	& Upload	Svstem	Settings page:	Verifv Settings Fil	le
5			- /		, ,	

System Admin Download & Upload System Settings		
Click the below link to download controller settings from the RAID system		
Uclick to download controller settings		
Upload a 'settings' file to the RAID system		
Select file: Choose File settings.dat Clear Selection		
Advanced debugging mode		
Verify Settings Eile Upload And Install Settings		

### To restore encryption key files to the system:



**CAUTION**: Improper or incorrect settings in the encryption key file can prevent the Nexsan Storage System from being accessible on the network.

ALWAYS verify the contents of an encryption key file—both manually (by opening it as a text file) and by using the **Verify Settings File** button—before uploading and installing it.

- 1. Verify the contents of the encryption key file manually:
  - a. Locate the encryption key file for the array that was exported previously.
  - b. Open the encryption key file as a text file.
  - c. Verify that the array name and generation date are correct for the array to be restored.
- 2. Verify the encryption key file with the Verify Settings File feature:
  - a. On the *Download & Upload System Settings* page, click **Browse**.

Note If you select a wrong file, click **Clear Selection** and try again.

- b. Navigate to the encryption key file according to the method of your operating system.
- c. Click Verify Settings File to validate the file.

A Settings File Processing Report displays. Errors are shown in red text.

3. If the file is successfully validated, reselect the file and click **Upload and Install Settings**. The key is automatically installed, but will only take effect after a system reboot.

- 4. If you need to restore more than one key, restore them one at a time in any order. Keys will not be applied until the system is rebooted. Repeat this procedure for each of the encryption keys.
- 5. Reboot the system (see Reboot System on page 203).

### Update Firmware

Clicking **System Admin > Update Firmware** takes you to the *Update Firmware* page, which enables you to

- Check for firmware updates, and
- Upload new RAID Controller firmware.

Figure 3-211: Update Firmware page

EXSAN	
Home RAID Information	Cache Alarm Enclosure Reboot Rebuild Settings Update Fundors Settings
System Information Configure RAID	System Admin Update Firmware
Configure Volumes	Check for Updates
nfigure Host Access	
Power Settings	Firmware updates include important security and reliability fixes, and may enable additional features. Click the button below to check for available updates for your product (this will open a new browser tab). Checking for updates will send the product model and current firmware version to Nexsan.
System Admin	To check for firmware updates for other products, visit:
Configure Network	https://packages.nexsan.com/nxs-fw/
Quick Start	
Technical Support	Check for Updates
	The firmware may take several minutes to be sent over the network - you will see NO response from your browser while this is happening. Once the firmware has been transferred to the RAID system, the ROM update will start automatically. Whilst the update is running you will see a progress screen on the GUI. DO NOT SWITCH THE RAID SYSTEM OFF UNTIL YOU ARE SURE THAT THE FIRMWARE UPDATE HAS FINISHED Once the update has finished successfully, it is safe to switch the RAID system off and restart with the updated firmware. A system restart is required for the uploaded firmware to take effect.
	If in any doubt DO NOT switch the RAID system off and contact a technical support representative.
	Select file: Choose File No file chosen Clear File Selection
	Upload Firmware

From time to time, Nexsan issues updates to Nexsan Storage System firmware to introduce new features or to solve firmware-related issues. New firmware files can be acquired by clicking **System Admin > Update Firmware > Check for Updates** or from Nexsan Technical Support (see <u>Technical Support on page 235</u>). Usually, the new firmware file is compressed in a .zip archive and must be extracted before uploading.

#### To upload new firmware to a Nexsan Storage System, do the following:

- 1. Ensure that both RAID Controllers on the Nexsan Storage System are up and running (if applicable).
- 2. Click **Browse** and navigate to the extracted firmware file according to the method of your operating system. (If you select the wrong file, click **Clear File Selection** and try again.)
- 3. When the file's path displays in the Select file field, click Upload Firmware.

**Note** The firmware file may take several minutes to be sent over the network. You will see NO response from the browser while this is happening.

- 4. If the progress window is not displayed automatically, click the Click this text ... link.
  - The progress bar shows the progress of the installation.

Figure 3-212: Firmware update progress dialog

This system is currently updating firmware			
DO NOT switch this system off			
When the firmware update has firmware updated successfully by at the top of the event log	finished yo checking th g DO NOT st	u will be granted access to the GUI. After returning to the GUI, double-check the ne event log for the 'Microcode Updated OK' message. If this message is <u>NOT</u> found witch the RAID system off and contact a technical support representative.	
This page has auto refresh enabled,	IT YOUR DROWS	er does not support this you will need to click the refresh button on your browser to see the current status.	
		Current progress:15%	
09	%	100%	

When the installation is complete, the following page displays:

Figure 3-213: Firmware update complete dialog

This system is currently updating firmware		
DO NOT switch this system off		
When the firmware update has finished you will be granted access to the GUI. After returning to the GUI, double-check the firmware updated successfully by checking the event log for the 'Microcode Updated OK' message. If this message is <u>NOT</u> found at the top of the event log DO NOT switch the RAID system off and contact a technical support representative.		
This page has auto refresh enabled, if your browser does not support this you will need to click the 'refresh' button on your browser to see the current status.		
Firmware update finished, status - 'Microcode Updated OK'		
Return To GUI		
The system will need to be restarted for the firmware update to take effect		

- 5. Click the **Return to GUI** button to be taken to the *Reboot System* page (see <u>Reboot System on page 203</u>).
- 6. Restart the system using a Rolling Restart (if available) or a System Reboot.
- 7. Once the reboot has completed, verify that the update was successful:
  - a. Go to **System Information > System Info** and check that the *Firmware revision* and *Build Loader revision* for both controllers are updated.
  - b. If hosts were shut down or disconnected for the system reboot (see <u>Reboot System on page 203</u>), reconnect them to the storage system.
  - c. Ensure that your volumes are visible and working as expected.
- 8. Update the emergency firmware, if required:

Note This does not require a reboot and can safely be carried out at any time.

- a. Check your current *Emergency revision* on the **System Information > System Info** page.
- b. If an emergency firmware update is required, upload it by repeating the above procedure.

# Reset to Factory Defaults

Clicking **System Administration > Factory Settings** takes you to the *Reset to factory defaults* page, where you can reset various settings to their factory defaults.

Figure 3-214: Reset to factory defaults page

Home		Update Factory	
RAID Information	Cache Alarm Config Reboot Config Mode Settings	Firmware Settings	
System Information		System Admin	6
Configure RAID	Rese	t to factory defaults	
Configure Volumes		Factory Settings	
nfigure Host Access	Install factory default settings (except management network settings)	0	
Power Settings	Additionally install default management network settings	0	
System Admin	Redetect single/dual-controller mode	0	
Configure Network	Clear expansion chassis identities and settings		
Quick Start	Clear iSCSI host list		
Quick Start	Clear iSCSI and host access list		
Technical Support	Clear all installed encryption keys		
Log Off	Redetect host plugin modules (HBAs)		
	C0 HBA module 0	4 x 16Gbit Fibre	Fibre 🗸
	C1 HBA module 0	4 x 16Gbit Fibre	Fibre ¥

### > To reset system settings to factory defaults:

1. Select or deselect each check box as required:

Table 3-215: Factory reset settings

Setting	Description
Install factory default set- tings (except management network settings)	Installs factory default values to the system. This may take up to two minutes to complete.
Additionally install default management network set- tings	Installs the default management network settings. It requires <b>Install fact- ory default settings</b> to be checked.
Redetect single/dual-con- troller mode	(E48P and E60P only) Causes the device to redetect the number of con- trollers and to set the appropriate system mode.
Clear expansion chassis identities and settings	Clears stored Nexsan Storage Expansion identifiers (including friendly names and AutoMAID 5 settings).
Clear iSCSI host list	Clears the stored iSCSI transport configurations for hosts.
Clear iSCSI and host access list	Clears the stored iSCSI transport configurations and access settings for hosts.

Setting	Description
Clear all installed encryp- tion keys (E-Series only)	Removes all encryption keys for encrypted arrays. Ensure that you have downloaded and backed up all keys before selecting this option (see <u>Configure Array Encryption on page 127</u> ).
Redetect host plugin mod- ules (HBAs)	Redetects HBAs after a reset.
C <i>n</i> HBA module 0	Select the desired host transport (Fibre or 10Ge-iSCSI) if the installed HBA supports multiple transport types.

2. When you have selected the desired items, click the **Apply Factory Defaults** button. A confirmation screen appears:

Figure 3-216: Factory default reset warning and confirmation dialog

Confirm that you wish to perform action(s) listed below
Install factory defaults
Clear chasis and expansion identities
Clear host iSCSI data
Clear host access list
Confirm by clicking the checkbox and then clicking the 'Confirm' or Cancel by clicking the 'CANCEL' button.
• • • • • • • • • • • • • • • • • • •
Confirm
CANCEL

3. To proceed with the factory reset, check the confirmation check box and click **Confirm**.

After a period of time, a message displays, confirming that the Nexsan Storage System has been reset. Click the **Back** button to return to the *Reset to factory defaults* page.

Note To cancel the factory reset, click CANCEL.

A message displays, stating that the operation has been canceled. Click the **Back** button to return to the *Reset to factory defaults* page.
# **Configure Network**

Clicking **Configure Network** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-217: Configure Network navigation bar

Network Settings	E-Alert	SNMP Syslog	Date & Time	Security	SSL	GUI Settings
Settings		Syslog	Time			Settings

Refer to Table 3-218 for help with the Nexsan E-Series/BEAST network configuration firmware:

Table 3-218: Configure Network pages

Nav bar button	GUI pages and documentation links
Network Settings	Configure Network Settings on the next page
E-Alert	E-Alert Settings on page 220
SNMP Syslog	SNMP/SYSLOG Settings on page 223
Date & Time	Configure Time and Date on page 225
Security	Security on page 228
SSL	SSL Configuration on page 230
GUI Settings	GUI Settings on page 232

# **Configure Network Settings**

Clicking **Configure Network** takes you to the *Configure Network Settings* page, which enables you to configure all of the settings on each network management port.

NEXSAN			ALL OK
Home RAID Information	Network Settings E-Alert SNMP Date & Security	SSL GUI Settings	
System Information		Configure Network	(7)
Configure RAID			
Configure Volumes	Controller 0	Management	
Configure Host Access	Port setting	Auto Speed/Duplex	
Power Settings	Hostname	NXS-0109304D-0	
System Admin	IPv4 mode	Static IP V	
Configure Network	IP address	172.17.118.223	
Ouick Start	Subnet mask	255.255.0.0	
Quick Start	Gateway	172.17.1.1	
Technical Support	Primary DNS	172.17.1.11	
Log Off	Secondary DNS	172.17.1.15	
	IPv6 mode	Disabled V	
	IP address		
	Prefix length		
	Gateway		
	Primary DNS		
	Secondary DNS		
	Controller 1 Port status	Management	
	Port setting	Auto Speed/Duplex	
	Hostname	NXS-0109304D-1	
	IPv4 mode	Static IP 🗸	
	IP address	172.17.118.224	
	Subnet mask	255.255.0.0	
	Gateway	172.17.1.1	
	Primary DNS	172.17.1.11	
	Secondary DNS	172.17.1.15	
	IPv6 mode	Disabled V	
	IP address		
	Prefix length		
	Gateway		
	Primary DNS		
	Secondary DNS		
		Save Configuration Save and Apply Changes Reset	

Figure 3-219: Configure Network Settings page

The information is arranged by controller, with Controller 0 at the top and Controller 1 at the bottom. **Current status** indicates whether the link is up or down. If the link is up, it displays the current link speed and duplex mode setting.

#### To configure network settings:

1. Apply the appropriate network settings for the **Mgmt** port on both controllers of your Nexsan Storage System:

Table 3-220: Configure Network Settings

Setting	Action
Port Settings	For most networks, the default setting of <b>Auto Speed/Duplex</b> is recommended. However, if your LAN switch doesn't support auto-negotiation, you can "force" one or both settings. The options are:
	Auto Speed/Duplex (the default) Auto Speed, Full Duplex Auto Speed, Half Duplex 1Gbit Full Duplex 100Mbit Full Duplex 100Mbit Half Duplex 10Mbit Full Duplex
Hostname	This defaults to the host's address. Enter a "friendly" host name for the port, if desired.
IPv4 mode	Choose <b>Automatic</b> , <b>Static IP</b> , or <b>Disabled</b> for each controller in the Nexsan Storage System.
	If you select <b>Automatic</b> , then the Nexsan Storage System will use DHCP and no other configuration is needed.
	<b>Note</b> To use <b>Automatic</b> , your network must be configured for DHCP. If it is not, you MUST use a static IP address.
	If you select Static IP, then you must fill in the IP Address and Subnet Mask.
IPv6 mode	Choose <b>Automatic</b> , <b>Static IP</b> , or <b>Disabled</b> for each controller in the Nexsan Storage System.
	If you select <b>Automatic</b> , then no other configuration is needed. IPv6 will be configured automatically from router advertisements (SLAAC), and a fixed link-local IPv6 address will be assigned.
	<b>Note</b> To use <b>Automatic</b> , your network must be configured for SLAAC. If not, you MUST use a static IP address.
	If you select <b>Static IP</b> , then you must fill in the <b>Static IP Address</b> and <b>Prefix</b> length.

- 2. When you have selected the desired new settings, do one of the following:
  - Click **Save Configuration**. The settings are saved and are applied after the Nexsan Storage System is restarted (see <u>Reboot System on page 203</u>).
  - Click Save and Apply Changes. The settings are saved and applied immediately.

If at any time you wish to return the *Configure Network Settings* page to its initial state, click **Reset**.

## **E-Alert Settings**

Clicking **Configure Network > E-Alert** takes you to the *E-Alert Settings* page, which enables you to set up automatic email alerts for RAID system events.

NEXSAN						
Home RAID Information	Network Settings E-Alert SNMP Date & Security	SSL GUI Settings				
System Information		Con	figure Network			?
Configure RAID		E -	Alert Settings			
Configure Volumes		E-Alert 0	General Configuration			
Configure Host Access	Sender email address		MauveE48@Nexsan.com	n		
Power Settings	SMTP email server		smtp.example.com			
Svetom Admin	Use encrypted connection (TLS)		Preferred ¥			
System Admin	Use authentication		C Enabled			
Contigure Network	Username		Not Required			
Quick Start	Password		Not Required			
Technical Support	Email subject format		FriendlyName Model (St	(sID) AlertType Ever	t v	
Log Off	Current emailer status		Send queue is empty (Re	ady)		
		II queue	d emails will be deleted / lost.			
		Si	aved Certificate		Last Received Certifi	cate
	Issued by	-		-		
	Issued to Valid from			-		
	Issued to Valid from Valid until			-		
	Issued to Valid from Valid until View Certificate	- - - -		- - - -		
	Issued to Valid from Valid until View Certificate	- - - - - - - - - - - - - - - - - - -	ne SMTP server does not match t st Received Certificate	- - - - ne saved certificate.		
	Issued to Valid from Valid until View Certificate Email Address Net Configured		ne SMTP server does not match t st Received Certificate ar All Certificates of All Email Recipients Automatic Status Emails Schedule	Format	Test Email	Castinus
	Issued to Valid from Valid until View Certificate  Email Address Not Configured Not Configured Not Configured		ne SMTP server does not match t st Received Certificate ar All Certificates of All Email Recipients Automatic Status Emails Schedule Disabled	re saved certificate.	Test Email	Configure
	Issued to Valid from Valid until View Certificate  Email Address Not Configured Not Configured Not Configured Not Configured		e SMTP server does not match t st Received Certificate ar All Certificates of All Email Recipients Automatic Status Emails Schedule Disabled Disabled Disabled	Format	Test Email	<u>Configure</u> Configure

Figure 3-221: E-Alert Settings page

The E-Alert General Configuration section displays settings for the sender (the Nexsan Storage System).

- To verify or change E-Alert settings:
- 1. Click **Configure Network > E-Alert** to open the *E-Alert Settings* page.
- 2. Apply settings as described in the following table:

Table 3-222: Verify or change E-Alert settings

Setting	Action
Sender email address	Enter the address for the E-Alert sender. Although this can be any address that the mail server will accept as valid, you may wish to make the sender email address unique to the Nexsan Storage System.

Setting	Action
SMTP email server	Enter the SMTP server IP address or DNS host name of the mail server. You can only use a mail server name (for instance, smtp.example.com) if you have a domain name server (DNS) configured (see <u>Configure Network Settings</u> on page 218). Otherwise, you must use the server's IP address.
Use encrypted connection (TLS)	Choose the encrypted connection setting: <b>Required</b> , <b>Preferred</b> , or <b>Disabled</b> .
Use authentication	Choose the authentication preference, either <b>Enabled</b> or <b>Disabled</b> . <b>User name</b> : Define a user name to be used for authentication. <b>Password</b> : Define a password to be used for authentication.
Email Subject format	Select the email subject format using the Email Subject format drop-down list. There are three options: FriendlyName Model (SysID) AlertType Event — Populates the subject line with the Nexsan Storage System's friendly name, model, system ID, alert type, and a short description of the event. FriendlyName Model (SysID) SubSystem AlertType Event — Populates the subject line with the Nexsan Storage System's friendly name, model, system ID, specific enclosure, alert type, and a short description of the event. FriendlyName Model (SysID) (S,A) Event — Populates the subject line with the Nexsan Storage System's friendly name, model, system ID, abbreviated forms of the enclosure and alert type, and a short description of the event.
Current emailer status	Shows whether there are emails waiting in the queue to be sent. You can click <b>Clear Email Queue</b> to delete any emails currently in the queue. This may be necessary or useful if you need to have the Nexsan Storage System send a critical alert immediately.

3. Click the **Apply** button to save your settings. A message appears, informing you that the settings have been saved.

The Certificates section includes the following viewing options:

Table 3-223: Certificate valid dates

Field	Description
Issued by	Displays a list of all certificates issued by the system.
Issued to	Displays a list of all certificates issued to the system.
Valid from	Displays the certificate valid from date.
Valid until	Displays the certificate valid until date.
View certificate	Displays the certificate details.

You can perform the following actions with certificates:

- Save the last received certificate. Click the **Save Last Received Certificate** button.
- Clear all certificates by clicking the Clear All Certificates button.

Next, use the *Summary of All Email Recipients* section to configure the types of alerts to be sent to Nexsan Storage System email recipients.

#### To configure alert types to be sent:

1. In the *Summary of All Email Recipients* section, click the **Configure** link for an email recipient. The *Configure E-Alert Recipient* page displays:

N <del>i</del> xsan					J ALL OK
Home	Network E-Alert SNMP Settings E-Alert System	Date & GU	l Jas		
RAID Information	o o unigo o joro g		.90		
System Information	¢	,	Configure Network		(?)
Configure RAID		(	configure E Alert Recipie	ent	
Configure Volumes					<u>Next &gt;</u>
Configure Host Access			Configure Recipient 1		
Power Settings	Email address	storageadmin1@example.co	m	Send Test	Email Now
System Admin			Filter Options for Recipient 1	1	
-,		Errors	Warnings	Information	System
Configure Network	Network				
Quick Start	Disk				
Technical Support	RAID				
roomindar oupport	Host				
Log Off	Misc				
	Арр		0		
Select All Clear All					
	Email Schedule	Disabled V	tic Status Email options for R	ecipient 1	
	Email formatting	Send as MIME attachment ~	•		
			Apply Recipient Options		

Figure 3-224: Configure E-Alert Recipient page

2. You can configure up to five email addresses to receive email alerts. Configure a selected email recipient using the following table:

Table 3-225: Summary of All Email Recipients for E-Alerts

Setting	Action
Configure Recipient n Email Address	Enter a valid email address in the <b>Email address</b> field. You can test that the email is valid using the <b>Send Test</b> <b>Email Now</b> button.
Filter Options for Recipient <i>n</i> Network, Disk, RAID, Host, Misc, and Application	Check the boxes for the kinds of messages that you wish to notify the recipient of by email. You can select to receive <b>Error</b> , <b>Warning</b> , <b>Information</b> , or <b>System</b> alerts for each category. You can also us the <b>Select All</b> and <b>Clear All</b> buttons.

Setting	Action
Automatic Status Emails Email schedule	Select <b>Disabled</b> , <b>Every 1 Day</b> , <b>Every 2 Days</b> , <b>Every 4</b> <b>Days</b> , <b>Weekly</b> , or <b>Monthly</b> .
Email formatting	Select Send as MIME attachment or Send as plain-text email.

- 3. Click the Apply Recipient Options button.
- 4. Click the **Back** button to return to the *E-Alert Settings* page.

### SNMP/SYSLOG Settings

Clicking **Configure Network > SNMP Syslog** takes you to the *SNMP/SYSLOG Settings* page, which enables you to configure settings for SNMP traps and system log (SYSLOG) messages.

Figure 3-226: SNMP/SYSLOG Settings page

NEXSAN			ALL OK
Home RAID Information	Network Settings E-Alert SNMP Date & Security SSL GU Syslog Time Security SSL Setting	ll Igs	
System Information Configure RAID		Configure Network SNMP/SYSLOG Settings	(2
Configure Volumes		SNMP Configuration	
Configure Host Access	SNMP server address 1		
Power Settings	SNMP server address 2		
System Admin	Community string	public	
Configure Network	Trap version	● SNMPv1 ○ SNMPv2c	
Quick Start	When to send SNMP traps	Do not send SNMP traps	
Technical Support		SYSLOG Configuration	
Log Off	SYSLOG server address		
Log On	SYSLOG server UDP Port	514	
	SYSLOG facility	LOCALO V	
	When to send SYSLOG messages	Send SYSLOG messages for all events	
		Save Settings Reset	
		Test SYSLOG/SNMP	
	Test String: Test string	Test SNMP Test SYSLOG	

Information captured by an SNMP trap or a SYSLOG message is similar to the information sent in an E-Alert (see <u>E-Alert Settings on page 220</u>), except that it is sent to an SNMP Management Station or system log.

#### Notes:

- If you use SNMP traps, you must parse the trap MIB (Management Information Base) into your application. Use the **MIB** links in the Help section at the bottom of the page to download the MIB for SNMP v1 and v2c.
- Only SNMP traps are available; there is no general SNMP management capability in the Nexsan Storage System.

#### To set up SNMP traps:

1. Use the following table for help with setting up SNMP traps.

#### Table 3-227: SNMP traps

ACUON
Enter the IP address that SNMP traps will be sent to. The default is Not Configured. The server address can either be an FQDN (domain name) or IP address. IPv6 addresses should be enclosed in "[" and "]". One or two IP addresses can be specified.
Enter the SNMP Network Management Server password. By default, this is <b>public</b> .
Jse the selection buttons to select the type of SNMP trap that is to be sent: <b>SNMPv1</b> the default) or <b>SNMPv2c</b> .
Using the drop-down list, select what kinds of events (see <u>Event Log on page 112</u> ) will be sent as SNMP traps. There are five options: <b>Do not send SNMP traps</b> (the default), <b>Send SNMP traps for errors only, Send SNMP traps for warnings and errors</b> , <b>Send SNMP traps for information, warnings and errors</b> , and <b>Send SNMP traps for information, warnings and errors</b> , and <b>Send SNMP traps for information</b> , warnings and errors, and <b>Send SNMP traps for information</b> , warnings and errors, and <b>Send SNMP traps</b> for information, warnings and errors, and <b>Send SNMP traps for information</b> , warnings and errors, and <b>Send SNMP traps</b> for information, warnings and errors, and <b>Send SNMP traps</b> for the sent set of the sent set of the set of

#### 2. Click Save Settings.

A message displays, informing you that the settings have been updated. Click the **Back** button to return to the *SNMP/SYSLOG Settings* page.

#### To set up SYSLOG messages:

1. Use the following table for help with setting up SYSLOG messages.

Table 3-228: SYSLOG messages

Setting	Action
SYSLOG server IP address	Enter the IP address of the host running the SYSLOG service that will receive the SYSLOG messages.
SYSLOG server UDP port	Enter the UDP port number that the management station is listening to. The default is 514.
SYSLOG Facility	Using the drop-down list, select the designation for the part of the system the SYSLOG message originates from. This is defined by the SYSLOG protocol. Options will vary depending on your operating system.
When to send a SYSLOG message	Using the drop-down list, select what kinds of events (see Event Log on page 112) will be sent in SYSLOG messages. There are five options: Do not send SYSLOG messages (the default), Send SYSLOG messages for errors only, Send SYSLOG messages for warnings and errors, Send SYSLOG messages for information, warnings and errors, and Send SYSLOG messages for all events. Note If at any time you wish to return the <i>SNMP/SYSLOG Settings</i> page to its initial state, click <b>Reset</b> .

3

#### 2. Click Save Settings.

A message displays, informing you that the settings have been updated. Click the **Back** button to return to the *SNMP/SYSLOG Settings* page.

- To test SNMP trap and SYSLOG settings:
- 1. Enter a test phrase (default Test string) in the Test String field.
- 2. Click Test SNMP or Test SYSLOG.

A message displays, informing you that the test string has been sent, and the management station or SYSLOG file will receive the test string within a few minutes. Click the **Back** button to return to the *SNMP/SYSLOG Settings* page.

#### Configure Time and Date

Clicking **Configure Network > Date and Time** takes you to the *Configure Time and Date* page, which enables you to set the time and date used by the Nexsan Storage System's internal clock. This can be done manually or automatically.

NEXSAN			
Home RAID Information	Network Settings E-Alert SNMP Date & Security SSL GUI Settings		A
System Information Configure RAID		Configure Network Configure Time and Date	2
Configure Volumes		Time and Date Configuration	
Configure Host Access	Current local time (in 'hh:mm:ss' format)	15:14:10	
Power Settings	Current local date	21 V / Dec V / 2021 V	
System Admin Configure Network	Timezone	Use fixed GMT offset: GMT  Automatically adjust for Daylight Saving Time: [GMT+00:00] EuropeLondon	
Quick Start Technical Support	Time server address	Use IP address from list:     129.6.15.28     Use time server address:	
209 01	Time server protocol	SNTP     Daytime with format:     Jijj yy-mm-dd hh:mm:ss tt l h [NIST format]	
	Set system time and date by the time server every 24 hours		
		Save Settings	
	Attempt to configure sy	stem time and date automatically (contact time server now)	
	Contact	Time Server to Auto Configure Time And Date	
		Retrieve Time Server Data	
	Data retrieved from contacting the time server	No data retrieved	

Figure 3-229: Configure Time and Date page

#### Set time and date manually

Use this procedure to set your Nexsan Storage System time and date manually.

#### To set time and date manually:

1. Use the following table for details about setting the parameters:

Table 3-230: Setting time and date manually

Setting	Action
Current local time (in 'hh:mm:ss' format)	Enter the time in the field. The time entered in the <b>Current local time (in 'hh:mm:ss' format)</b> field will be set when you click the <b>Save Settings</b> button. Therefore, it is suggested that you enter the time rounded to the next five-minute mark, then click <b>Save Settings</b> when the entered time is reached.
Current local date	Enter the date using the drop-down lists.
Timezone	<ul> <li>In this section, do one of the following:</li> <li>Select Use fixed GMT offset and set the GMT offset using the drop-down list.</li> <li>Select Automatically adjust for Daylight Saving Time and select the appropriate time zone in the drop down list.</li> </ul>
Time server address and Time server protocol	Leave the default settings in these sections. No changes are required when you are setting the time and date manually and no SNTP server is available.
Set system time and date by the time server every 24 hours	In this section, click to enable the setting as required. If no SNTP server is available, the setting remains deselected.

#### 2. Click Save Settings.

Set time and date automatically

- **•** To configure the Nexsan Storage System to set time and date automatically:
- 1. Use <u>Table 3-231: "Configuring time and date automatically"</u> on the facing page for details about setting the parameters:

**Note** For automatic time setting to work, you may have to configure the **Gateway** setting for your network. See <u>Configure Network Settings on page 218</u> for more information.

Table 3-231: Configuring time and date automatically

Setting	Action
Time and Dat	e Configuration
Timezone	<ul> <li>In this section, do one of the following:</li> <li>Select Use fixed GMT offset and set the GMT offset using the drop-down list.</li> <li>Select Automatically adjust for Daylight Saving Time and select the appropriate time zone in the drop down list.</li> </ul>
Time server address	<ul> <li>In this section, do one of the following:</li> <li>Select Use IP address from list and select a time server IP address from the drop-down list.</li> <li>Select Use time server address and enter the IP address of a known time server into the text box.</li> </ul>
Time server protocol	Select either SNTP or Daytime with format.
Daytime with format	If you entered a time server address and selected <b>Daytime with format</b> , select the time server time and date format using the drop-down list. <b>Note</b> If you do not know the format of the time server data, click the <b>Retrieve Time</b> <b>Server Data</b> button in the <i>Attempt to configure system time and date automatically</i> (contact time server now) section. The data is retrieved and displayed next to <i>Data</i> <i>retrieved from contacting the daytime server</i> . Use this data to choose the proper format in the time and date format drop-down list.
Set system time and date by the time server every 24 hours	Enable this option if you want the Nexsan Storage System to contact the time server every twenty-four hours to update the time and date.
Attempt to co	onfigure system time and date automatically
Contact Time Server To Auto Configure	If you want to update the time immediately, click the button in this section. The time and date are updated immediately.

2. Click Save Settings.

Time And Date

# Security

Clicking **Configure Network > Security** takes you to the *Password Configuration* page, which enables you to set passwords for the administrator-level (ADMIN) and user-level (USER) accounts.

EXSAN			<mark>√all ok</mark>
Home RAID Information	Network E-Alert SNMP Date & Security SSL GUI Settings E-Alert Syslog Time		<b>^</b>
System Information	-	Configure Network	?
Configure RAID	Pa	issword Configuration	
Configure Volumes		Administrator access	
Configure Host Access	Current 'ADMIN' login password requirement	Login password required (security enabled)	
Power Settings	Change 'ADMIN' login password requirement to	<ul> <li>Required</li> <li>NOT Required</li> </ul>	
System Admin	Login user name is fixed to	ADMIN	
Configure Network	Current Password		
Quick Start	New Password		
Technical Support	Confirm password		
	Current 'USER' login password requirement	User access Security disabled - login password NOT required	_
	Change 'USER' login password requirement to	<ul> <li>Required</li> </ul>	
		NOT Required	
	Login user name is fixed to	NOT Required USER	
	Login user name is fixed to	NOT Required  USER  -Not Required	
	Login user name is fixed to New Password Confirm password	NOT Required      USER      - Not Required      - Not Required      - Not Required	
	Login user name is fixed to New Password Confirm password	NOT Required USER	
	Login user name is fixed to New Password Confirm password	NOT Required USER     - Not Required     - Not Required     - Not Required Set USER Password Connected Host access	
	Login user name is fixed to New Password Confirm password Current host trust setting	NOT Required USER     - Not Required     - Not Required     Set USER Password  Connected Host access Limited	
	Login user name is fixed to New Password Confirm password Current host trust setting Change host trust setting to	NOT Required USER     Not Required     Not Required Set USER Password  Connected Host access Limited     None     Read-only     Limited     Full	

Figure 3-232: Password Configuration page

#### Administrator and User access

The Administrator access and User access sections display the following information:

Table 3-233: Administrator and User access

Setting	Description
Current "ADMIN"/"USER" login password requirements	Indicates whether a password is currently required for the ADMIN or USER account, respectively.
Change "ADMIN"/"USER" login password requirement to	Used to enable or disable password protection. Select <b>NOT Required</b> (the default) to disable password-protected login. Select <b>Required</b> to enable password-protected login.

Setting	Description
Login user name is fixed to	Displays the account user name- ADMIN or USER.
Current Password	Enter the current account password to make changes. If password-pro- tected login is currently disabled for this account, this item is not displayed.
New Password	Enter the new account password.

#### To change security settings

- 1. Next to Change "ADMIN/USER" login password requirement to, select Required or NOT Required.
- 2. Enter the current ADMIN/USER password into the Current Password field.
- 3. If you selected **Required**, enter the password into the **New Password** and **Confirm Password** fields. Passwords should be eight characters or longer and can contain both letters and numbers, but not special characters or punctuation.

#### 4. Click Set ADMIN/USER Password.

A message displays, informing you that the password has been set. Click the **Back** button to return to the *Password Configuration* page.

Passwords take effect immediately. The next time you try to access a configuration page, the GUI will ask you to enter the user name and password to gain access. Both fields are case-sensitive, and user names must be entered in all capitals ("ADMIN" or "USER").

#### **Connected Host access**

The *Connected Host access* section enables you to configure the option to allow hosts that are connected to the storage area network (SAN) to provision the Nexsan Storage System directly, without requiring the ADMIN password. This feature requires compatible storage management software (such as the Nexsan Storage Tools provisioning application—see Appendix B, <u>Nexsan Storage Tools on page 253</u>) to be installed on the host. This section displays the following information:

Table 3-234: Connected	Host access	settings
------------------------	-------------	----------

Setting	Description
Current host trust setting	The current level at which SAN-connected hosts can access the Nexsan Storage System without the ADMIN password.
Change host trust	Select one of four levels
setting to	None Host-based management access is disabled.
	<b>Read-only</b> Hosts can read information about the High-Density Storage System, but cannot provision storage.
	<b>Limited</b> (default) Hosts can create new volumes, and expand or delete any volumes to which they have read/write access.
	<b>Full</b> Hosts can create new volumes, modify volume access rights, and expand or delete any volumes on the RAID system.

#### To change connected host provisioning access:

1. In the Change host trust setting to section, select None, Read-only, Limited, or Full.

**CAUTION**: If untrusted users have administrative access to hosts on the storage area network (SAN), we strongly recommend that you set this option to **None**.

#### 2. Click the Set Host Trust Setting button to save your change.

A message displays, indicating that the settings have been changed. Click the **Back** button to return to the *Password Configuration* page.

#### SSL Configuration

Clicking **Configure Network > SSL** takes you to the *SSL Configuration* page, which enables you to set up Secure Sockets Layer (SSL) encryption between the Nexsan Storage System and the browser accessing the system's GUI.

(SAN		
Home Network E-Alert SNMP Date D Information Settings Tim	& Security SSL GUI Settings	
Information igure RAID	Configure Network SSL Configuration	(
imes	Configure SSL Controller 0. Certificate and less are valid	
SSL status	CA: False, Common name : 172.17.118.100 Controller 1 Certificate and key are valid CA: False, Common name : 172.17.118.101	
SSL mode	O HTTP only HTTPS only HTTPS and HTTP	
Minimum SSL version Management API (NMP)	TLSv1.2 V	
O Dynamic certificate	Configure Certificate and Key (Advanced)	
Dynamic certificate inherited fror Certificate Choose File     Use uploaded certificate and key Controller 0 : Certificate Choose File	No file chosen     Key Choose File     No file chosen	
Controller 1 : Certificate Choose File	No file chosen Key Choose File No file chosen	
-	Save Configuration Reset	

Figure 3-235: SSL Configuration page

The Configure SSL section displays the following information:

#### Table 3-236: SSL settings

Setting	Description
SSL status	The current SSL configuration. Also shows any certificate problems and a download link for the current root CA certificate (when applicable).
	<b>Note</b> It is recommended that you download the root CA certificate and add it to your browser's trusted certificate list to avoid certificate errors when connecting via HTTPS.
SSL mode	<ul> <li>The type of browser connection allowed by the RAID system. There are three options:</li> <li>HTTP only (the default) Disables SSL or HTTPS connection.</li> <li>HTTPS only Enables SSL/HTTPS connection and disables unsecured (HTTP) connection.</li> <li>HTTPS and HTTP Enables both SSL/HTTPS and unsecured HTTP connections.</li> </ul>
Minimum SSL version	The minimum SSL version you need. There are three options: TLSv1.0 TLSv1.1 TLSv1.2
Management API (NMP)	Enables setting TLS for the Management API (NMP - Nexsan Management Protocol).

The *Configure Certificate and Key (Advanced)* section displays selection buttons for each of three options: **Dynamic certificate**, **Dynamic certificate inherited from uploaded CA root**, and **Use uploaded certificate and key**.

#### **To configure SSL:**

- 1. Select the desired SSL mode using the selection buttons: **HTTP only**, **HTTPS only**, or **HTTP and HTTPS**.
- 2. Select the Minimum SSL version: TLSv1.0, TLSv1.1, or TLSv1.2.
- 3. Click to enable Management API (NMP), as required.
- 4. In the Configure Certificate and Key (Advanced) section, select the desired option:

Table 3-237: Configure Certificate and Key (Advanced) settings

Setting	Description
Dynamic certificate	This is the default mode. The SSL key and certificate are automatically generated at startup and signed with the default Nexsan root CA certificate.

Setting	Description
Dynamic certificate inherited from uploaded CA root	The SSL key and certificate are automatically generated at startup and signed with the uploaded root CA certificate. To select this mode, you must provide and select files for the <b>Certificate</b> and <b>Key</b> by clicking <b>Browse</b> and navigating to the files according to the method of your operating system. CA certificate and SSL key files must be in PEM or DER format.
Use uploaded certificate and key	Uses the uploaded certificate and key (PEM or DER format) as long as both files are valid. On dual-controller systems, you must provide different files for each controller.

#### 5. Click Save Configuration.

A message displays, indicating that the settings have been changed. Click the **Back** button to return to the *SSL Configuration* page.

#### **GUI** Settings

Clicking **Configure Network > GUI Settings** takes you to the *GUI Settings* page, which enables you to configure GUI options.

NEXSAN		
Home RAID Information	Network E-Alert SNMP Date & Security SSL GUI Settings E-Alert Syslog Time Security SSL	
System Information	Configu GUI	re Network 3
Configure Volumes	GUI	Settings
Configure Host Access	Enable GUI enhancements (requires Javascript) Enable persistent tooltips (requires Javascript)	
Power Settings	Enable hot tracking (requires Javascript)	
System Admin	Minimize page scrolling by using submenus where appropriate	
Configure Network	Minimize page scrolling by showing less information	
Quick Start	Highlight array text using different colors	
Technical Support Log Off	Select how you would like the home page to be displayed	<ul> <li>Use default view</li> <li>Always use expansion overview</li> <li>Always use enclosure detail view</li> </ul>
	Select the units you wish to use for volume size and free space entry	<ul> <li>Mega bytes (MB)</li> <li>Giga bytes (GB)</li> <li>Percentage of array size (%)</li> <li>Binary Mega bytes (MiB)</li> <li>Binary Giga bytes (GB)</li> </ul>
	Web page auto refresh (10 to 120 secs)	Enabled 🗷 , Auto refresh time 60 seconds
	Save	Settings

#### Figure 3-238: GUI Settings page

#### To change GUI settings:

1. Adjust the default settings as described in the following table.

#### Table 3-239: GUI settings

Setting	Action		
Enable GUI enhancements (requires Javas- cript)	This option is enabled by default. If your browser does not support JavaScript, or if the JavaScript enhancements cause browser problems, disable this option. <b>Note</b> Sometimes, JavaScript errors can prevent user login. If this occurs, enter http:// <ip address="">/admin/guiprefs.asp into the browser's address bar to load this page directly. JavaScript can then be turned off and login reattempted.</ip>		
Enable per- sistent tooltips (requires Javas- cript)	is option is disabled by default. Enable this option to display pop-up tool tips when e mouse pointer is hovered over an icon. This option requires that the <b>Enable GUI</b> hancements option be enabled.		
Enable hot tracking (requires Javascript)	This option is enabled by default. When enabled, this option causes lines in certain tables to be highlighted when the mouse cursor is over them. Disable this option to not highlight table lines with the mouse cursor is over them. This option requires that the <b>Enable GUI enhancements</b> option be enabled.		
Minimize page scrolling by using submenus where appropriate	This option is disabled by default. Enable this option to show a summary submenu of links on certain pages. This submenu reduces the need to scroll on long pages. <b>Note</b> Enabling this option may change the way in which you are able to access certain features. In such cases, the instructions in this <i>User Guide</i> may not match your experience.		
Minimize page scrolling by showing less informationThis option is disabled by default. Enable this option to show only essential information on each page.Note which you are able to access them. In such cases, the instructions in this Use Guide may not match your experience.			
Highlight array text using dif- ferent colors	This option is enabled by default. Text displayed below disk icons is color-coded by array to aid in visual identification of array members. Disable this option if you wish to display all disk text in black.		
Select how you would like the home page to be displayed	The default setting for this option is <b>Use default view</b> , which is described in <u>Home</u> <u>page on page 65</u> . Select a different option, if desired. The three options are <b>Use default view</b> , <b>Always use expansion overview</b> , and <b>Always use enclosure detail view</b> .		
Select the stor- age systems you wish to use for volume and free space entry	The default setting for this option is <b>Gigabytes (GB)</b> . Select a different option, if desired. The options are: Megabytes (MB), Gigabytes (GB), Percentage of array size (%), Binary Megabytes (MiB), and Binary Gigabytes (GiB).		

Setting	Action
Web page auto refresh (10 to 120 secs)	This option is enabled and set to <b>30</b> seconds by default. When no links or buttons are clicked in the GUI for this length of time, the page is automatically refreshed with updated information from the Nexsan Storage System. Disable this option to stop pages from automatically refreshing. Change the number in the <b>Auto refresh time</b> field to make automatic page refresh happen more or less often.

#### 2. Click Save Settings.

A message displays, indicating that the settings have been changed. Click the **Back** button to return to the *GUI Settings* page.

# **Technical Support**

Clicking **Technical Support** in the navigation pane opens the related GUI pages. The buttons at the top of these pages provide links to the pages described in this section.

Figure 3-240: Technical Support navigation bar

App License

Refer to Table 3-241 if you need to contact Nexsan E-Series/BEAST Technical Support.

Table 3-241: Technical Support pages

Nav bar button	GUI pages and documentation links
Contact Details	Contact Information on the next page
Tech Support	Technical Support Email Form on page 237
End User License	End User License Agreement on page 238
App License	Application and Feature Licenses on page 239

## **Contact Information**

Clicking **Technical Support** takes you to the *Contact Nexsan Technical Support* page, which provides several options for contacting Nexsan Technical Support.



NEXSAN			✓ <u>ALL OK</u>	
Home	Contact Tech End User App			
RAID Information	Details Support License License			
System Information	1	echnical Support	2	
Configure RAID	Contacting	Nexsan Technical Support	J	
Configure Volumes	Contacting Nexsan Technical Support			
Configure Host Access	Using the Tech. Support Email form (recommended)	Click Here		
Power Settings	Electronic mail	support@nexsan.com		
System Admin	United States Technology Center	+1-866-263-9726 / +1-760-690-1111		
System Admin	United Kingdom Technology Center	+44(0)1332-291-600		
Configure Network				
Quick Start		2		
Technical Support		Help		
Log Off	The recommended means of contacting Nexsan Technical Support is via the email support form. This requires correct configuration of the E-Alert system, specifying an email server capable of mailing Nexsan. Should this not be possible, you can also email technical support directly, or via telephone at the numbers above. Please be sure to register all your Nexsan systems at <u>http://registration.nexsan.com</u> .			

This page displays an email address and several telephone numbers for contacting Nexsan Technical Support.

If your network settings (see <u>Network Information on page 105</u>) and E-Alert settings (see <u>Network Services</u> on page 107) allow the Nexsan Storage System to send email directly, you can click the **Click Here** link next to **Using the Tech. Support Email form (recommended)** to open the email contact form (see <u>Technical</u> Support Email Form on the facing page).

# Technical Support Email Form

Clicking **Technical Support > Tech Support** (or the **Click Here** link on the Contact Nexsan Technical Support page) takes you to the **Send System Status to Technical Support** email form.

NEXSAN				✓ <u>ALL OK</u>	
Home	Contact Tech End User	App			
RAID Information	Details Support License L	icense			
System Information			Technical Support	?	
Configure RAID		Send System Status To Technical Support			
Configure Volumes		E-A	lert/Tech. Support Emailer Status		
Configure Host Access		E	mail send queue is empty (Ready)		
Power Settings			Technical Support Form		
System Admin	Send tech. support messa	age to *	support@nexsan.com		
Configure Network	Customer email address	¢.			
Quick Start		Contact Details	Shi	pping Details (if different)	
Technical Support	Contact Name *		Shipping Name		
Log Off	Company *		Company		
	Telephone *		Telephone		
	Address		Address		
	Brief description of the problem * (2000 chars max)				
				Ŧ	
	Check 🗖 to confirm Send Tech. Support Email Clear Form				
		• •	Clear Email Queue		

Figure 3-243: Send System Status to Technical Support email form

You must fill out the fields marked with a red asterisk (\*). Once you have filled out all required information, check the confirmation check box and click **Send Tech Support Email**. The email is sent, along with a system diagnostic report to help Nexsan Technical Support understand your issue.

If you make errors, click Clear Form to erase all data in the form. You can then re-enter it.

If there are emails in the email queue, check your network settings to make sure that they are correct (see <u>Network Information on page 105</u>). If the settings are correct and there are still emails in the queue, you can delete them by clicking **Clear Email Queue**. (If you have already queued the Support email, this will also delete the Support email.)

# End User License Agreement

#### Clicking **Technical Support > End User License** takes you to the *End User License Agreement* page.

Figure 3-244: End User License Agreement

NEXSAN		<u>LL OK</u>
Home	Autor Tak Fullys for	~
RAID Information	Details Support License	- 1
System Information	Technical Support	
Configure RAID	End User License Agreement	
Configure Volumes	NEXSAN END-USER SOFTWARE LICENSE AGREEMENT	
Configure Host Access		
Power Settings	IMPORTANT! THIS LICENSE AGREEMENT IS A BINDING AGREEMENT BETWEEN THE END USER (sometimes referred to as "YOU") AND NEXSAN	
System Admin	accompanies Nexsan's products ("Software"). When you, the End User, order, download, install or use the Software, you acknowledge that you have read this	
Configure Network	Agreement and understand it, and agree to be bound by its terms. In you act on benañ or a company or other entity, you warant that you are duly autoinced to enter into this Agreement on behalf of such company or other entity as the End User. If you did not obtain this copy of the Software legally, immediately delet the	
Quick Start	Software from the system and destroy any copies. If you do not accept all of the terms and conditions of this Agreement do not download, install, or use the Software. Please return the Software to the entity from which you licensed it for a full refund.	
Technical Support	THE RIGHT TO USE THE SOFTWARE IS GRANTED ONLY UPON THE CONDITION THAT YOU AGREE TO THE TERMS AND CONDITIONS OF THIS	
Log Off	AGREEMENT.	
	1. <u>DEFINITIONS</u>	
	"Agreement" means this End-User Software License Agreement.	
	"Designated Storage System" means the hardware storage array upon which you are authorized by Nexsan to use the Software and in conjunction with which this Software has been provided.	
	"End User" means the entity or individual that has been granted a license to use the Software, as well as its employees, officers, directors, consultants, agents or others who are authorized to have access to the Software through the End User.	
	"Nexsan" means Nexsan Technologies, Inc. and any related companies, as well as " when applicable " Nexsan's employees, officers, directors and shareholders.	
	"Services" means Software updates, upgrades or other related services provided by Nexsan and subscribed to by the End User. The terms and conditions of such Services are set forth in a separate agreement ("Services Agreement") to be entered into by the End User and Nexsan.	
	"Software" means (a) the software, firmware or other computer information with which this Agreement is provided including, but not limited to: (i) Nexsan or third party computer information or software and (ii) related explanatory written materials or files ("Documentation"); and (b) modified versions, updates, upgrades, additions and copies of the Software, if any, licensed to the End User by Nexsan.	
	2. LICENSE	
	(a) PER CAPACITY LICENSE. The licensing and pricing of the Software is based on "Registered Capacity." Registered Capacity is defined as the maximum raw capacity (measured in terabytes) with which the Software may be legally and properly used under the License (as further defined in Section 2(b), below). Exceeding the Registered Capacity is a breach of this Agreement and is grounds for termination of the License by Nexsan. In addition, Software is licensed for use only on one (1) sectifically identified Designated Storage System. Originally the purchase of each Designated Storage System convirges of the purchase of (1) the Designated (1) sectifically identified Designated Storage System.	~

You must accept the EULA the first time you log into the Nexsan Storage System (see <u>Accept the End User</u> License Agreement (EULA) on page 20).

# Application and Feature Licenses

Clicking **Technical Support > App License** takes you to the *Application and Feature Licenses* page, which displays licensing details for additional features for Nexsan Storage Systems.

NEXSAN			
Home RAID Information	Contact Tech End User App Details Support License License		
System Information Configure RAID	Technic Application and	<mark>al Support</mark> I Feature Licenses	()
Configure Volumes Configure Host Access Power Settings System Admin Configure Network	Licensed Feature Snapshots Replication (outbound) Replication (inbound)	Status Licensed Licensed Licensed	Allowed Available Unlimited Unlimited Unlimited
Quick Start Technical Support Log Off	Upload new Ap Select file: Clear F	blication License file Browse Ie Selection	
	Uploa License F The above license file was generated on "Tuesday	d License le Information 16-Oct-2012 10:53:02" by "Nexsa	n US SnR License"

The **Licensed Feature** section displays the license status for *Snapshots*, *Replication (outbound)*, and *Replication (inbound)*.

Table 3-246: Licensed Features settings

Setting	Description
Status	The column displays whether this machine is <i>Licensed</i> or <i>Not Licensed</i> for each feature.
Allowed	The column displays the number of replications allowed by the license. This can be <i>None</i> , a number, or <i>Unlimited</i> .
Available	The column displays the number of replications still available under the current license. This can be <i>None</i> , a number, or <i>Unlimited</i> .

The Upload new Application License file section enables you to upload a new license file.

The **License File Information** section displays when and by whom the current license file was generated. This section is only displayed if a custom license has been installed. Otherwise, it does not appear.

#### To upload an Application License file:

- 1. Click the Browse button to open the Choose File to Upload dialog.
- 2. Navigate to the location of the new license file, select it, and click Open.

**Note** If you select the wrong file, you can clear the selection by clicking the **Clear File Selection** button. Then repeat steps 1 and 2 to select the correct file.

3. Click Upload License.

A message appears, indicating that the license file has been uploaded. Click the **Back** button to return to the *Application and Feature License* page.

**Note** For detailed information regarding the snapshots and replication features, see the *Nexsan High-Density Storage Snapshots and Replication User Guide*.

# Log Off

When you click the **Log Off** button in the navigation pane, the system logs you out and displays a message prompting you to close down your browser.

Do one of the following:

- Log back in to resume your work (see Log in on page 48).
- Close the browser to clear its cache and prevent unauthorized access to the Nexsan Storage System.

# Chapter 4

# Troubleshooting

This chapter contains troubleshooting tips and procedures for some of the more common problems encountered by Nexsan Storage System users. If you do not find your issue in this chapter, refer to Technical Support on page 235 for ways of contacting a service representative for assistance.

This chapter contains the following sections:

Web interface problems	241
Start up problems	
Other problems	

# Web interface problems

#### Can't connect using my IP address.

If your browser fails to connect to the Storage System, troubleshoot the system according to the following procedure:

#### **b** To check IP address settings on a Nexsan Storage System:

- 1. Check to see if the system is responding by "pinging" the management port (Net 0 or Management):
  - a. Open a terminal window. The method for doing this varies by operating system.
  - b. On the command line of the terminal window, type:
    - ping <IP address>

where < IP address> is the IP address of the Nexsan Storage System's management port.

If the ping is successful, you will see a response similar to the following:

```
Reply from <IP address>: bytes=32 time=10ms TTL=30
Reply from <IP address>: bytes=32 time<10ms TTL=30
Reply from <IP address>: bytes=32 time<10ms TTL=30
Reply from <IP address>: bytes=32 time<10ms TTL=30
Ping statistics for <IP address>:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milliseconds:
Minimum = 0ms, Maximum = 10ms, Average = 2ms
```

4

If you have a successful reply, but still cannot access the home page, contact Technical Support. If there is no reply to the ping, proceed to step 2.

- Check the IP address of the machine you are trying to access using either Nexsan Storage Manager or IP Configuration Tool (see Appendix B, <u>Nexsan Storage Tools on page 253</u>). Both tools automatically detect all Nexsan Storage Systems on the same subnet.
- 3. If you are using DHCP, make certain that the DHCP server has allocated an address to the Nexsan Storage System management port.
- 4. If you are trying to connect to the Web interface from a host that is on a different network, verify that the gateway was set correctly on the Nexsan Storage System (see <u>Network Information on page 105</u>). This can be done by trying to access the Web interface from a host that is on the same network as the Nexsan Storage System.
- 5. If you still get no reply, do one of the following:
  - Use a serial port connection to set up IP addressing. Refer to <u>Alternate IP configuration on</u> page 245.
  - Reset the IP address of the management port manually. See <u>Initial network address setup on</u> page 16 for instructions.

#### Menus ask for a user name and password.

This means that administrator security is turned on (see <u>Security on page 228</u>). To access configuration pages, you must enter ADMIN as the user name and the configured administrator account password. If you haven't configured an administrator account password, use the default password: PASSWORD.

#### Can't access configuration pages even as admin.

Make certain that you are entering ADMIN in all caps and the password exactly as it was configured. If no password was configured, make sure you are entering PASSWORD in all caps.

If, after double checking the user name and password, you still are unable to access the Nexsan Storage System or the configuration pages, reset the password using a serial port connection to set up IP addressing. Refer to Alternate IP configuration on page 245.

If you are still unable to resolve the password issue, contact Technical Support (see <u>Contact Information on</u> page 236) to have them guide you through the process of resetting the ADMIN password.

# Start up problems

#### My Nexsan Storage System beeps on startup.

The system may beep for a variety of reasons. A beep does not mean that the Nexsan Storage System is broken. However, if you are concerned, do the following:

#### **•** To double-check causes for system beeping at startup:

- 1. If you have E-Alerts enabled (see <u>E-Alert Settings on page 220</u>), check the inbox of a recipient's email account. If there is a problem, an E-Alert provides a clear explanation of any problems.
- 2. Log in to the GUI for the Nexsan Storage System and check the status indicator in the top right. If it says WARNING or FAILURE, click the icon to be taken to the *Summary of System Problems* page (see <u>Summary of System Problems on page 111</u>).
- 3. Check the Event and Error logs for issues (see Working with the Event Log on page 57).

4. Check the LEDs on the front and back of the Nexsan Storage System. If an LED is any color other than green, consult the storage system's *Installation Guide* to determine what the problem may be.

For further help, contact Nexsan Technical Support (see Contact Information on page 236).

# Other problems

#### A disk has failed.

The GUI says that a disk has failed, but my data is still accessible. What should I do?

#### If a disk has failed:

- 1. Contact your Nexsan dealer or Nexsan Technical Support (see <u>Contact Information on page 236</u>) to arrange for a replacement disk drive to be shipped as quickly as possible.
- 2. DO NOT REMOVE THE FAILED DISK DRIVE until the new disk drive has arrived and is ready to be installed. Removing a disk drive changes air flow and cooling and can result in the system overheating.
- 3. Once the new disk drive has arrived, follow the instructions in the Nexsan Storage System's *FRU Removal and Replacement Guide* to replace the failed disk drive. The new disk drive will either be rebuilt into the array (if the array is in a critical state) or it will be assigned as a pool spare (see <u>Add Hot</u> <u>Spare on page 134</u>).

Note Do NOT re-install a failed disk into any Nexsan Storage System, even if examination reveals no fault.

# A power supply unit (PSU) has failed, but my Nexsan Storage System is still functioning. What should I do?

#### If a PSU has failed:

- 1. Contact your Nexsan dealer or Nexsan Technical Support (see <u>Contact Information on page 236</u>) to arrange for a replacement power supply unit to be shipped as quickly as possible.
- 2. DO NOT REMOVE THE FAILED PSU until the new PSU has arrived and is ready to be installed. Removing a PSU reduces air flow and cooling and can result in the system overheating.
- 3. Once the new PSU has arrived, follow the instructions in the Nexsan Storage System's *FRU Removal and Replacement Guide* to replace the failed PSU with the new one.

### A RAID Controller has failed. What should I do?

If a RAID Controller fails, you may not have access to your data. However, the data is still safe on the disks and will be available as soon as a new RAID Controller has been installed.

#### If a RAID Controller has failed:

- Contact Nexsan Technical Support (see <u>Contact Information on page 236</u>) to determine the reason for the RAID Controller failure. In many cases, the RAID Controller can be recovered and continue to work properly.
- 2. If the RAID Controller cannot be recovered:
  - a. Contact your Nexsan dealer or Nexsan Technical Support to arrange for a replacement RAID Controller to be shipped as soon as possible.
  - b. DO NOT REMOVE THE FAILED RAID CONTROLLER until the new controller has arrived and is ready to be installed. Removing a RAID Controller reduces air flow and cooling and can result in the system overheating.

c. Once the new RAID Controller has arrived, follow the instructions in the Nexsan Storage System's *FRU Removal and Replacement Guide* to replace the failed RAID Controller with the new one.

#### Disks are locked and data is inaccessible

The graphical user interface says that some disks are locked and my data is inaccessible. What should I do? Locked disks are indicated by an icon on the Disk Drives tab of the RAID Information page. See "Disk Information" (page 81).





#### If disks are showing as 'locked':

- 1. If your system is encrypted and you have saved copies of the encryption keys, upload the keys using the Upload System Settings function. See Download & Upload System Settings on page 210.
- 2. If the disks cannot be unlocked:

Contact Nexsan Technical Support (see <u>Contact Information on page 236</u>) to determine the reason for the disks being locked. In some cases the disks can be unlocked and continue to work properly.

DO NOT REMOVE THE LOCKED DISK DRIVES. Removing disks reduces air flow and cooling and can result in the system overheating. The disks probably will not need to be replaced.

# Appendix



# Alternate IP configuration

In cases where using the Nexsan Storage Tools isn't possible, there are additional ways to set up the IP address of your Nexsan Storage System.

This appendix contains the following sections:

Add a route to access the desired IP address	246
Use the serial port to change the IP address	247

# Add a route to access the desired IP address

Adding a route doesn't change the IP address of the Nexsan Storage System; it simply maps a path to the storage system's existing IP address. This method requires your workstation to be directly connected to the same Ethernet network that the storage system's management port (**Net 0** or **MGMT**) is connected to.

To add a route to access the IP address of the Nexsan Storage System's RAID Controllers, you must have access to the command line interface or a terminal window.

#### To add an IP address access route:

- 1. At the command prompt, enter the information according to your OS:
  - Windows: route add 10.11.12.13 mask 255.255.255.255 <workstation IP address>
  - Linux: /sbin/route add 10.11.12.13/32 gw <workstation IP address>
  - Solaris: route add 10.11.12.13 mask 255.255.255.255 <workstation IP address>

where <workstation IP address> is the IP address of the workstation you are using.

2. To add a path to the second controller, repeat step 1, but replace the first IP address with 10.11.12.14.

Note The IP addresses 10.11.12.13 and 10.11.12.14 are the system defaults.

# Use the serial port to change the IP address

To use the serial port on your Nexsan Storage System to configure the IP address, you must directly connect your computer to the storage system via the supplied RJ45-to-DB9 serial cable. You must also have a terminal emulation program installed on the computer.

#### To change the IP address via the serial port:

- 1. Connect the serial cable to your computer's serial (COM) port.
- 2. Connect the other end of the cable to the Nexsan Storage System serial port.
- 3. Open your terminal emulation program and set up a new connection to the system. It should be set to 115,200 bits per second, and 8 data bits, 1 stop bit, no parity bits, and no flow control.
- 4. Open the serial connection to the Nexsan Storage System (the command varies depending on the type of terminal emulation program you are using). The system management console displays.

   Nexsan	E48P system management	console	  FAULT
1			
Main Menu			
System information			
Set time and date   Configure network			
Alarms and security   Reboot / shutdown			
Display debug messages			
16:53:33 Pre	ss 'return' to open a	new menu 06-1	Dec-2021

Figure A-1: Serial port system management console

5. Using the arrow keys on your keyboard, navigate to **Configure network** and press **Enter**.

6. Next, use the arrow keys to select the appropriate network port (**Controller 0, Management** or **Controller 1, Management**).

Figure A-2: Select Network Port



The Network Menu displays.

Figure A-3: Network Menu

[
Network Menu
Configure link speed
Configure IPv4
Configure IPv6
Set hostname
Display network status
Display network settings
Apply new settings
Exit

7. Select **Configure IPv4** or **Configure IPv6** as required and press **Enter**. The **IP Settings** menu displays.

Figure A-4: IP Settings



8. Select **Set IP**<*version*> mode and press **Enter**. The **Select IP Mode** menu displays. \*Asterisks\* indicate the current IP mode. In the examples, IP Mode is set to **Automatic**.

1	
Select IPv4 Mode	Select IPv6 M
<u></u> I	1
Disabled	Disabled
itomatic*	*Automatic*
tatic IP	Static IP
Ixit	Exit

Figure A-5: Select IP Mode

#### Table A-6: IP modes

IPv4	IPv6
Disabled	
Select this option to disable IPv4 addressing.	Select this option to disable IPv6 addressing.
Automatic	
Select this option if your network is configured for DHCP, in which case the Nexsan Storage firmware will use DHCP to assign IP addresses automatically. If DHCP is not enabled in your network, you MUST use <b>Static IP</b> . Use the <b>Hostname</b> field to change the name reported to the DHCP server.	Select this option to have IPv6 configured automatically from router advertisements (SLAAC). A fixed link-local IPv6 address will also be assigned.
Static IP	
Using this mode, you must set the <b>Static IP</b> Address and <b>Subnet Mask</b> .	Using this mode, you must set the values for <b>Static IP address</b> and <b>Prefix Length</b> .
	A fixed link-local IPv6 address will also be assigned.

9. When you have made your selection, press the **Esc** key to save your changes and return to the **IP Settings** menu.

**Note** To implement your settings, you must go back to the **Network Menu**, select **Apply New Settings**, and press **Enter**.

10. If you are using **Static IP**, manually enter the IP settings for your network:

Table A-7: IP settings menu choices

IPv4 menu	IPv6 menu
Set static IP address	Set static IP address
Set subnet mask	Set prefix length

- 11. Select Set hostname to enter a host name and press Enter.
- 12. Optionally, select **Display network settings** and press **Enter** to review the new settings, for example:

Figure A-8: Network Settings

Information		
Port mode	(Mgmt): Auto Speed, Auto Duplex	
Jumbo frames	(Mgmt): Disabled, 1500 MTU	
Hostname	(Mgmt): E60	
IPv4 mode	(Mgmt): Automatic	
IP address	(Mgmt):	
Subnet mask	(Mgmt):	
Gateway	(Mgmt):	
DNS server	(Mgmt):	
IPv6 mode	(Mgmt): Automatic	
IP address	(Mgmt):	
Prefix	(Mgmt):	
Gateway	(Mgmt):	
DNS server	(Mgmt):	
	Press 'space' or 'ESC' to continue	

Press Esc to return to the Network Menu.

13. Select **Apply New Settings** to complete the configuration process for this port. An information window appears. In **Automatic** mode, it may take up to 60 seconds for the system to complete the IPv4 or IPv6 configuration.

Figure A-9: Network settings applied



14. Optionally, select **Display network status** and press **Enter**, for example:

Figure A-10: Network Status

		Information
   Port status   Jumbo frames	(Mgmt):	Link Up, 1Gbit Full Duplex
MAC address	(Mgmt):	00-04-02-C3-19-97
IPV4 mode   IP address	(Mgmt): (Mgmt):	172.17.250.1
Subnet mask   Gateway	(Mgmt): (Mgmt):	255.255.0.0 172.17.1.1
DNS server   DNS server	(Mgmt): (Mgmt):	172.17.1.11 172.17.1.15
IPv6 mode   IP address	(Mgmt): (Mgmt):	Automatic fe80::204:2ee:110d:101
Prefix   Gateway	(Mgmt):	
DNS server	(Mgmt):	fe80::215:5dff:fe0c:fa0e
	Press	'space' or 'ESC' to continue

Press Esc to return to the Network Menu.

15. Repeat this procedure for the other port on your Nexsan Storage System.
# Appendix

## Nexsan Storage Tools

This appendix provides an overview of the Nexsan Storage Tools. For a deeper understanding, please refer to the Nexsan Storage Tools Help, which is available after installation in Windows Help format from the Windows Start menu and Storage Tools interface, and in PDF format from the Storage Tools zip file.

If you completed the <u>Initial network address setup on page 16</u>, the Nexsan Storage Tools are already installed on your system. If not, or if you want to install them on one or more additional computers, the latest tools are always available for download from the Nexsan Support Web site at <a href="https://helper.nexsansupport.com/esr\_downloads.html">https://helper.nexsansupport.com/esr\_downloads.html</a>. The Server Features are only available for installation on Windows Server.

The Nexsan Storage Tools are tested to run on:

- Windows Vista, 7, 8, 8.1, 10, and 11 and Windows Server versions 2008, 2012, 2012 R2, 2019, and 2022 (all versions)
- Macintosh OS X 10.5 to 10.11
- RHEL 8.2 and Linux Storage Tools 1.3.5

### Prerequisites

- To use these tools, your Nexsan Storage System host must have read and write access to at least one LUN.
- There must be a file system on the volume or drive.

### Nexsan Storage Tools Overview

### This section provides a brief overview of the basic Nexsan Storage Tools.

Nexsan Storage Tools 1.7.76 Setup Custom Setup Select the way you want features to be installed.	
Nexsan Storage Tools     Storage Manager     Shell Extensions     IP Configuration     Host Identification     PowerShell     Server Features	Provides a common management point for all Nexsan RAID systems, using an Explorer-style interface. This feature requires 14MB on your hard drive.
	Browse
Reset Ba	ick Next Cancel

### Figure B-1: Custom Setup

### Table B-2: Nexsan Storage Tools

Tool	Description
Nexsan Storage Manager	A Windows Explorer-style interface to manage Nexsan Storage Systems. See <u>Nexsan Storage Manager on page 256</u>
Shell Extensions	A Windows shell extension to provide information about the Nexsan Storage System associated with a particular disk. See <u>Shell Extensions on page 257</u>
IP Configuration	A GUI-based tool to configure the IP address of any Nexsan Storage System on the local subnet. See IP Configuration tool on page 257
Host Identification	A GUI-based tool that displays the identifiers of local storage adapters. See <u>Host</u> <u>Identification tool on page 258</u>
PowerShell	Microsoft PowerShell cmdlets module for managing Nexsan Storage Systems. Includes Storage Management Provider (SMP) and additional tools.
	In Windows Server environments, Nexsan Storage Systems can also be managed within Windows Server Manager, including monitoring and end-to-end provisioning workflows. See <a href="PowerShell_on page 259">PowerShell_on page 259</a>

### Nexsan Storage Tools Server Features

### This section provides a brief overview of the Nexsan Storage Tools Server Features.

Figure B-3: Custom Setup, Server Features

Custom Setup Select the way you	want features to be insta	alled.
	er Features Multipathing (MPIO) Provisioning (VDS) Snapshots (VSS) Management (SMP)	Drivers and components for Windows Servers connected to Nexsan RAID storage.
		This feature requires 0KB on you hard drive. It has 4 of 4 subfeatures selected. The subfeatures require 13MB on you hard drive.
		Browse
	Reset	Back Next

### Table B-4: Server Features

Tool	Description
Multipathing (MPIO)	Enables and configures the Microsoft multipathing (MPIO) feature for Nexsan Storage Systems. See Multipathing on page 260
Provisioning (VDS)	<ul> <li>Enables you to:</li> <li>Create and manage storage volumes on connected Nexsan Storage Systems directly from a Windows-based server.</li> <li>Perform advanced storage configuration tasks, including managing hot-spares and setting up clustered storage.</li> <li>See Provisioning (VDS) on page 261</li> </ul>
Snapshots (VSS)	Enables you to create and manage snapshots on connected Nexsan Storage Systems directly from a Windows-based server. See <u>Snapshots (VSS) on page 262</u>
Management (SMP)	Enables Windows Server to run the Nexsan Storage Management Provider (SMP). The management server does not need to be connected to the SAN, but must be able to contact the Nexsan Storage System management IP addresses. See <u>Management</u> (SMP) on page 265

### Nexsan Storage Manager

Nexsan Storage Manager provides a common management point for all Nexsan Storage Systems, either in a standalone window or directly integrated into Computer Management. The tool automatically discovers all Nexsan Storage Systems on the local area network (LAN) and displays them in the RAID Systems section, along with their status and IP address. The left-hand pane provides a tree view, enabling you to organize RAID systems into folders and favorites.

### To launch the Nexsan Storage Manager:

On the Windows workstation where the Nexsan Storage Tools are installed, click Start
 > Nexsan > Nexsan Storage Manager.

Selecting Nexsan RAID Storage returns to the default summary view.

Click the Help icon or Tasks menu for details.

Nexsan Storage Manager			_	
Eile Action View Help				
<ul> <li>Nexsan RAID Storage</li> <li>Favorites</li> <li>Other Systems</li> <li>Summary</li> <li>Mapped Locally</li> <li>All RAID Systems</li> </ul>	Nexsan RAID Storage overview Nexsan Storage Tools		Last refreshed: 16 Mar 2022 20:3	9:27 🕝 ^
	Nexsan Storage Tools provide enhanced function: Installed features: Nexsan Storage Manager Console Multipathing (MultiSan IO) Provisioning and Snapshots (VDS, VSS, SMP)	ality for deploying and ma	naging Nexsan RAID systems.	
	All systems   33 total   3 alarms   9 warnings		Γ	TASKS 🔻
	System Name OKSupportBEAST4 UKSupportE18-02 UKSupportE32-01 UKSupportE48P-01 UKSupportE48P-02 Yellow E60#1 - 32gDEV Yellow-E32-f 1307.1	Status OK OK OK OK OK ALARM WARNING ALARM	IP Address 172.17.131.214 172.17.131.14 172.17.131.19, 172.17.131.20 172.17.131.25, 172.17.131.26 172.17.131.27, 172.17.131.28 172.17.110.200, 172.17.110.201 172.17.110.110, 172.17.110.120	~
	LOCAL VOLUMES Local volumes   4 total Volume Name Volume #1 Volume #2 Volume #3 Volume #4	Status OK OK OK OK	Mounted As System Mauve E48#2 10G Mauve E48#2 10G Mauve E48#2 10G Mauve E48#2 10G	TASKS V

Figure B-5: Nexsan Storage Manager

### Shell Extensions

### This feature adds several additional elements to Windows:

Table B-6: Shell Extensions

Extension	Description
Explorer Disk Extension	Displays information about the Nexsan RAID volumes on the <b>Properties</b> dialog in Windows Explorer.
Disk Management Extension	Displays information about the Nexsan RAID volume on the <b>Properties</b> dialog in Disk Management (under <b>Computer Management &gt; Storage</b> ).
Computer Man- agement Exten- sion	Integrates the High-Density Storage Console under <b>Computer Management &gt; Storage</b> for convenient access.

### IP Configuration tool

The Nexsan IP Configuration Tool enables you to configure Nexsan Storage Systems for use on your network, as described <u>Configure the Nexsan Storage System IP address on page 18</u>. The tool automatically detects all systems connected to the subnet and displays their status and IP settings.

### To launch the IP Configuration tool:

On the Windows workstation where the Nexsan Storage Tools are installed, click Start
 > Nexsan > IP Configuration Tool.

System Name	Syst	em ID	Firmwa	are	IP Addres	35		
Mariana ECOD MMCar		50100	0011	1207	172 17 1	10.1		
Nevsan E48	0366	F0188	5011.	1306.2	172.17.1	19.1		
Nexsan E60	05F9	9C2AC	R011.	1208.10	172.17.1	00.240		
UKSupportBEAST4	01F9	9C2F6	R011.	1208.10	172.17.1	31.214	 	
UKSupportE48P-01	0123	33635	S011.	1306.1	172.17.1	31.25, 172.17.131.26		
UKSupportE48P-02	0532	239D0	S011.	1306.1	172.17.1	31.27, 172.17.131.28		
Vollow E22 f DickDR	EV 0F04	400.00			172 17 1	10 110 172 17 110 120		
stem: Nexsar itatus: Check i iystem ID: 05F9C2i IRL: http://1 4 Settings IPv6 Set	E60 IP settings AC (E60) 72.17.100.240 tings	+002C	S011.0	0617.rc42	1/2.1/.1	0.110, 172.17, 110, 120	Beacon	n
stem: Nexsar Status: Check System ID: 05F9C2 IRL: http://1 r4 Settings IPv6 Set Controller 0 Mgmt	E60 IP settings AC (E60) 72, 17, 100, 240 tings	+0020	5011.0	Controller	1 Mgmt		Beacon	n
stem: Nexsar itatus: Check iystem ID: 05F9C2 IRL: http://1 4 Settings IPv6 Set Controller 0 Mgmt IPv4 Mode	160 (P settings AC (E60) 72: 17.100.240 tings Static IP	+0020	\$011.0	Controller IPv4 Mode	1 Mgmt	Automatic	Beacon	n
stem: Nexsar tatus: Check ystem ID: 05F9C2 RR1: http://1 4 Settings IPv6 Set Controller 0 Mgmt IPv4 Mode IP Address	160           IP settings           XC (E60)           72: 17.100.240           tings           Static IP           172: 17: 100 - 240	]	S011.0	Controller IPv4 Mode IP Addres	1 Mgmt — e s	Automatic	Beacon	n
stem: Nexsar Itatus: Check is isystem ID: 05F9C2. http://1 4 Settings IPv6 Set Controller 0 Mgmt IPv4 Mode IP Address Subnet Mask	It60         Psettings           Kc (E60)         72.17.100.240           tings         Static IP           172.17.100.240         225.255.00.00	]	S011.0	Controller IPv4 Mode Subnet Ma	1 Mgmt — e s ask	Automatic	Beacon	n
stem: Nexsar Itatus: Check ( Version D): 05F9C2 IRL: http://1 4 Settings IPv6 Set Controller 0 Mgnt IPv4 Mode IP Address Subnet Mask Gateway	160           IP settings           V6 (E60)           72. 17.100.240           tings           172. 17. 100.240           255.255.00.00	]	S011.4	Controller IPv4 Mode IP Addres Subnet Ma Gateway	1 Mgmt — e s ask	Automatic	Beacon	n ~
stem: Nexsar     status: Check:         Check:	E60           IP settings           AC (E60)           72.17.100.240           tings           Static IP           172         17           255         255           255         255           .         .           .         .	] ] ] ]	S011.4	Controller IPv4 Mode IP Addres Subnet Ma Gateway Primary DI	1 Mgmt — e s ask	Automatic	Beacon	n

Figure B-7: Nexsan IP Configuration Tool

For details about the IP Settings tool and how to configure a new RAID system, see the Nexsan Storage Tools Help.

B

### Host Identification tool

The Nexsan Host Identification tool enables you to view the status and identifiers for local storage interfaces. You must have Administrator privileges on the local computer for all adapters to be listed.



On the Windows workstation where the Nexsan Storage Tools are installed, click Start
 > Nexsan > Host Identification Tool.

	Figure	B-8: Nexsa	an Host Ide	entification	Тоо
--	--------	------------	-------------	--------------	-----

Nexsan File Help	Host Identification Tool	— [	>	<
Local storag	e interfaces:			
Type iscsi iscsi iscsi iscsi	Identifier iqn. 1991-05.com.microsoft:mauve-server 16 iqn. 1991-05.com.microsoft:mauve-server 16 iqn. 1991-05.com.microsoft:mauve-server 16	Status Up, 10 Gbit/sec, 10.11 Up, 10 Gbit/sec, 10.11 Available	.11.6 .10.5	
Technical I Identifi	Petails er: Copy to Clipboard			
Interface Status: Manufaci Model: Driver:	Type: hurer:			
	Refresh			

### PowerShell

The Nexsan Storage Tools include a set of PowerShell cmdlets to manage Nexsan Storage Systems through the Storage Management API. These cmdlets are designed to be used in conjunction with the Windows Storage cmdlets.

To display a list of all available Nexsan PowerShell cmdlets, use the following PowerShell command:

Get-Command -Module NexsanRaid

For help and syntax information about a specific Nexsan PowerShell cmdlet, use one of the following PowerShell commands:

```
Get-Help <cmdletname>
Get-Help <cmdletname> -examples
Get-Help <cmdletname> -detailed
Get-Help <cmdletname> -full
```

Commonly-used Nexsan PowerShell commands include:

Table B-9: Common Nexsan PowerShell commands

Cmdlet	Description
Register-NexsanRaidSubSystem	Registers a specific Nexsan Storage System or updates security credentials. The credentials will be stored for the local computer (that is, any local administrator will also be able to administer the Nexsan Storage System).
Unregister-NexsanRaidSubSystem	Unregisters a specific Nexsan Storage System from the local computer.
Get-NexsanRaidProvider	Gets properties for the Nexsan Storage System SMP provider.
Set-NexsanRaidProviderAttributes	Sets attributes for the Nexsan Storage System SMP pro- vider. The new attributes will be stored for the local com- puter.
Get-NexsanRaidVirtualDisk	Gets properties for virtual disks managed by the Nex- san Storage System SMP provider.
Set-NexsanRaidVirtualDisk	Sets properties for virtual disks managed by the Nexsan Storage System SMP provider.

PowerShell Storage Management requires Windows 8.1 or later, or Windows Server 2012 or later. The PowerShell session must have Administrator privileges to manage Nexsan Storage Systems.

### Multipathing

Multipathing enables a system to load-share over multiple host links and to switch paths in the event of problems on the storage area network (SAN).

Multipathing support depends upon the Windows operating system of the host, and is managed using Windows tools.

The Windows MPIO app shows the MPIO configuration. Click Windows **Search > MPIO**.

Figure B-10: MPIO Properties

MPIO Propertie	25			×
MPIO Devices	Discover Multi-Paths	DSM Install	Configuration	Snapshot
To add suppo Product Ids a Devices can b To remove su then click Rem	rt for a new device, cli s a string of 8 characte e specified using semi- pport for currently MPI nove.	ck Add and en rs followed by colon as the d iO'd devices, s	iter the Vendor / 16 characters lelimiter. select the devic	and . Multiple es and
Devices:				
Device Hard	ware Id			
NEXSAN DA	TABEAST			
NEXSAN NX	S-B01-000			
NEXSAN SA	TABeast			
NEXSAN SA	TABeast2			
NEXSAN SA	TABoy2			
NEXSAN SA	TABoy2-SH			
Vendor 8Pro	duct 16			
		Add	<u>R</u> emo	ve
			OK	Cancel

### Windows Server 2016 and later

The Multipathing (MPIO) component installs the Microsoft DSM and configures it for Nexsan Storage Systems.

Windows Server 2012 R2 and earlier

The Multipathing (MPIO) component installs a Nexsan-specific DSM and Nexsan MultiSan IO tool to manage multipathing.

For details, see the *Nexsan High-Density Storage Multipathing Best Practices Guide* and Nexsan Storage Tools Help.

### Provisioning (VDS)

The Provisioning (VDS) feature enables you to create and manage storage volumes and snapshots using Virtual Disk Service on connected Nexsan Storage Systems directly on a Windows server. For storage provisioning to work, the host trust setting must be appropriately configured (see <u>Security on page 228</u>).

Here is an overview of the features included with these tools:

Table B-11: Provisioning (VDS) features

Features	Description
Creating Volumes	Provision new storage volumes using unallocated capacity on existing Nexsan Storage Systems.
Expanding or Migrating Volumes	Expand existing storage volumes using free space on the same Nexsan Storage Sys- tem, move them between Nexsan Storage Systems or RAID levels, or from non-Nex- san storage to a Nexsan Storage System.
Deleting Volumes	Remove existing storage volumes, making the space available for other uses.
Advanced Pro- visioning	Perform advanced storage configuration tasks including managing hot-spares and set- ting up clustered storage.

### To create a new volume:

- Launch the Nexsan Provisioning wizard in either of the following ways:
  - a. From the **Windows Start** menu, select **All Programs > Nexsan > Create New Nexsan Volume**, or
  - b. In Nexsan Storage Manager, right-click a system and select New Volume.

System Name	Model	Bus Type	IP Address	Max Capa	city
IT Store	E18	iSCSI	172.17.24.104	14750.5	GB
RAID Level			M	ax Capacity	-1
RAID 0 (striped)		14750.5 GB			
RAID 1 (mirrored)				7373.2 GB	
RAID 4 (panty disk)				12906.2 GB	
RAID 5 (rotating parts	y)			12906.2 GB	
KALD 6 (IVIAUNG UDAI)	parity)			11001.9 00	-

This feature is only available on Windows Server. For details, see the Nexsan Storage Tools Help.

### Snapshots (VSS)

You can use the Snapshots (VSS) tool to manage volumes on Nexsan Storage Systems that support hardware snapshots. Supported operations include creating, scheduling, restoring, mounting, deleting, and offlining hardware snapshots, as shown in <u>Figure B-14Manage Snapshots</u> on the facing page. For detailed information and procedures, see the Nexsan Storage Tools Help.

Shadow Copies	Previous \	/ersions	Quot	a C	ustomize		
General Tools	Hardware	Nexsan	RAID	Sharing	Security		
Volume Name			М	ount			
Volume #2			D	:\			
Volume Information							
Volume Name:	Volume #2						
Capacity:	3563.3 GB (3	318.6 GiB)					
Serial Number:	48B035DA						
Created:	01-Dec-2021	13:54:10					
Array Information							
Array Name:	Array #2						
Status:	OK	OK					
RAID Type:	11-disk RAID	11-disk RAID6, 128k stripe (SATA)					
System Information							
System Name:	Mauve E48	#2 10G					
Status:	ALARM (Si	enced)					
System ID:	05030024 (E48P S011.1307)						
URL:	http://172.17	7.118.223					
-			-				
Cre	ate Snapshot	Snap	pshots	Ex	pand		

Figure B-13: Volume Properties > Nexsan RAID tab

To create a snapshot immediately, click Create Snapshot.

B

### **To launch Nexsan Snapshot Management:**

1. Do any of the following:

### From Windows Explorer

- a. In Windows **Explorer**, right-click the volume you want to manage, and select **Properties**. The *Volume Properties* window opens.
- b. Select the Nexsan RAID tab and click Snapshots. The Manage Snapshots dialog opens.

🕘 Manage Snapshots					_		×
File Help							
Select volume:							
Volume Name		Capacity	Mounted As	Snapshots	Latest Sna	apshot	
Volume #2		3318.6 GB	D:\	1	17-Mar-20	022 15:41:40	
Volume Information							
Name	Volum	e #2 (D:\)				Create Snap	shot
Status:	ОК						
Capacity:	3318.6	GB		Schedule			
Type:	11-disk	11-disk RAID6 (SATA) on Mauve E48#2 10G					
Snapshots: 1							
Snapshot Space Used: 0.0 GB of 829.6 GB (0%)						Restore	
- Volume Snapshots							
Created		Status	Mounted As			Mount	1
17-Mar-2022 15:41:40							
						Offline	
						Delete	
						Offline A	I
						Delete Al	
1							

Figure B-14: Manage Snapshots

### From the Windows Disk Management application

- a. In Windows **Disk Management**, right-click the disk or logical volume to manage, and select **Properties**.
- b. Select the **Nexsan RAID** tab and click **Snapshots**. The **Manage Snapshots** dialog opens, as shown in Figure B-14.

### From Nexsan Storage Manager

- a. In Nexsan Storage Manager, right-click a system and select Snapshots.
- b. The Manage Snapshots dialog opens, as shown in Figure B-14.

### To create and manage snapshots:

In the Manage Snapshots dialog, you can do any of the following:

- Create snapshots
- Set up a schedule for snapshot creation
- Restore snapshots

- Mount snapshots
- Delete snapshots
- Take snapshots offline
- To manage a locally-mounted snapshot:
  - In Windows Explorer, right-click the snapshot to manage, and select Properties.

Select the **Nexsan RAID** tab and click **Delete** to permanently delete the snapshot, or **Rewind** to return it to its original state.

 In Windows Disk Management, right-click the snapshot disk or logical volume to manage, and select Properties.

📅 Disk Managem	ient									$\times$
File Action Vi	ew Help									
🔶 🏟 📰 🛛										
Volume	Lavout	Type	File Sv:	stem Sta	itus	Сара	city	Free Spa	% Free	
= (C:)	Simple	Basic	NTFS	He	althy (B	111.2	5 GB	68.60 GB	62 %	
🚍 (Disk 3 partition	3) Simple	Basic		He	althy (P	0 MB		0 MB	100 %	
- System Reserved	d Simple	Basic	NTFS	He	althy (S	549 N	1B	126 MB	23 %	
- Volume 1 (D:)	Simple	Basic	NTFS	He	althy (P	3318.	64 GB	3318.41	100 %	
🛲 Volume 2 (E:)	Simple	Basic	NTFS	He	althy (P	6637.	75 GB	6637.41	100 %	
🛲 Volume 3 (F:)	Simple	Basic	NTFS	He	althy (P	6637.	75 GB	6637.41	100 %	
🛲 Volume 4 (G:)	Simple	Basic	NTES	He	althy (P	3318	64 GB	3318.41	100 %	
		🥪 Volume	1 (D:) Pro	perties				×		
		Shadow C	opies	Previous	Versions	Qu	ota	Customize		
		General	Tools	Hardware	Nexsan	RAID	Sharing	Security		
		Volume Na	ame				Mount			
Dick 0		Volume #2	2				D:\			^
Basic	System Reserv	Velume In	(							
111.79 GB	549 MB NTFS	Volume	Name:	Volume #2						
Online	Healthy (Systen	Capacity	/ Wallie.	3563 3 GB (	3318 6 GiB)					
		Serial N	umber:	48B035DA						
-		Created		01-Dec-2021	1 13:54:10					
Basic		Array Infor	mation							
111.79 GB	111.79 GB	Array I	lame:	Array #2						
Online	Unallocated	Status:		OK						
		RAID T	/pe:	11-disk RAID	06, 128k str	pe (SA1	ΓA)			
		System In	formation							
Inallocated	Primany partition	System	Name:	Mauve E4	8#2 10G					
	Printary partition	Status:		ALARM (Si	ilenced)					
		System	ID:	05030024 (E	48P S011.	1307)				
		URL:		http://172.1	7.118.223					
			Cm	ta Snanehot	Con	nehoto		Fynand		
			Clea	ato onaparlot	Jild	pariots		Apana		
					OK	C-	ncel	Apply		
					JI			1000		

Figure B-15: Disk Management > Properties

Select the **Nexsan RAID** tab and then click **Snapshots** to open the **Manage Snapshots** window, shown in <u>Figure B-14</u>. permanently delete the snapshot, or **Rewind** to return it to its original state.

• In Nexsan Storage Manager, right-click a system and select Snapshots.

For details, see the Nexsan Storage Tools Help.

This feature is only available on Windows Server.

R

### Management (SMP)

The Management (SMP) feature enables Windows Server to run the Nexsan Storage Management Provider (SMP). The management server does not need to be connected to the SAN, but must be able to contact the Nexsan Storage System management IP addresses.

Nexsan Storage Tools integrate with the native storage management features of Windows Server, allowing Nexsan Storage Systems to be managed through the Server Manager console, PowerShell cmdlets, and third-party applications and tools that use the Storage Management API, such as System Center Virtual Machine Manager.

Nexsan Storage Systems are discovered and authenticated automatically and appear in the Server Manager console for standalone servers and storage using the default settings, but additional configuration may be needed if non-default security settings have been chosen. Managing clusters and multiple servers requires additional configuration.

This feature is only available on Windows Server.

For details, see the Nexsan Storage Tools Help.

# Appendix

## **RAID** levels

The RAID arrays in Nexsan Storage Systems can be configured in various RAID levels. Except where noted below, all RAID levels require a minimum of two disk drives. The levels available are described in the following table:

Table C-1: RAID levels

RAID level	Description
RAID 0	Provides data striping. Blocks of data from each file are spread out across multiple disk drives. It does not provide redundancy. This improves the speed of both read and write operations, but does not provide fault tolerance. If one drive fails, all data in the array is lost.
RAID 1	Provides disk mirroring. Files are written identically to two or more disk drives. If one drive fails, the other drive still contains the data. This improves the speed of read operations, but not write operations.
RAID 10	Provides a combination of RAID levels 0 and 1. Data is both striped and mirrored. RAID level 10 is used whenever an even number of drives (minimum of four) is selected for a RAID 1 array.
RAID 4	Provides block level striping similar to RAID level 0, but with a dedicated parity disk. If a data disk fails, the parity data is used to recreate the data on the failed disk. Because there is only one parity disk, this RAID level can slow down write operations.
RAID level 5	Provides data striping at the byte level and also stripe error correction information. Parity data, instead of being stored on only one disk, is distributed among all disks in the array. This level provides excellent performance. It is one of the most popular implementations of RAID.
RAID level 5S	Provides the same level of fault tolerance as RAID 5, but stores user data on HDDs and parity data on a single SSD. This provides a significant improvement to random write performance compared to RAID 5 using a similar total number of disks. RAID level 5S requires a minimum of two HDDs and exactly one SSD disk.

RAID level	Description
RAID level 6	Provides block level data striping with parity data distributed across all disks. For addi- tional redundancy, each block of parity data exists on two disks in the array instead of only one. RAID level 6 requires a minimum of four disk drives. RAID 6 is recommended over RAID 5 because of its increased fault tolerance of the second parity disk.
RAID 6S	Provides the same level of fault tolerance as RAID 6, but stores user data on HDDs and parity data across two SSDs. This provides a significant improvement to random write performance compared to RAID 6 using a similar total number of disks. RAID level 6S requires a minimum of three HDDs and exactly two SSDs.

Note RAID levels 2 and 3 are not available on Nexsan Storage Systems.

### Glossary

### 1

### 10Gb Ethernet

A 10 gigabit per second (Gb/s) Ethernet connection using either fibre-optic cables or twisted-pair copper wires.

### 10Gb iSCSI

An iSCSI connection that runs on a 10Gb Ethernet network.

### 10GE

See "10Gb Ethernet" and "10Gb iSCSI".

### 2

### 2-Port Active-Active (2PAA) mode

A system mode for Nexsan Storage Systems. In this mode, each RAID controller operates as an independent node, but only one port is active on each controller. The second port operates in passive mode. Port 0 is active on controller 0, and port 1 is active on controller 1. The volumes are mapped to the active port on their owning controller. When one controller fails, the passive port on the other controller activates and takes over the host port functions of the failed controller. In a switched environment, failover is completely transparent to the hosts.

### 4

### 4-Port Active-Active (4PAA) mode

A system mode for Nexsan Storage Systems. In this mode, each RAID controller operates as an independent node, and all ports are active. Port 0 is the primary port on controller 0, and port 1 is the primary port on controller 1. The volumes must be mapped to at least one port on its owning controller and to the secondary port on the other controller, which requires the host to be configured for multipathing. When one controller fails, the secondary port on the other controller takes on the host address of the primary port on the failed controller, allowing host I/O to continue (see failover); the host sees the storage become active through its second path.

### active drawer

Α

A slide-out container on the front of Nexsan E-Series Storage Systems that houses the disk drives used by the system for data storage. Also sometimes referred to as a "pod" in event logs and other internal statistics.

### All Ports All LUNs (APAL) mode

A system mode for Nexsan Storage Systems. In this mode, the entire system operates as a single node. The volumes can be mapped to any or all ports on both RAID controllers. When a controller fails, the ports on that controller become inaccessible. However, if the volumes are mapped to ports on the other controller as well (which requires the host to be configured for multipathing), they remain accessible to the host, which sees the storage become active through its second path.

#### array

A linked group of one or more physical, independent hard disk drives. See also "RAID".

### AutoMAID

Nexsan's proprietary system which reduces the energy consumption of disk drives that are in an idle state. AutoMAID is organized into four levels, which can be configured, customized, or even overridden by the customer according to performance needs. Each AutoMAID level reduces disk drive energy consumption further than the last. AutoMAID is referred to as "Nexsan AutoMAID energy-saving technology" in sales, marketing, and media. Nexsan AutoMAID technology incorporates disk protection functions not found in other MAID systems. See also "MAID".

### B

bit

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

### block

See "data block".

### byte

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

### С

cache

Reserved areas of memory that are used to speed up instruction execution, data retrieval,

and data updating. In Nexsan Storage Systems, a memory unit in the RAID controller that temporarily holds user data.

### CHAP

Challenge-Handshake Authentication Protocol. A method of authenticating any two devices that wish to communicate securely over a network. CHAP uses a "shared secret", which is a plain text key known by both devices, to authenticate the connection.

### community

The administrative relationship between the SNMP agent and the SNMP manager. Community provides a means by which an SNMP agent can correlate an incoming request to an SNMP manager. Through this correlation, the SNMP agent can determine the level of authorization provided to the incoming request.

### daisy-chain

The attachment of hardware to a computing system by connecting each component to another similar component rather than directly to the computing system that uses the component. Only the last component in the chain directly connects to the computing system. For example, up to two Nexsan Storage Expansions can be daisy-chained to the back of one Nexsan Storage System.

DAS

See "direct-attached storage".

DAT

The file format of text-based event logs downloaded from Nexsan Storage Systems and of snapshot and replication license files uploaded to Nexsan Storage Systems.

### data block

A sequence of data that is a specific number of bits (b) or bytes (B) long. When data is written to a disk drive, it is organized into data blocks so that it can be stored and retrieved more easily. This is not the same thing as data striping, as sequential data blocks are all stored on the same disk drive. Sometimes a data block can be "bad"; this does not necessarily mean that the data is bad, only that the specific part of the surface of a storage disk is unable to be read from or written to. Most disk drives automatically quarantine bad blocks as soon as they are detected so that they do no disrupt data writing or retrieval.

#### data striping

The technique of segmenting logically sequential data, such as a file, in a way that sequential segments are stored on and retrieved from different physical storage devices. Each segment is called a "stripe". Stripes on different drives can be accessed at the same time, increasing throughput and reducing access delays. See also "stripe size" and "stripe width".

#### Daytime

Short for "Daytime Protocol". One of two protocols for synchronizing a Nexsan Storage System's internal clock with that of a time server.

#### dedicated spare

See "spare disk".

#### DHCP

Dynamic Host Configuration Protocol. A communication protocol that centrally manages and automates the assignment of IP addresses on a network.

#### direct-attached storage

A digital storage system directly attached to a server or workstation, without a storage network in between. This term is mainly used to differentiate non-networked storage from storage area networks (SAN) and networkattached storage (NAS).

### DNS

See "Domain Name System".

#### Domain Name System

A program or computer server that implements a name-service protocol. It maps a human-recognizable identifier to a systeminternal, often numeric, identification or addressing component (usually an IP address).

drive drawer

See "active drawer".

Dual Controller Non-Redundant (DCNR) mode

A system mode for Nexsan Storage Systems. In this mode, both RAID controller are active, but each controller operates as an independent node, and all ports are independent from each other. The volumes can only be mapped to ports on the controller that owns the Array. They become inaccessible if the controller fails.

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" enables both devices to send information simultaneously. For example, telephones and videoconferencing systems use full-duplex communication.

#### E-Series

E

The series of Nexsan Storage Systems that includes the Nexsan E18, E48, and E60 Storage Systems (and their V, VT and P variants), the Nexsan E32V, and the Nexsan E18X, E48X, and E60X Storage Expansions (and their XV variants). Nexsan E-Series systems feature Active Drawer Technology, Anti-Vibration Design, and CoolDrive Technology.

### emergency firmware

In Nexsan Storage Systems, an extra piece of firmware that enables the Nexsan Storage System to be started up in emergency mode. Emergency firmware can be uploaded to the storage system at any time without having to restart.

### emergency mode

In Nexsan Storage Systems, a mode into which the storage system can be started if the main firmware becomes corrupt and the storage system becomes inaccessible. Emergency mode requires the presence of emergency firmware. Emergency mode enables the user to upload new firmware to the storage system so that it can operate normally.

### encrypted array

On Nexsan E-Series Storage Systems, a RAID array that is entirely composed of selfencrypting disks (SEDs) and has been encrypted at the hardware level by using the Configure Array Encryption page in the graphical user interface (GUI). User data on disks in an encrypted array cannot be read without the accompanying encryption key.

### encryption

A technology which protects information by converting it into unreadable code that cannot be deciphered easily by unauthorized people. Accessing encrypted information requires the use of an encryption key.

### encryption key

On Nexsan E-Series Storage Systems, a data file (.dat) that enables user data to be read from and written to an encrypted array.

### End User License Agreement

A type of license used for most software. It is a legal contract between the manufacturer/author and the end user of an application. It details how the software can and cannot be used and any restrictions that the manufacturer/author imposes. The user has the option of not accepting the End User License Agreement, in which case the user surrenders the rights and ability to use the software. End User License Agreements also protect both parties from liability if the software is used in a way not intended by the manufacturer/author.

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.

### Ethernet address

See "MAC address".

### EULA

See "End User License Agreement".

### event log

A record of system events that tracks informational, warning, and error events, such as when significant milestones are reached or when errors occur during activity.

### **Expansion Controller**

A module of Nexsan High-Density Storage Expansions that connects via SAS to a Nexsan Storage System's RAID controller.

### failover

F

The capability of a system to switch over automatically to a redundant or standby system upon the failure or abnormal termination of the previously active system. In Nexsan Storage Systems, failover describes one RAID controller taking over the host connections and RAID set control of the other RAID Controller when that controller fails.

### fault-tolerant

Systems that can continue operating when one or more parts fail are said to be "fault-tolerant". In Nexsan Storage Systems, the term can be applied to two different areas: the individual arrays and the storage system as a whole. Arrays are said to be fault-tolerant when data is preserved even if one or more disks fail. The storage system as a whole is said to be fault-tolerant if the system mode is set to 2-Port Active-Active (2PAA) mode, 4-Port Active-Active (4PAA) mode, or All Ports All LUNs (APAL) mode and volumes are properly mapped.

### FC port

See "Fibre Channel port".

### FCC

The Federal Communications Commission; the United States federal agency that regulates firmware electromagnetic emissions.

### **Fibre Channel**

A gigabit (Gb) speed network technology primarily used for storage networking and the current standard connection type for storage area networks (SANs). Despite its name, Fibre Channel signaling can run on both twisted-pair copper wire and fibre-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. Depending on the system, the Fibre Channel ports on Nexsan Storage Systems can support 2Gb/s, 4Gb/s, or 8Gb/s connections.

### Fibre Channel switch

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

### Fibre Channel topology

The method of connecting Fibre Channel ports together. A point-to-point (P2P) topology connects two devices directly to each other, with no hub or switch in between. A loop topology usually connects two or more devices in a ring, but can also connect two devices directly to each other just like a P2P topology can. A full-fabric topology connects multiple devices in a network.

### firewall

A device or set of devices, either hardware- or software-based, designed to permit or deny network transmissions based upon a set of rules. Used to protect networks from unauthorized access while permitting legitimate communications to pass. Many personal computer operating systems include softwarebased firewalls to protect against threats from the public Internet.

Small, fixed software applications, stored in read-only memory (ROM) or programmable read-only memory (PROM), that internally control various electronic devices. In Nexsan Storage Systems, each RAID controller is loaded with firmware to control its functionality. Occasionally, this firmware must be updated using the Update Firmware page in the graphical user interface.

### frame

A data packet on an Ethernet or Fibre Channel link. Each frame encapsulates a piece of data with sender and destination information, along with a data integrity check routine. Normal frames can contain data up to 1,500 bytes in length. Jumbo frames can contain larger data payloads (9,000 bytes on Nexsan Storage Systems) and are supported on 1Gb/s and 10Gb/s Ethernet (10GbE) networks. Jumbo frames are typically used to boost performance of iSCSI traffic.

FUA

Force Unit Access. A bit in some SCSI commands which forces a storage device to bypass cache memory and directly access the storage medium.

full duplex

See "duplex".

### G

### gateway

An internetworking system that joins together the different subnets of a network or two networks that use different base protocols. A network gateway can be implemented completely in software, completely in hardware, or as a combination of both.

### Gb

Gigabit. Approximately one billion (1,000,000,000) bits.

### GΒ

Gigabyte. Approximately one billion (1,000,000,000) bytes. 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).

### Gb/s

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

### GB/s

Gigabytes (GB) per second. Used to describe the speed of network data transmission. 1 GB/s is eight times faster than 1Gb/s.

### GBIC

See "gigabit interface converter".

### GiB

A binary gigabyte, computed as 2^30 (1,073,741,824) bytes. See "GB".

### 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 fibre, at lengths of up to hundreds of kilometers.

### graphical user interface

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

GUI

See "graphical user interface".

### Н

half duplex See "duplex".

host

A computer, server, or other device which accesses the volumes in a Nexsan Storage System. The host can be connected to the Nexsan Storage System with a Fibre Channel connection, an iSCSI connection, or a SAS connection.

### Host Identification Tool

A Nexsan Storage Tool that enables users to view the status and identifiers for local storage interfaces (Fibre Channel, iSCSI, SAS).

### hot-plug

To insert a new piece of hardware into a computerized system while the system is running. See also "hot-swap".

### hot-swap

To replace a failed or faulty component of a computerized system while the system is running. See also "hot-plug".

### hot spare

A spare disk in a RAID array designated as "hot standby", available to replace a failed disk without requiring a system shutdown.

### HTTP

HyperText Transfer Protocol. A networking protocol for distributed, collaborative hypermedia information systems such as the World Wide Web.

### HTTPS

HyperText Transfer Protocol Secure. A combination of HTTP and SSL used to provide encrypted communication and secure identification of a network Web server.

### I/O

Input/Output. The communication between an information processing system (such as a computer or a Nexsan 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 System) on a computer network that uses TCP/IP for communication.

### **IP** Configuration Tool

A Nexsan Storage Tool that enables users to configure the IP address of a Nexsan Storage System on the local subnet.

### IPv6

Internet protocol v.6, which supports 128-bit addresses, was ratified by the IETF to respond to the shortage of IP addresses under the IPv4 protocol.

### iSCSI

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

### J

jumbo frame See "frame".

### K

Kb

Kilobit. Approximately one thousand (1,000) bits.

KB

Kilobyte. Approximately one thousand (1,000) bytes. Used to describe the storage capacity of hard disk drives and the stripe size in RAIDs. A kilobyte is usually computed as 10^3 (1,000) bytes, but can also be computed as 2^10 (1,024) bytes (often called a "binary kilobyte" and abbreviated KiB).

KiB

A binary kilobyte. Computer as 2<sup>10</sup> (1,024) bytes. See "KB".

### L

LAN

See "local area network".

### load balance policy

In multipathing, a set of instructions for the multipathing software to follow in order to ensure that I/O transfers through host paths are optimally routed and that no one path gets overloaded with data.

local area network

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

### logical unit

See "volume".

### LUN

Logical Unit Number. An identification scheme for storage disks that supports a small number of logical units. On Nexsan Storage Systems, LUNs are assigned to volumes and are addressed as LUN 0 through 254.

### Μ

### MAC address

Media Access Control address. A unique, usually unchanging, identifier assigned to network interfaces for communications on the physical network segment. MAC addresses are most often assigned by the manufacturer of a network interface device and are stored in its hardware, read-only memory (ROM), or some other firmware mechanism.

### MAID

Massive Array of Idle Disks. A storage array where each drive is only spun up on demand as needed to access the data stored on that drive.

### Management Information Base

A virtual database used for managing objects that can be exchanged between the SNMP manager and any SNMP agents. These objects deal with resources (for example, links or connections) that can be managed on a node. Each object defined in the MIB is assigned a unique Object Identifier (OID) in the MIB object tree.

### Management Information Base II

A specific portion of the entire Management Information Base, as defined in RFC 1213, which deals with TCP/IP-related attributes. The SNMP agent enables network management stations to retrieve or set various management objects (attributes). These objects are defined in the MIB.

### Mb

Megabit. Approximately one million (1,000,000) bits.

### MB

Megabyte. Approximately one million (1,000,000) bytes. Used to describe the storage capacity of hard disk drives. A megabyte is usually computed as 10^6 (1,000,000) bytes, but can also be computed as 2^20 (1,048,576) bytes (often called a "binary megabyte" and abbreviated MiB).

### Mb/s

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

### MB/s

Megabytes (MByte) per second. Used to describe the speed of network data transmission. 1 MB/s is eight times faster than 1Mb/s.

### MiB

A binary megabyte. Computed as 2<sup>20</sup> (1,048,576) bytes. See MByte.

MIB

See "Management Information Base".

### MIB-II

See "Management Information Base II".

#### MIME

Multipurpose Internet Mail Extensions. An Internet standard that extends the format of email to support text in character sets other than ASCII, non-text attachments, message bodies with multiple parts, and header information in non-ASCII character sets.

#### mirror

In RAID levels 1 and 10, the method of providing fault tolerance for a RAID set. All data is written to two drives in the RAID set, so that if one drive fails, the data can be read from the other write location.

### multipathing

A means of presenting volumes to a particular host or hosts via redundant data paths. The intent is to maintain I/O in the event of a path failure. Multipathing may also be used to increase performance. If not configured properly, multipathing may lead to data corruption, as an operating system may not inherently realize that the redundant paths are of the same volume and thus could treat them as different volumes.

### Multipathing IO (MPIO)

A Nexsan Storage Tool that enables Nexsan Storage Systems to load-share over multiple host links (using a load balance policy) and to switch paths in the event of problems on the storage area network.

### Ν

NAS

See "network-attached storage".

### network-attached storage

File-level computer data storage connected to a computer network providing data access to clients on the network. Network-attached storage uses specialized hardware, software, or both, and is often a specialized device built from the ground up for storing and serving files.

### network gateway

See "gateway".

### Nexsan Storage Tools

A suite of tools that, in addition to the graphical user interface, provide ways to manage Nexsan Storage Systems.

### NMP (Nexsan Management Protocol)

Nexsan's network based protocol for configuration and monitoring of Nexsan Storage Systems.

### 0

### **Object Identifier**

In an SNMP Management Information Base, the unique number identifying a variable that can be read or set via SNMP. OID

See "Object Identifier".

### parity

In RAID levels 2 through 6, the method of providing fault tolerance for a RAID set. RAID parity is created using either a Boolean XOR (exclusive or) operation (for RAID 2 through 5) or Reed-Solomon error correction (for RAID 6). Data from a failed disk can be reconstructed using parity data onto a spare disk, preventing data loss.

### parity scrub

A RAID data verification scheme which checks all parity data in a RAID and makes sure that it is correct. In Nexsan Storage Systems, the parity scrub utility also performs a surface scan.

### pod

See "active drawer".

### pool spare

See "spare disk".

### power supply unit

A module that regulates electrical power to the components of Nexsan Storage Systems.

### provisioning

Directly accessing and configuring RAIDs and volumes on a Nexsan Storage System without use of the graphical user interface. See also "VDS Storage Provisioning".

### PSU

See "power supply unit".

### R

### 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. In the event of failure of one of the RAID disks, data should not be lost. Also referred to as a RAID set. 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 an array and presents them as a single logical unit to attached devices. The RAID Controllers in Nexsan Storage Systems are hardware modules. Nexsan RAID Controllers also provide connections for system administration and configuration.

### **RAID** level

A numeric indicator of the architecture used by a RAID. RAIDs can be built using any combination of striping, mirroring, and parity. The levels are numbered from 0 through 6. Some RAID levels can also be combined, and these configurations are usually referred to with a two-digit number. For example, RAID 10 = RAID 1 + RAID 0.

### RAID set

See "RAID".

### read-only memory (ROM)

A memory chip that stores values but cannot be changed by normal program instructions. Values in read-only memory are nonvolatile; they are retained even when the system is powered down.

### reboot

To restart a computer or computerized electronic device. See also system reboot.

### redundant

The duplication of critical components or functions of a system with the intention of increasing the reliability of the system. RAID sets are redundant when one or more spare disks are available to it.

#### replica

A duplicate of a volume on a Nexsan Storage System copied onto another Nexsan Storage System. At the time of replication, replicas contain all of the data on the original volume. Replicas can be promoted to full volumes, after which replication between the two volumes is no longer possible.

### replication

A function of Nexsan Storage Systems that enables the user to make replicas of a volume onto another Nexsan Storage System to protect data in the event of a disaster or as part of a backup and restore architecture.

### rolling restart

On Nexsan Storage Systems, a method of rebooting both RAID controllers in a storage system so that host I/O is not interrupted. Rolling restart is only available if system mode is set to 2-Port Active-Active (2PAA) mode, 4-Port Active-Active (4PAA) mode, or All Ports All LUNs (APAL) mode.

### S

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 1.5Gb/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.

### self-encrypting disk (SED)

A disk drive with special firmware that enables encryption of the contents without the use of specialized encryption software. Selfencrypting disks are required for encrypted arrays to be created on Nexsan E-Series Storage Systems.

### SFP

Small Form-factor Pluggable. A type of gigabit interface converter (GBIC) in a compact form factor. The Fibre Channel ports or 10Gb iSCSI ports on Nexsan storage devices are SFPs.

### Shell Extensions

A Nexsan Storage Tool that adds an extension to the Windows shell to provide information about the Nexsan Storage System associated with a particular disk drive.

### Single Controller Mode

A system mode for Nexsan Storage Systems. In this mode, only one RAID controller is active, and failure of this controller makes all arrays and volumes inaccessible.

### SLAAC

Stateless Address Autoconfiguration was designed as a simplified approach to implementing IPv6 auto-addressing.

### SMTP

Simple Mail Transfer Protocol. An Internet standard for electronic mail (email) transmission across TCP/IP networks.

### snapshot

A "picture" of the data and state of a volume at a particular point in time using a copy-on-write function to capture only data that has changed since the last snapshot. Snapshots can be used for many purposes, including backups, restores, and "sandboxing".

### SNMP

Simple Network Management Protocol. An Internet-standard protocol for managing devices on TCP/IP networks. SNMP is based on the manager/agent model and consists of an SNMP manager, an SNMP agent, a Management Information Base, managed SNMP devices, and the network protocol.

### SNMP agent

Provides the interface between the SNMP manager and the physical devices being managed. Enables network management stations to retrieve or set the values various management objects (attributes) that are applicable to the networking environment by referencing their Object Identifiers.

### SNMP manager

A software application or suite of software applications that monitor and control managed devices in an SNMP environment.

### SNTP

Simple Network Time Protocol. One of two protocols for synchronizing a Nexsan Storage System's internal clock with that of a time server.

### spare disk

A blank disk drive that is available to a RAID in case any of the disks assigned to the RAID should fail. If a RAID disk fails, the RAID controller rebuilds the data from the failed disk onto the spare disk, which then becomes part of the RAID. In Nexsan Storage Systems, there are two kinds of spare disk: "pool spares", which can be used by any RAID in the storage system; and "dedicated spares", which are assigned to a specific RAID.

SSD

Solid State Disk. A high-performance storage device that contains no moving parts.

### SSL

Secure Sockets Layer. A method of encrypting communication between a Web server and Web browser. SSL requires the use of an SSL certificate, which binds the encryption key to the server. The SSL protocol secures input/output (I/O) and serial port data. On Nexsan Storage Systems, SSL is used to encrypt the connection between the storage system and any computer that is accessing the system's graphical user interface.

### 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.

### Storage Manager

One of the Nexsan Storage Tools. Storage Manager provides a common management point for all Nexsan Storage Systems, either in a standalone window or directly integrated into Windows' Computer Management.

#### stripe

See "data striping".

#### stripe size

The size of a data stripe (see data striping) on an individual disk.

#### stripe width

The storage capacity of a data stripe (see data striping) across all disks in an RAID. It is calculated by multiplying the stripe size by the number of disks that contain data that is neither mirroring nor parity data. Therefore, for example, in a four-disk RAID 0 (see RAID level) where the stripe size is set to 128KB, the stripe width will be 512KB (128KB x 4 disks = 512KB); however, in a four-disk RAID 6 with a 128KB stripe size, the stripe width is only 256KB because two of the disks contain parity information.

#### subnet

A subnetwork, or subnet, is a logically visible subdivision of a TCP/IP network. All computers

in a subnet have IP addresses with the same prefix. Addresses in the same subnet are reachable without going through a router, and thus can be reached by broadcast.

#### subnet mask

A means of restricting IP addresses on a subnet to a specific range.

#### syslog

System log. A standard for computer data logging. It enables separation of the software that generates messages from the system that stores them and the software that reports and analyzes them.

### system reboot

On Nexsan Storage Systems, a method of rebooting the unit's RAID controllers. With this method, both controllers are restarted at the same time, which can interrupt host I/O. It is therefore recommended that hosts be disconnected or shut down before performing a system reboot.

ΤВ

Т

Terabyte. Approximately one trillion (1,000,000,000,000) bytes. 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 addresses to join network segments. TiB

A binary terabyte. Computed as 2<sup>40</sup> (1,099,511,627,776) bytes. See TB.

### TLS (Transport Layer Security)

A cryptographic protocol, replaces SSL, and provides computer networking communications security. TLS is used to secure HTTPS, and in email, instant messaging and VoIP applications.

### trap

An asynchronous notification from an agent (such as a Nexsan Storage System) to an SNMP manager. Destination addressing for traps is determined in an application-specific manner, typically through trap configuration variables in the Management Information Base.

### trap community

Defines an SNMP manager to which the SNMP agent sends SNMP trap messages. Trap communities consist of community name/IP address pairs.

### U

UDP

User Datagram Protocol. A protocol that enables computer applications to send messages to other hosts on a TCP/IP network without requiring prior communications to set up special transmission channels or data paths.

### UDP port

An application-specific or process-specific software construct used by UDP as a communications endpoint. Identified by its number and the IP address with which it is associated.

### V

### VDS (Virtual Disk Service)

Manages a variety of storage types, including external storage arrays. The service exposes

an application programming interface (API).

### VDS Storage Provisioning

One of the Nexsan Storage Tools. Enables users to create and manage storage volumes on connected Nexsan Storage Systems directly from a Windows-based server.

### volume

An area of usable storage that is addressed as a single unit as if it were a separate, physical disk drive. Volumes can exist on a single disk drive or on a RAID that spans multiple disk drives.

### VSS (Volume Shadow Copy Service)

VSS performs actions required to coordinate creating consistent snapshots (also referred to as shadow copies) of data to be backed up.

### W

WAN

See "wide area network".

### wide area network

A telecommunication network that covers a broad area or that links across metropolitan, regional, or national boundaries. Wide area networks are used to connect local area networks and other types of networks together, so that users and computers in one location can communicate with users and computers in other locations.

### World Wide Name

A unique identifier which identifies a particular Fibre Channel or SAS target. Nexsan Storage Systems use two kinds of World Wide Names: World Wide Node Names (WWNN), which identify a device; and World Wide Port Names (WWPN), which identify a specific port on the device.

### WWN

See "World Wide Name".

### Ζ

ZIP file

A compressed data storage or archive file that uses the ZIP file format. A ZIP file contains one or more files that are compressed to reduce their size and typically ends in ".zip".



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