CLI Guide

3ware® SATA+SAS RAID Controller Card

Command Line Interface

Version 10.2 – Supports the 9750, 9690SA, and 9650SE Models

PN: 45413-00, Rev. A
May 2010

Document Description

Document 45413-01, Rev. A. May 2010.
This document will remain the official reference source for all revisions and releases of this product until rescinded by an update.

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About this CLI Guide

This manual, the *3ware SATA+SAS RAID Controller Card CLI Guide, Version 10.2*, provides instructions for configuring and maintaining your 3ware® controller card using the 3ware command line interface (CLI).

This manual describes CLI support for the LSI 3ware 9750, 9690SA, and 9650SE with Release 9.5.2 or newer.

If you have an earlier LSI™ 3ware controller (9590SE, 9550SX(U), 9500S or a legacy 7000/8000 series board), refer to the CLI guide for your controller. Documentation is available from the LSI website at http://www.lsi.com/channel/ChannelDownloads. You can still use many of the CLI commands with earlier 3ware controllers, although not all commands are supported on every controller. Earlier versions of the CLI Guide detail which commands are supported on each controller model.

Before you can use the CLI, you must install your LSI 3ware RAID controller card. For details, see the installation guide that came with your 3ware RAID controller. The installation guide is available in PDF format on your 3ware CD, or you can downloaded it from the LSI™ website at http://www.lsi.com/channel/ChannelDownloads.

Table 1: Sections in this CLI Guide

Chapter	Description
1. Introduction to 3ware Command Line Interface	Installation, features, concepts
2. CLI Syntax Reference	Describes individual commands using the primary syntax

Although this manual includes instructions for performing tasks using the command line interface, you can also use the following applications:

- 3ware BIOS Manager (not applicable to the Mac OS®)
- 3DM2™ (3ware Disk Manager 2)

For details, see the user guide or the 3ware HTML Bookshelf.

1

Introduction to the 3ware Command Line Interface

The 3ware SATA+SAS Controller Card Command Line Interface (CLI) manages multiple 9750, 9690SA, and 9650SE 3ware RAID controllers.

⚠ **Important!**

For all of the functions of the 3ware CLI to work properly, you must install the proper CLI, firmware, and driver versions. For the latest versions and upgrade instructions, check http://www.lsi.com/channel/ChannelDownloads.

This chapter includes the following sections:

- “Features of the CLI” on page 1
- “Installing the 3ware CLI” on page 2
- “Working with 3ware CLI” on page 6
- “Understanding RAID Levels and Concepts” on page 9

Features of the CLI

You can use the 3ware CLI to manage 3ware RAID Controllers. The CLI provides all the features and functions found in 3DM 2 but in command line format. You can use the CLI in both interactive and batch modes, providing higher level application programming interface (API) functionalities.

You can use the CLI to view and manage controller, unit, drive, enclosure, and Battery Backup Unit (BBU).

For a summary of CLI capabilities, see “Common Tasks Mapped to CLI Commands” on page 19.

Supported Operating Systems

3ware 9750 RAID controllers may be used with the following operating systems for Intel and AMD 32-bit and 64-bit x86 based motherboards:

- Microsoft Windows Server 2003 (SP2 or newer) and 2008
- Microsoft Windows Vista and Windows 7
- Red Hat Enterprise Linux®
- openSUSE Linux
- SUSE® Linux Enterprise Server
- Fedora Core Linux
- Other Linux distributions based on open source Linux 2.6 kernel
- VMware
- OpenSolaris
- FreeBSD
- Mac OS X (Intel only)

For the latest supported operating systems, see the current Release Notes at http://www.lsi.com/channel/ChannelDownloads or the file versions.txt, available on the 3ware CD.

Installing the 3ware CLI

This section section includes information about installing the 3ware CLI on various operating systems.

Installing the 3ware CLI on Windows

You can install the 3ware CLI from the 3ware software CD, or you can run it directly from the CD. You can also download the latest version from the LSI web site, http://www.lsi.com/channel/ChannelDownloads. Online manual pages are also available in nroff and html formats. These are located on the software CD in the folder `/packages/cli/tw_cli.8.html` or `tw_cli.8.nroff`.

To install 3ware CLI on Windows, do one of the following:

- **Run the installer from the 3ware CD.** Start the 3ware CD and at the 3ware menu, click **Install Software**.

  Follow the instructions in the installation wizard and make sure that Command Line Interface (tw_cli) is selected.

- **Copy the file from the 3ware CD.** Copy the file `tw_cli.exe` to the directory from which you want to run the program.

  CLI is located on the 3ware CD in the directory `\packages\cli\windows`

> **Note:** CLI comes in both 32-bit and 64-bit versions. If you are copying the file directly, be sure to copy the correct version for your operating system.

Permissions Required to Run CLI

To run CLI, you can be logged onto Windows with one of the following sets of permissions:

- Administrator
- User with administrator rights
- Domain administrator
- Domain user with Domain Admin or Administrator membership

Without the correct privileges, the CLI displays a prompt and then exits when the application is executed.

If you are uncertain whether you have the correct permissions, contact your network administrator.

To start CLI, do one of the following:

- Start the 3ware CD and at the 3ware menu, click **Run CLI.**
- Open a console window, change to the directory where tw_cli is located, and at the command prompt, type
  `tw_cli`
- Double-click the CLI icon in the folder on your computer where you copied it.

After you start CLI, the CLI prompt appears in a DOS console window.

Installing the 3ware CLI on Linux, FreeBSD, OpenSolaris, and VMWare

You can install the 3ware CLI from the 3ware software CD or you can download the latest version from the LSI web site, http://www.lsi.com/channel/ChannelDownloads.

To install 3ware CLI on Linux, FreeBSD, OpenSolaris, or VMWare do one of the following:

- **Copy the file.**

  CLI binary and executable files are located on the 3ware CD in the following directory:

  `/packages/cli`

  Navigate to the appropriate folder under `/packages/cli` for your OS. Coy the file `tw_cli` to an appropriate location on your system where you can easily access the file. Make sure to copy the correct version for your OS and OS architecture (32-bit or 64-bit).

  Online manual pages are also available in nroff and html formats. These are located in `/packages/cli/tw_cli.8.html` or `tw_cli.8.nroff.`

  You must be root or have root privileges to install the CLI to `/usr/sbin` and to run the CLI.

> **Notes:**
> When copying the CLI, it is best to copy it to a location that is in the environment path so you can run CLI without using the complete path (i.e., /usr/sbin)
>
> Otherwise you will have to type the complete path:
> `/home/user/tw_cli`

- **Use the setup command from a command line.**

  For Linux

  a Navigate to one of the following directories on the 3ware CD

  ```
  /packages/installers/tools/linux
  ```

  b Type

  ```
  ./install.sh -i
  ```

  c Respond to each screen as the script walks you through the installation.

  d After the installation is complete, check that the software was installed correctly.

  For FreeBSD

  a Navigate to the directory on the mounted image or CD that contains the installer:

  ```
  /packages/installers/tools/freebsd
  ```

  b Type

  ```
  ./install.sh -i
  ```

c Respond to each screen as the script walks you through the installation.

d After the installation is complete, check that the software was installed correctly.

For OpenSolaris

a Navigate to the following directory on the 3ware CD:

```
/packages/installers/tools/OpenSolaris
```

b Type:

```
./setupSolaris_x86.bin
```

c Press **Enter** to begin installation.

d After the installation is complete, check that the software was installed correctly.

For VMWare

a Navigate to the following directory on the 3ware CD:

```
/packages/installers/tools/vmware/esx40/
```

b Type:

```
rpm -ivh <LSI-3ware-CommandLine-Management-Utility-
xxx.rpm>
```

c Press **Enter** to begin installation.

d After the installation is complete, check that the software was installed correctly.

Permissions Required to Run CLI

To run CLI, you must be logged on with one of the following sets of permissions:

- Administrator
- Root

To start CLI

- In a Terminal window, type
  `tw_cli`

Installing the 3ware CLI on Mac OS X

3ware CLI can be installed from the 3ware software CD, or the latest version can be downloaded from the LSI web site, http://www.lsi.com/channel/ChannelDownloads.

To install 3ware CLI on Mac OS X

- Run the installer and select CLI as the software to be installed.

  For more complete instructions, see "Appendix B, Driver and Software Installation," in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Permissions Required to Run CLI

To run CLI, you must be logged on with one of the following sets of permissions:

- Administrator
- Root

You can also use SUDO to run CLI.

To start CLI

- In a Terminal window, type

  ```
  sudo ./tw_cli
  ```

  If prompted, enter your password.

Working with 3ware CLI

You can work with the 3ware CLI in three different ways:

- Interactively, by entering commands at the main prompt
- As a series of single commands
- By creating a script – that is, an input file with multiple commands

The next topics shows examples of these different methods.

- "Using the command interface interactively" on page 7
- "Using a single command with output" on page 7
- "Using an input file to execute a script" on page 8
- "Outputting the CLI to a Text File" on page 9

Examples shown in the CLI Syntax Reference chapter reflect the interactive method.

Using the command interface interactively

You can use the CLI interactively by entering commands at the main prompt and observing the results on the screen.

To use the CLI interactively

1 If necessary, change to the directory that contains CLI.

2 Type the following command:

```
tw_cli
```

(Under Mac OS X, Linux, FreeBSD, and OpenSolaris, if the directory containing the CLI is not in your path, you might need to type `./tw_cli`)

The main prompt appears, indicating that the program is awaiting a command.

```
//localhost>
```

3 At the CLI prompt, you can enter commands to show or act on 3ware controllers, units, and drives.

For example,

```
//localhost> show
```

lists all controllers in the system and shows summary information about them. For example:

```
Ctl  Model   Ports  Drives Units NotOpt RRate  VRate  BBU
------------------------------------------------------------
c0 9750-4I     4    12      2    0      1       1       -
c1 9650SE-4    4     4      1    0      3       5  TESTING
c2 7500-12    12     8      3    1      2       -       -
```

Using a single command with output

You can use 3ware CLI with line arguments, processing a single command at a time. To do so, simply type the command and the arguments.

Single commands are useful when you want to perform a task such as redirecting the output of the command to a file. They also allow you to use the command line history to reduce some typing.

Syntax

`tw_cli` <command_line_arguments>

Example

```
tw_cli /c0 show diag > /tmp/3w_diag.out
```

Using an input file to execute a script

You can operate 3ware CLI scripts by executing a file. The file is a text file containing a list of CLI commands that you have entered in advance. Each command must be on a separate line.

Syntax

```
tw_cli -f <filename>
```

Where `<filename>` is the name of the text file you want to execute.

Example

```
tw_cli -f clicommand.txt
```

This example describes execution of the file `clicommand.txt`, which runs the CLI commands included in that file.

Scripting examples

The following scripting example, which is for a four-port controller, uses a text file called config_unit.text that contains three commands. This example sets up a four-port controller with two units, each with two drives mirrored. The last command then prints the configurations for verification. The following commands are included in the script file:

```
/c0 add type=raid1 disk=0-1
/c0 add type=raid1 disk=2-3
/c0 show
```

The following scripting example, which is for a 12-port controller, uses a text file called config_unit.text that contains three commands. This example sets up a 12-port controller with two units: one with the first two drives mirrored, and another with the remaining drives in a RAID 5 array. The last command then prints the configurations for verification. The following commands are included in the script file:

```
/c0 add type=raid1 disk=0-1
/c0 add type=raid5 disk=2-11
/c0 show
```

To run either of the scripts, type:

```
tw_cli -f config_unit.txt
```

Outputting the CLI to a Text File

You can send the output of the 3ware CLI, including errors, to a text file by adding 2>&1 to the end of the line. Outputting to a text file can be useful, for example, if you want to email the output to LSI Technical Support.

Examples

```
tw_cli /c2/p0 show >> controller2port0info.txt 2>&1
```

or

```
tw_cli /c0 show diag >> Logfile.txt 2>&1
```

Conventions

The following conventions are used throughout this guide:

- In text, `monospace font` is used for code and for things you type.
- In descriptions and explanations of commands, a bold font indicates the name of commands and parameters, for example, **/c0/p0 show all**.
- In commands, an italic font indicates items that are variable, but that you must specify, such as a controller ID, or a unit ID, for example, **/c0/p0 show *attribute***, and **/c*x*/p*x* show all**
- In commands, brackets around an item indicate that it is optional.
- In commands, ellipses (...) indicate that more than one parameter at a time can be included, for example, **/c0/p0 show *attribute* [*attribute* ...]**
- In commands, two dots (..) indicate that there is a range between two values from which you can pick a value, for example, **/c*x* set carvesize=[1024..2048]**.
- In commands, a vertical bar (|) indicates an *or* situation where you have a choice between more than one attribute, but only one can be specified.

Example: In the command to rescan all ports and reconstitute all units, the syntax appears as **/cx rescan [noscan]**. The brackets [ ] indicate that you can omit the noscan parameter so that the operation will be reported to the operating system.

Understanding RAID Levels and Concepts

3ware RAID controllers use RAID (Redundant Array of Independent Disks) to increase your storage system’s performance and provide fault tolerance (protection against data loss).

This section includes the following RAID-specific topics:

- “RAID Concepts”

- “Available RAID Configurations” on page 11
- “Determining Which RAID Level to Use” on page 16

RAID Concepts

The following concepts are important to understand when working with a RAID controller:

- **Arrays and Units**. In the storage industry, an *array* refers to two or more disk drives that appear to the operating system as a single unit. When working with a RAID controller, *unit* refers to an array of disks that you can configured and manage through the 3ware software. You can also use the 3ware software to configure Single-disk units.
- **Mirroring**. Mirrored arrays (RAID 1) write data to paired drives simultaneously. If one drive fails, the data is preserved on the paired drive. Mirroring provides data protection through redundancy. In addition, mirroring using a 3ware RAID controller provides improved performance because the 3ware TwinStor® technology reads from both drives simultaneously.
- **Striping**. Striping across disks allows data to be written and accessed on more than one drive simultaneously. Striping combines each drive’s capacity into one large volume. Striped disk arrays (RAID 0) achieve highest transfer rates and performance at the expense of fault tolerance.
- **Distributed Parity**. Parity works in combination with striping on RAID 5, RAID 6, and RAID 50. Parity information is written to each of the striped drives, in rotation. If a failure occurs, you can reconstructed the data on the failed drive from the data on the other drives.
- **Hot Swap**. The process of exchanging a drive without shutting down the system. This process is useful when you need to exchange a defective drive in a redundant unit.
- **Array Roaming.** The process of removing a unit from a controller and putting it back either on the same controller, or a different controller, and having the unit recognized as a unit. You can attach the disks to different ports without harm to the data.

Available RAID Configurations

RAID is a method of combining several hard drives into one unit. It can offer fault tolerance and higher throughput levels than a single hard drive or group of independent hard drives. LSI's 3ware controllers support RAID 0, 1, 5, 6, 10, 50, and Single Disk. The following information explains the different RAID levels.

RAID 0

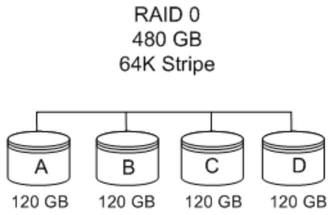
RAID 0 provides improved performance, but no fault tolerance. Because the data is striped across more than one disk, RAID 0 disk arrays achieve high transfer rates because they can read and write data on more than one drive simultaneously. You can configure the stripe size during unit creation. RAID 0 requires a minimum of two drives.

When drives are configured in a striped disk array (see Figure 1), large files are distributed across the multiple disks using RAID 0 techniques.

Striped disk arrays give exceptional performance, particularly for data-intensive applications such as video editing, computer-aided design, and geographical information systems.

RAID 0 arrays are not fault tolerant. The loss of any drive results in the loss of all the data in that array, and can even cause a system hang, depending on your operating system. RAID 0 arrays are not recommended for high-availability systems unless you take additional precautions to prevent system hangs and data loss.

Figure 1. RAID 0 Configuration Example



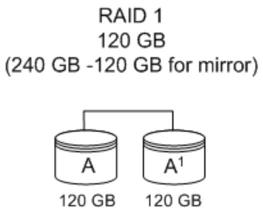
RAID 1

RAID 1 provides fault tolerance and a speed advantage over non-RAID disks. RAID 1 also is known as a mirrored array. Mirroring is done on pairs of drives. Mirrored disk arrays write the same data to two different drives using RAID 1 algorithms (see Figure 2). This gives your system fault tolerance by preserving the data on one drive if the other drive fails. Fault tolerance is a basic requirement for critical systems should as web and database servers.

3ware firmware uses a patented TwinStor technology, on RAID 1 arrays for improved performance during sequential read operations. With TwinStor technology, read performance during a sequential read operation is twice the speed of a single drive.

The adaptive algorithms in TwinStor technology boost performance by distinguishing between random read request and sequential read requests. For the sequential read requests generated when accessing large files, both drives are used with the drive heads simultaneously reading alternating sections of the file. For the smaller random transactions, the data is read by a single optimal drive head.

Figure 2. RAID 1 Configuration Example



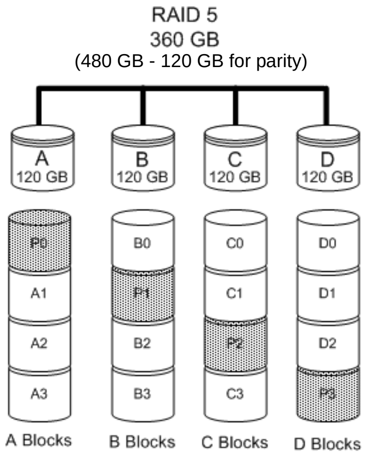
RAID 5

RAID 5 provides performance, fault tolerance, high capacity, and storage efficiency. It requires a minimum of three drives and combines striping data with parity (exclusive OR) to restore data in case of a drive failure. Performance and efficiency increase as the number of drives in a unit increases.

Parity information is distributed across all of the drives in a unit rather than being concentrated on a single disk (see Figure 3). This method avoids throughput loss due to contention for the parity drive.

RAID 5 can tolerate one drive failure in the unit.

Figure 3. RAID 5 Configuration Example



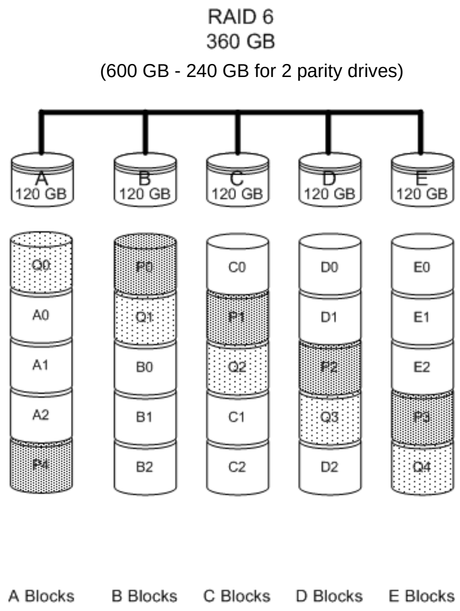
RAID 6

RAID 6 provides greater redundancy and fault tolerance than RAID 5. It is similar to RAID 5 but, instead of a single block, RAID 6 has two blocks of parity information (P+Q) distributed across all the drives of a unit (see Figure 4).

Due to the two parities, a RAID 6 unit can tolerate two hard drives failing simultaneously. This also means that a RAID 6 unit can be in two different states at the same time. For example, one subunit can be degraded while another is rebuilding, or one subunit can be initializing while another is verifying.

The 3ware implementation of RAID 6 requires a minimum of five drives. Performance and storage efficiency also increase as the number of drives increase.

Figure 4. RAID 6 Configuration Example



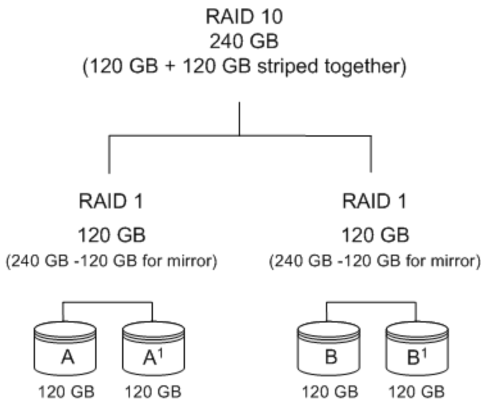
RAID 10

RAID 10 is a combination of striped and mirrored arrays for fault tolerance and high performance.

When drives are configured as a striped mirrored array, the disks are configured using both RAID 0 and RAID 1 techniques (see Figure 5). A minimum of four drives are required to use this technique. The first two drives are mirrored as a fault-tolerant array using RAID 1. The third and fourth drives are mirrored as a second fault-tolerant array using RAID 1. The two mirrored arrays are then grouped as a striped RAID 0 array using a two-tier structure. Higher data transfer rates are achieved by leveraging TwinStor technology and striping the arrays.

In addition, RAID 10 arrays offer a higher degree of fault tolerance than RAID 1 and RAID 5 because the array can sustain multiple drive failures without data loss. For example, in a 12-drive RAID 10 array, up to 6 drives can fail (half of each mirrored pair) and the array continues to function. Note that if both halves of a mirrored pair in the RAID 10 array fail, all of the data is lost.

Figure 5. RAID 10 Configuration Example


RAID 10
240 GB
(120 GB + 120 GB striped together)
RAID 1
120 GB
(240 GB -120 GB for mirror)
RAID 1
120 GB
(240 GB -120 GB for mirror)
A
A1
B
B1
120 GB
120 GB
120 GB
120 GB

RAID 50

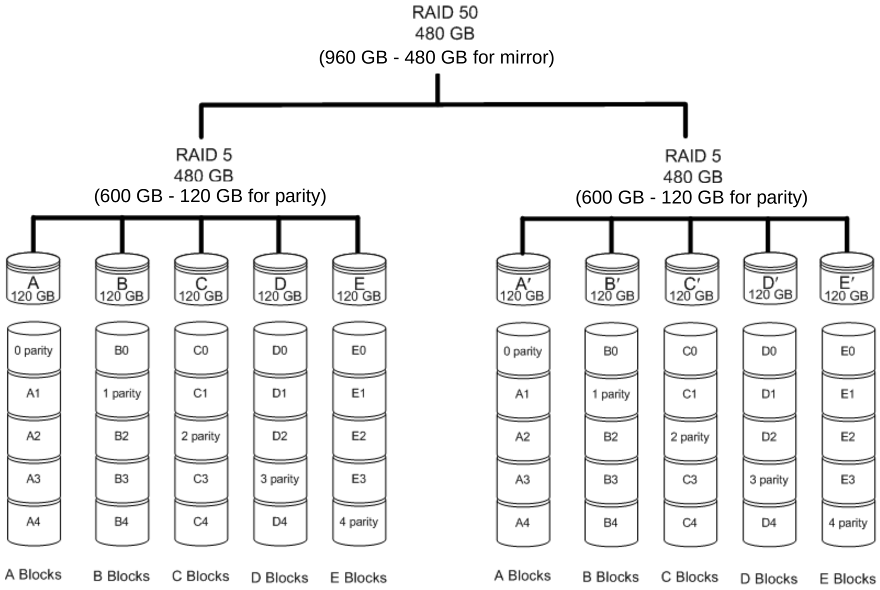
RAID 50 is a combination of RAID 5 and RAID 0. This array type provides fault tolerance and high performance. RAID 50 requires a minimum of six drives.

Several combinations are available with RAID 50. For example, on a 12-port controller, you can have a grouping of three, four, or six drives. A grouping of three means that the RAID 5 arrays used have three disks each; four of these 3-drive RAID 5 arrays are striped together to form the 12-drive RAID 50 array. On a 16-port controller, you can have a grouping of four or eight drives.

No more than four RAID 5 subunits are allowed in a RAID 50 unit. For example, a 24-drive RAID 50 unit may have groups of 12, eight, or six drives, but not groups of four or three (see Figure 6).

In addition, RAID 50 arrays offer a higher degree of fault tolerance than RAID 1 and RAID 5, because the array can sustain multiple drive failures without data loss. For example, in a 12-drive RAID 50 array, one drive in each RAID 5 set can fail and the array continues to function. Note that if two or more drives in a RAID 5 set fail, all of the data is lost.

Figure 6. RAID 50 Configuration Example



Single Disk

You can configure a single drive as a unit through 3ware software. (3BM, 3DM2, or CLI).

Similar to disks in other RAID configurations, single disks contain 3ware Disk Control Block (DCB) information and the OS addresses them as available units.

Single drives are not fault tolerant and, therefore, are not recommended for high availability systems unless you take additional precautions to prevent system hangs and data loss.

Hot Spare

A hot spare is a single drive, available online, so that a redundant unit is automatically rebuilt without human intervention in case of drive failure.

Determining Which RAID Level to Use

The type of RAID unit (array) that you create depends on your needs. You might want to maximize speed of access, total amount of storage, or redundant protection of data. Each type of RAID unit offers a different blend of these characteristics.

The following table summarizes RAID configuration types.

Table 2: RAID Configuration Types

RAID Type	Description
RAID 0	Provides performance, but no fault tolerance.
RAID 1	Provides fault tolerance and a read speed advantage over non-RAID disks.
RAID 5	Provides performance, fault tolerance, and high storage efficiency. RAID 5 units can tolerate one drive failing before losing data.
RAID 6	Provides very high fault tolerance with the ability to protect against two consecutive drive failures. Performance and efficiency increase with higher numbers of drives.
RAID 10	Provides a combination of striped and mirrored units for fault tolerance and high performance.
RAID 50	Provides a combination of RAID 5 and RAID 0. RAID 50 provides high fault tolerance and performance.
Single Disk	Not a RAID type - but supported as a configuration. Provides maximum disk capacity with no redundancy.

You can create one or more units, depending on the number of drives you install. The following table provides possible configurations based on your number of drives.

Table 3: Possible Configurations Based on Number of Drives

Number of Drives	Possible RAID Configurations
1	Single disk
2	RAID 0 or RAID 1

Table 3: Possible Configurations Based on Number of Drives

Number of Drives	Possible RAID Configurations
3	RAID 0 RAID 1 with hot spare RAID 5
4	RAID 5 with hot spare RAID 10 Combination of RAID 0, RAID 1, single disk
5	RAID 6 RAID 5 with hot spare RAID 10 with hot spare Combination of RAID 0, RAID 1, hot spare, single disk
6 or more	RAID 6 RAID 6 with hot spare RAID 50 Combination of RAID 0, 1, 5, 6,10, hot spare, single disk

Using Drive Capacity Efficiently

Because the capacity of each drive is limited to the capacity of the smallest drive in the unit, use drives of the same capacity in a unit.

The total unit capacity is defined as follows:

Table 4: Drive Capacity

RAID Level	Capacity
Single Disk	Capacity of the drive
RAID 0	(number of drives) X (capacity of the smallest drive)
RAID 1	Capacity of the smallest drive
RAID 5	(number of drives – 1) X (capacity of the smallest drive) Storage efficiency increases with the number of disks: storage efficiency = (number of drives – 1)/(number of drives)
RAID 6	(number of drives – 2) x (capacity of the smallest drive)
RAID 10	(number of drives/2) X (capacity of smallest drive)
RAID 50	(number of drives – number of groups of drives) X (capacity of the smallest drive)

Through drive coercion, the capacity used for each drive is rounded down to improve the likelihood that you can use drives from differing manufactures as spares for each other. The capacity used for each drive is rounded down to the nearest GB for drives under 45 GB (45,000,000,000 bytes), and rounded down to the nearest 5 GB for drives over 45 GB. For example, a 44.3-GB drive is rounded down to 44 GB, and a 123-GB drive is rounded down to 120 GB.

Note: All drives in a unit must be of the same type, either SAS or SATA.

2

CLI Syntax Reference

This chapter provides detailed information about using the command syntax for the 3ware CLI.

Throughout this chapter, the examples shown use the interactive mode of using the 3ware CLI.

Common Tasks Mapped to CLI Commands

The table below lists many of the tasks that you can use to manage your RAID controllers and units, and also lists the primary CLI command associated with those tasks.

Table 5: Common Tasks Mapped to CLI Commands

Task	CLI Command	Page
Controller Configuration Tasks		
View information about a controller	/cx show	32
View controller policies and other details	/cx show [attribute] [attribute]	33
View drive performance statistics	/cx show dpmstat [type=inst|ra|ext]	36
Set policies for a controller		
• Modify staggered spinup	/cx set stagger and /cx set spinup	68
• Enable/disable autocarving	/cx set autocarve	68
• Enable/disable autorebuild	/cx set autorebuild	69
• Set the autocarve volume size	/cx set carvesize	68
• Enable/disable drive performance monitoring statistics (dpmstat)	/cx set dpmstat	62
Controller Maintenance Tasks		

Table 5: Common Tasks Mapped to CLI Commands (Continued)

Task	CLI Command	Page
Update controller with new firmware	/cx update	58
Add a time slot to a rebuild schedule	/cx add rebuild	59
Add a time slot to a verify schedule	/cx add verify	60
Add a time slot to a selftest schedule	/cx add selftest	61
Enable/disable the initialize/ rebuild/migrate schedule and set the task rate	/cx set rebuild	63
Enable/disable the verify schedule and set the task rate	/cx set verify	65
Set the verify schedule to advanced or basic	/cx set verify=advanced|basic|1..5	66
Set the rebuild/migrate task rate	/cx set rebuildrate	64
Set the rebuild/migrate task mode	/cx set rebuildmode	63
Set the verify task rate	/cx set verifyrate	67
Set the verify task mode	/cx set verifymode	66
Set the basic verify start time and day	/cx set verify=basic [pref=ddd:hh]	66
Enable/disable the selftest schedule	/cx set selftest	68
View controller alarms (errors, warnings, messages)	/cx show alarms /cx show events /cx show AENs	43
Unit Configuration Tasks		
View information about a unit	/cx/ux show	72
Create a unit or hot spare	/cx add	53
Enable/disable unit write cache	/cx/ux set wrcache	81 82
Enable Basic or Intelligent read cache, or disable both.	/cx/ux set rdcache	82
Set the queue policy	/cx/ux set qpolicy	84
Set the rapid RAID recovery policy	/cx/ux set rapidrecovery	84

Table 5: Common Tasks Mapped to CLI Commands (Continued)

Task	CLI Command	Page
Set the storsave profile	/cx/ux set storsave	84
Unit Configuration Changes		
Change RAID level	/cx/ux migrate	86
Change stripe size	/cx/ux migrate	86
Expand unit capacity	/cx/ux migrate	86
Delete a unit	/cx/ux del	79
Remove a unit (export)	/cx/ux remove	78
Name a unit	/cx/ux set name	83
Unit Maintenance Tasks		
Start a rebuild	/cx/ux start rebuild	79
Start a verify	/cx/ux start verify	80
Stop verify	/cx/ux stop verify	80
Enable/disable autoverify	/cx/ux set autoverify	81
Identify all drives that make up a unit by blinking associated LEDs	/cx/ux set identify	64
Port Tasks		
Locate drive by blinking an LED	/cx/px set identify	101
Check if LED is set to on or off	/cx/px show identify	94
View information for specific drive	/cx/px show	92
View the status of specific drive	/cx/px show status	95
Show statistics for the drive on a particular port	/cx/px show dpmstat type=inst|ra|lct|histdata|ext	98
Clear statistics counters for a particular drive	/cx/px set dpmstat=clear [type=ra|lct|ext]	101
PHY Tasks		
View details about link speed for a specified phy	/cx/phyx show	102
Set the link speed for a specified phy	/cx/phyx set link=auto|1.5|3.0|6.0	103
BBU Tasks		

Table 5: Common Tasks Mapped to CLI Commands (Continued)

Task	CLI Command	Page
Check on charge and condition of battery	/cx/bbu/ show status	106
Start a test of the battery	/cx/bbu test [quiet]	108
Enclosure Tasks		
View information about an enclosure and its components	/cx/ex show	110
Locate a drive slot in an enclosure by blinking an LED	/cx/ex/slotx set identify	116
Locate a fan in an enclosure by blinking an LED	/cx/ex/fanx set identify	117
Set the speed for a fan in an enclosure	/cx/ex/fanx set speed	117
Locate a power supply in an enclosure by blinking an LED	/cx/ex/pwrsx set identify	118
Locate a temperature sensor in an enclosure by blinking an LED	/cx/ex/tempx set identify	119
Turn off or mute an audible alarm in an enclosure	/cx/ex/almx set alarm	120

Terminology

3ware SATA+SAS RAID Controller Card CLI Guide, Version 10.2 uses the following terminology:

Logical Units. This term is usually shortened to *units*. These are block devices presented to the operating system. A logical unit can be a one-tier, two-tier, or three-tier arrangement. Spare and Single logical units are examples of one-tier units. RAID 1 and RAID 5 are examples of two-tier units and as such have subunits. RAID 10 and RAID 50 are examples of three-tier units and, as such, have sub-subunits.

Port. 3ware controller models prior to and including the 9650SE series have one or many ports (typically 4, 8, 12, 16, or 24). You can attach each port to a single disk drive. On a controller such as the 9650SE with a multilane serial port connector, one connector supports four ports. On 9750 and 9690SA series controllers, connections are made with phys and vports (virtual port).

Phy. Phys are transceivers that transmit and receive the serial data stream that flows between the controller and the drives. 3ware 9750 and 9690SA controllers have four or more phys. These *controller phys* are associated with virtual ports (vports) by 3ware software to establish up to 128 potential connections with SAS or SATA hard drives. You can connect each controller phy directly to a single drive, or you can connect it through an expander to additional drives.

VPort. Connections from 3ware 9750 and 9690SA controllers to SAS or SATA drives are referred to as *virtual ports*, or VPorts. A VPort indicates the ID of a drive, whether it connects directly to the controller or cascades through one or more expanders. The VPort, in essence, is a handle in the software to uniquely identify a drive. The VPort ID or port ID allows a drive to be consistently identified, used in a RAID unit, and managed. For dual-port drives, although there are two connections to a drive, the drive is still identified with one VPort handle.

Note: For practical purposes, port and VPort are used interchangeably in this document in reference to a drive (or disk). Therefore, unless otherwise specified, the mention of port implies VPort as well. For example, when *port* is used to indicate a drive, it is implied that, for the applicable controller series, the reference also applies to VPort.

For additional information about 3ware controller concepts and terminology, refer to the user guide PDF for your 3ware RAID controller or the user guide portions of the 3ware HTML Bookshelf.

Syntax Overview

The command syntax uses the general form:

```
Object Command Attributes
```

Objects are shell commands, controllers, units, ports (drives), battery backup units (BBUs), and enclosures.

Commands can either select (show, get, present, read) attributes or alter (add, change, set, write) attributes.

Attributes are either *boolean attributes* or *name-value attributes*.

- The value of a *boolean attribute* is deduced by presence of a value for that attribute, or the lack of a value. For example, the command **show alarms,** by default, lists controller alarms with the oldest alarm first. If you include the attribute **reverse,** as in the command **show alarms reverse**, alarms are listed in reverse order with the most recent alarm first.
- The value of name-value attributes are expressed in the format *attribute=value*.

Example: When adding (creating) a unit to the controller by using the following command string,

```
/c1 add type=raid1 disk=0-1
```

`c1` is the object, `add` is the command, `type` (for type of array) is an attribute with `raid1` as the value of the attribute, and `disk` is another attribute with `0-1` as the value (ports 0 through 1).

Commands act on different objects, for example shell objects, controller objects, unit objects, and other objects. Information about these commands is organized into sections about each object.

Shell Object Commands. Shell object commands set the focus or provide information (such as alarms, diagnostics, rebuild schedules, and other functions) about all controllers in the system. For details, see “Shell Object Commands” on page 25.

Controller Object Commands. Controller object commands provide information and perform actions related to a specific controller. For example, you use controller object commands for such tasks as viewing a list of alarms specific to a controller, creating schedules during which background tasks are run, and setting policies for the controller. You can also use the controller object command **/c*x* add** to create RAID arrays. For details, see “Controller Object Commands” on page 30.

Unit Object Commands. Unit object commands provide information and perform actions related to a specific unit on a specific controller. You can use unit object commands for a number of tasks, for example, to see the rebuild verify, or initialize status of a unit; to start or stop verifies; to start rebuilds; to set policies for the unit, and to perform other tasks related to the unit. You also use the controller object command
/c*x*/u*x* migrate to change the configuration of a RAID array. For details, see “Unit Object Commands” on page 71.

Phy Object Commands. Phy object commands provide information and perform actions related to a specific phy on a 9750 or 9690SA controller.

Port Object Commands. Port object commands provide information and perform actions related to a drive on a specific port or vport. You can use port object commands for such tasks as viewing the status, model, or serial number of the drive. For details, see “Port Object Commands” on page 92.

BBU Object Commands. BBU object commands provide information and perform actions related to a Battery Backup Unit on a specific controller. For details, see “BBU Object Commands” on page 103.

Enclosure Object Commands. Enclosure object commands provide information and perform actions related to a particular enclosure. For example, you can use enclosure object commands to see information about an enclosure and its elements (slots, fan, and temperature sensor elements).

Help Commands. Help commands allow you to get help information for all commands and attributes. For details, see “Help Commands” on page 122.

Shell Object Commands

Shell object commands either apply to all the controllers in the system (such as show, rescan, flush, commit), or they redirect the focused object.

Syntax

```
focus object
commit
flush
rescan
show [attribute [modifier]]
    alarms [reverse]
    diag
    rebuild
    selftest
    ver
    verify
update fw=filename_with_path [force]
```

focus Object

The **focus** command is active in interactive mode only and is provided to reduce typing.

The focus command sets the specified object in focus and changes the prompt to reflect the specified object. This allows you to type a command that applies to the specified object instead of typing the entire object name each time.

For example, where normally you might type:
`/c0/u0 show`

If you set the focus to `/c0/u0`, the prompt changes to reflect `/c0/u0`, and you only have to type `show`. The concept is similar to working in a particular location in a file system and requesting a listing of the current directory.

When you type the command **focus /*object*,** *object* can have the following forms:

- `/cx/ux` specifies the fully qualified Universal Resource Identifier (URI) of an object on controller `cx`, unit `ux`.
- `..` (two trailing periods) specifies one level up (the parent object).
- `/` (a forward slash) specifies the root
- *object* specifies the next level of the object.

- `/c0/bbu` specifies a relative path with respect to the current focused hostname.

Example:

```
//localhost> focus /c0/u0
//localhost/c0/u0>

//localhost/c0/u0> focus..
//localhost/c0>

//localhost> focus u0
//localhost/c0/u0>

//localhost/c0> focus /
//localhost>
```

commit

The **commit** command sends a commit command to all 3ware controllers in the system. For more information, see “/cx commit” on page 58.

flush

The **flush** command sends a flush command to all 3ware controllers in the system. For more information, see “/cx flush” on page 58.

rescan

The **rescan** command sends a rescan command to all 3ware controllers in the system. For more information, see “/cx rescan [noscan]” on page 57.

show

The **show** command shows a general summary of all detected controllers and enclosures.

The output of this command can vary depending upon your controller model and whether the system has an enclosure with an expander attached.

Note that the device drivers for the appropriate operating system must be loaded for the list to show all controllers.

Example for 9750-8i controller without an enclosure and expander:

Typical output of the Show command for a controller is similar to the following:

```
 //localhost> show
 Ctl   Model        (V)Ports  Drives   Units   NotOpt  RRate   VRate  BBU
 ------------------------------------------------------------------------
 c0    9750-8i      8         8        2       0       1       1      -
```

The output above indicates that Controller 0 is a 9750-8i with eight (V)ports, eight drives detected, two units, both in optimal state, with rebuild rate set to 1 and verify rate set to 1. This controller does not have a BBU attached.

Not Optimal refers to any state except OK and VERIFYING. RRate also applies to initializing and migrating. (Definitions of the unit statuses are available in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.)

Example for 9750-8e with an enclosure attached:

Typical output of the Show command for a system with an enclosure, expander, and a 9750-8e controller is similar to the following:

```
 //localhost> show
 Ctl   Model        (V)Ports  Drives   Units   NotOpt  RRate   VRate  BBU
 ------------------------------------------------------------------------
 c1    9750-8e      23        23       3       0       1       1      OK

 Enclosure     Slots  Drives  Fans  TSUnits  PSUnits  Alarms
 --------------------------------------------------------------
 /c1/e0        24     23      4     6        2        2
```

The output above indicates that Controller 1 is a 9750-8e with 23 drives attached, with 3 units in optimal state, rebuild and verify rate set to 1, and with a BBU in normal and ready state.

show alarms [reverse]

The **show alarms** command shows the controller alarms or events, also known as Asynchronous Event Notification (AEN) messages, of all controllers in the system. The default is to list the most recent messages at the bottom. The **reverse** attribute lists the most recent message at the top.

To view this information for a specific controller, see “/cx show alarms [reverse]” on page 43.

show events [reverse]

The **show events** command is the same as “show alarms [reverse]”. Please see above for details.

show AENs [reverse]

The **show AENS** command is the same as “show alarms [reverse]”. Please see above for details.

show diag

The **show diag** command shows the diagnostic information for all controllers in the system. The enclosure diagnostic log might be requested by 3ware Customer Support to troubleshoot problems on your controller.

show rebuild

The **show rebuild** command shows all rebuild schedules for the 3ware RAID controllers in the system.

Example:

```
//localhost> show rebuild

Rebuild Schedule for Controller /c0
========================================================
Slot      Day       Hour         Duration     Status
--------------------------------------------------------
1         Sun       12:00am      24 hr(s)     disabled
2         Mon       12:00am      24 hr(s)     disabled
3         Tue       12:00am      24 hr(s)     disabled
4         Wed       12:00am      24 hr(s)     disabled
5         Thu       12:00am      24 hr(s)     disabled
6         Fri       12:00am      24 hr(s)     disabled
7         Sat       12:00am      24 hr(s)     disabled
```

For additional information about rebuild schedules, see “/cx add rebuild=ddd:hh:duration” on page 59, and refer to the discussion of background tasks and schedules in *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

show selftest

The **show selftest** command shows all selftest schedules for the 3ware RAID controllers in the system.

Example:

```
//localhost> show selftest

Selftest Schedule for Controller /c0
========================================================
Slot      Day       Hour         SMART
--------------------------------------------------------
1         Sun       12:00am      enabled
2         Mon       12:00am      enabled
3         Tue       12:00am      enabled
4         Wed       12:00am      enabled
5         Thu       12:00am      enabled
6         Fri       12:00am      enabled
7         Sat       12:00am      enabled
```

For additional information about selftest schedules, see “/cx add selftest=ddd:hh” on page 61, and refer to the discussion of background tasks and schedules in *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

show ver

The **show ver** command shows the CLI and API version.

Example:

```
//localhost> show ver
CLI Version = 2.00.03.0xx
API Version = 2.01.00.xx
```

In the above example, “xx” stands for the actual version. Refer to the Release Notes for details.

show verify

The **show verify** command shows all verify schedules. The output shows either the advanced or the basic verify schedule, depending upon which schedule is enabled for each controller.

Example:

This example shows two controllers, one with an advanced verify schedule and one with a basic verify schedule.

```
//localhost> show verify

Verify Schedule for Controller /c2
```

```
========================================================
Slot      Day       Hour         Duration     AdvVerify
--------------------------------------------------------
1         Sun       12:00am      24 hr(s)      on
2         Mon       12:00am      24 hr(s)      on
3         Wed       4:00pm       24 hr(s)      on
4         Wed       12:00am      24 hr(s)      on
5         Thu       12:00am      24 hr(s)      on
6         Fri       12:00am      24 hr(s)      on
7         Sat       12:00am      24 hr(s)      on

/c3 basic verify weekly preferred start: Saturday, 12:00AM
```

For additional information about verify schedules, see “/cx add verify=ddd:hh:duration” on page 60, “/cx set verify=basic [pref=ddd:hh]” on page 66, and refer to the discussion of background tasks and schedules in *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

update fw=filename_with_path [force]

The **update fw** command downloads the specified firmware image to the controllers that are compatible with the firmware image and iterates through all the controllers in the system, updating the firmware. For more information, see “/cx update fw=filename_with_path [force]” on page 58.

Controller Object Commands

Controller object commands provide information and perform actions related to a specific controller, such as **/c0**. For example, you use controller object commands to view a list of alarms specific to a controller, to create schedules for when background tasks are run, and to set policies for the controller. You also use the controller object command **/cx add type** to create RAID arrays.

Syntax

```
/cx show
/cx show attribute [attribute ...] where attributes are:
    achip|allunitstatus|autocarve|autorebuild|bios|
    carvesize|ctlbus|dpmstat[type=inst|ra|ext]|driver|
    drivestatus|firmware|memory|model|monitor|numdrives|
    numports|numunits|pcb|pchip|serial|spinup|stagger|
    unitstatus|
/cx show all (where all means attributes and configurations)
/cx show diag
/cx show alarms [reverse]
/cx show events [reverse]
/cx show AENS [reverse]
/cx show rebuild
```

```
/cx show rebuildmode
/cx show rebuildrate
/cx show verify
/cx show verifymode
/cx show verifyrate
/cx show selftest
/cx show phy (9750 and 9690SA only)

/cx add type=<RaidType>
    (RaidType={raid0,raid1,raid5,raid6,raid10,raid50,single,
    spare}) disk=<p:-p..> [stripe=<Stripe>][noscan][nocache|
    nowrcache][nordcache|rdcachebasic]
    [group=<3|4|5|6|7|8|9|10|11|12|13|14|15|16>]
    [autoverify][noqpolicy][ignorECC][name=string](
    [v0=n|vol=a:b:c:d](n=size of first volume in GB)
    [rapidrecovery=all|rebuild|disable]
    [storsave=<protect|balance|perform>]
/cx add rebuild=ddd:hh:duration
/cx add verify=ddd:hh:duration
/cx add selftest=ddd:hh

/cx del rebuild=slot_id
/cx del verify=slot_id
/cx del selftest=slot_id
/cx set dpmstat=on|off
/cx set spinup=nn
/cx set stagger=nn
/cx set autocarve=on|off
/cx set carvesize=[1024...32768]
/cx set rebuild=enable|disable|1..5
/cx set rebuildmode=<adaptive|lowlatency>
/cx set rebuildrate=<1..5>
/cx set autorebuild=on|off
/cx set autodetect=on|off disk=<p:-p>|all
/cx set verify=enable|disable|1..5
/cx set verify=advanced|basic|1..5
/cx set verifymode=<adaptive|lowlatency>
/cx set verifyrate=<1..5>
/cx set verify=basic [pref=ddd:hh]
/cx set selftest=enable|disable

/cx flush
/cx update fw=filename_with_path [force]
/cx commit          (Windows only. Also known as shutdown)
/cx rescan [noscan]
```

/cx show

The **/c*x* show** command shows summary information on the specified controller /c*x*. This information is organized into a report containing two or three parts:

- A **Unit** summary section listing all present units
- A **Port** summary section listing of all ports (or virtual ports) and disks attached to them.
- A **BBU** summary section listing, if a BBU is installed on the controller.

The **Unit** summary section lists all present units and, for each one, specifies their unit number, unit type (such as RAID 5), unit status (such as INITIALIZING), %R (percent completion of rebuilding), % V/I/M (percent completion of verifying, initializing, or migrating), stripe size, size (usable capacity) in gigabytes, the write cache setting, the read cache setting (if supported by your controller) and the autoverify policy status (on/off)

Possible unit statuses include OK, RECOVERY, INOPERABLE, UNKNOWN, DEGRADED, INITIALIZING, INIT-PAUSED, VERIFYING, VERIFY-PAUSED, REBUILDING, REBUILD-PAUSED, MIGRATING, and MIGRATE-PAUSED. Definitions of the unit statuses are available in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Note: An asterisk (*) next to the status of a unit indicates there is an error on one of the drives in the unit. This feature provides a diagnostic capability for potential problem drives. The error might not be a repeated error, and might be caused by an error correction code (ECC) error, Smart Monitoring Analysis and Reporting (SMART) failure, or a device error. Rescanning the controller clears the drive error status if the condition no longer exists.

For controllers with read cache support, the *Cache* column shows the settings of both the read cache and the write cache.

Below is a summary of the possible settings in the Cache column:
W – only the write cache is enabled
Rb – only the read cache Basic Mode is enabled
Ri – only the read cache Intelligent Mode is enabled
RbW – the read cache Basic Mode and the write cache are both enabled
RiW – the read cache Intelligent Mode and the write cache are both enabled
OFF – all caches are disabled

Note that when the Intelligent Mode of the read cache is enabled, the Basic Mode features are also enabled. For details, see "/cx/ux set rdcache=basic|intelligent|off" on page 82**.**

This section lists the ports or virtual ports present, and for each port, specifies the port or vport number, drive status, unit affiliation, drive type, phy number

(if direct attached), the enclosure and slot (if expander attached), and model number of the drive.

Note: If a drive is not present, that port entry is not listed.

Consequently, the port numbers in the list might not be sequential. Moreover, if there are no drives present for the specified controller, the output of its Port summary shows an empty summary consisting of only the header

The **BBU** summary lists details about the BBU, if one is installed. It lists the online state, readiness, and status of the BBU unit, along with the voltage, temperature, charge capacity expressed as time remaining in hours, and the BBU's last test date..

You can obtain additional attributes about controllers, units, ports and disks by querying for them explicitly. For details, see the other show subcommands.

Example output:

Note that the port information is represented by VPort (virtual port) and Cache is represented by both Read Cache and Write cache.

```
Unit  UnitType  Status        %RCmpl  %V/I/M  Stripe  Size(GB)  Cache  AVrfy
----------------------------------------------------------------------------
u0    SPARE     OK             -       -       -        149.042   -      OFF
u1    Single    OK             -       -       -        149.051   RiW    OFF

VPort Status       Unit    Size     Type  Phy Encl-Slot    Model
----------------------------------------------------------------------------
p0    OK             -    149.05 GB SATA   3  -        WDC WD1600JS-22NCB1
p1    OK            u0    149.05 GB SATA   0  -        WDC WD1600JS-22NCB1
p2    OK            u1    149.05 GB SATA   2  -        WDC WD1600JS-22NCB1
p3    OK             -    34.18 GB  SAS    6  -         SEAGATE ST936701SS
```

/cx show attribute [attribute ...]

The **/c*x* show attribute** command shows the current setting of the specified attributes on the specified controller. You can specify one or many attributes. If you specify an invalid attribute, the loop terminates. Possible attributes are: achip, allunitstatus, autocarve , autorebuild , bios, carvesize , driver, drivestatus, firmware, memory, model, monitor, numdrives, numports, numunits, ctlbus , pcb, pchip, qpolicy, serial, spinup, stagger, and unitstatus.

Example: To view the driver and firmware version installed on controller 0, type the following:

```
//localhost> /c0 show driver firmware
/c0 Driver Version = 2.x
/c0 Firmware Version = FE9X 3.x
```

(In the sample output above, *x* represents the actual version number.)

/c*x* show achip

The **/cx show achip** command shows the SAS+SATA I/O controller (IOC) version of the specified controller /c*x*.

Example:

```
//localhost> /c0 show achip
/c0 ACHIP Version = 3.x
```

/c*x* show allunitstatus

The **/cx show allunitstatus** command presents a count of total and Not Optimal units managed by the specified controller /c*x*.

Example:

```
//localhost> /c0 show allunitstatus
/c0 Total Optimal Units = 2
/c0 Not Optimal Units = 0
```

/c*x* show autocarve

The **/cx show autocarve** command shows the Autocarve policy. If the policy is *on*, all newly created or migrated units larger than the carvesize are automatically carved into multiples of carvesize volumes plus one remainder volume. You can treat each volume as an individual drive with its own file system. The default carvesize is 2 TB. For more information see, “/cx show memory” on page 39.

For operating systems that support units larger than 2 TB, do not set the policy to *on* unless you want the operating system to have multiple smaller volumes.

If you use a 32-bit operating system, it is best to keep the policy *on* unless your operating system supports disks larger than 2 TB.

When the Autocarve policy is *off*, all newly created units consist of one single volume.

Example:

```
//localhost> /c0 show autocarve
/c0 Autocarving Policy = on
```

/c*x* show autorebuild

The **/cx show autorebuild** command shows the Autorebuild policy. If you enable the policy, the firmware selects drives to use for rebuilding a degraded unit by using the following priority order. For more information, see “/cx set autorebuild=on|off” on page 69.

1. Smallest usable spare.

2. Smallest usable unconfigured (available) drive.

3. Smallest usable failed drive.

If the policy is disabled, only spare drives are used for an automatic rebuild operation.

Example:

```
//localhost> /c0 show autorebuild
/c0 Auto-Rebuild Policy = on
```

/c*x* show bios

The **/c*x* show bios** command shows the BIOS version of controller /c*x*.

Example:

```
 //localhost> /c0 show bios
 /c0 BIOS Version = BG9X 2.x
```

/c*x* show carvesize

The **/c*x* show carvesize** command shows the maximum size of the volumes that can be created if the autocarve policy is set to *on*. You can set the carvesize between 1024 GB and 32768 GB (1 TB to 32 TB). Default carvesize is 2048 GB (2 TB). For more information see, “/cx show autocarve” on page 34.

Example:

```
 //localhost> /c0 show carvesize
 /c0 Autocarving Size = 2000 GB
```

/c*x* show ctlbus

The **/c*x* show ctlbus** command shows the controller host bus type, bus speed, and bus width.

Example for 9690SA:

```
 //localhost> /c2 show ctlbus
 /c2 Controller Bus Type = PCIe
 /c2 Controller Bus Width = 8 lanes
 /c2 Controller Bus Speed = 2.5 Gbps/lane
```

/c*x* show driver

The **/c*x* show driver** command shows the device driver version associated with controller
/c*x*.

Example:

```
 //localhost> /c0 show driver
 /c0 Driver Version = 3.x
```

/*cx* show dpmstat [type=inst|ra|ext]

The **/*cx* show dpmstat** command shows the configuration and setting of the Drive Performance Monitor and a summary of statistics for drives attached to the controller.

The optional *type* attribute specifies which statistics are reported. The available options are: *inst* for Instantaneous, *ra* for Running Average, and *ext* for Extended Drive Statistics. If you do not specify a type, you see the default set of drive statistics, which is the type *inst*.

inst (Instantaneous). This measurement provides a short duration average.

ra (Running Average). Running average is a measure of long-term averages that even out the data, which results in older measurement results fading from the average over time.

ext (Extended Drive Statistics). The extended drive statistics refers to statistics of a drive's read commands, write commands, write commands with Force Unit Access (FUA), flush commands, and a drive sectors's read, write, and write commands with FUA. Additional statistics are available for drives at specific ports. For details, see “/cx/px show dpmstat type=inst|ra|lct|histdata|ext” on page 98.

You can turn Drive Performance Monitoring on and off using the command “/cx set dpmstat=on|off” on page 62.

Example of inst drive statistics:

To view a summary of instantaneous data for the set of drives attached to the controller, use command `/cx show dpmstat`. (Because *inst* is the default, you do not have to explicitly type it in the command).

Because this is a controller-level command, the output provides summary information for the set of drives attached to the controller. For statistics about a drive attached to a specific port, see “/cx/px show dpmstat type=inst|ra|lct|histdata|ext” on page 98.

In the configuration information shown below, the Performance Monitor is shown to be *ON*, *Version* refers to the firmware version of the Performance Monitor, *Max commands for averaging* refers to the maximum number of commands that can be saved and used for calculating the average, and *Max latency commands to save* refers to the maximum number of commands with high latency that are saved. These configurations and the amount of memory in the system determine the amount of statistics data in the buffer. These configuration settings cannot be changed at this time.

```
//localhost> /c0 show dmpstat
 Drive Performance Monitor Configuration for /c0 ...
 Performance Monitor: ON
 Version: 1
 Max commands for averaging: 100
 Max latency commands to save: 10
 Requested data: Instantaneous Drive Statistics
```

```
                           Queue          Xfer         Resp
Port   Status       Unit   Depth   IOPs   Rate(MB/s)   Time(ms)
---------------------------------------------------------------
p0     NOT-PRESENT  -      -       -      -            -
p1     NOT-PRESENT  -      -       -      -            -
p2     OK           -      -       -      -            -
p3     OK           u0     10      93     2.907        85
p4     OK           u1     10      84     2.640        95
p5     OK           -      -       -      -            -
p6     NOT-PRESENT  -      -       -      -            -
p7     NOT-PRESENT  -      -       -      -            -
```

Example of running average (ra) drive statistics:

To view a summary of the running average data for the set of drives attached to the controller, use command /*cx* `show dpmstat type=ra`.

Notice that in this case, the Performance Monitor is turned off.

```
//localhost> /c0 show dpmstat type=ra

Drive Performance Monitor Configuration for /c0 ...
Performance Monitor: OFF
Version: 1
Max commands for averaging: 100
Max latency commands to save: 10
Requested data: Running Average Drive Statistics

                               Queue           Xfer         Resp
Port   Status           Unit   Depth   IOPs    Rate(MB/s)   Time(ms)
------------------------------------------------------------------------
p0     NOT-PRESENT      -      -       -       -            -
p1     NOT-PRESENT      -      -       -       -            -
p2     OK               -      -       -       -            -
p3     OK               u0     0       435     25.249       2
p4     OK               u1     0       366     21.630       3
p5     OK               -      -       -       -            -
p6     NOT-PRESENT      -      -       -       -            -
p7     NOT-PRESENT      -      -       -       -            -
```

Example of extended drive statistics (ext):

To view a summary of the extended drive statistics associated with the specified controller, use command /*cx* `show dpmstat type=ext`.

```
//localhost> /c3 show dpmstat type=ext
Extended Drive Statistics for /c3 ...

                  Sectors                            Commands
----------------------------------  ---------------------------------------
Port   Read      Write     Write-FUA  Read      Write     Write-FUA  Flush
---------------------------------------------------------------------------
p0     28704384  0         28704384   28704448  0         0          0
p2     28704384  28704448  0          0         0         0          0
p3     28704704  0         0          0         0         0          0
```

```
 p6     0         0         0          0         0         0          0
```

Note: Depending on the amount of I/O and the rate or duration of the data transfer, overflow of the buffers containing this data can occur. In this case, the overflow is marked with "#######", as shown in the example below. If overflow occurs, you might want to return the counters to zero by using the clear command, "/cx/px set dpmstat=clear [type=ra|lct|ext]" on page 101.

Example of drive statistics overflow:

```
//localhost> /c3 show dpmstat type=ext
 Extended Drive Statistics for /c3 ...

                   Sectors                                Commands
 -----------------------------------  --------------------------------------
 Port   Read     Write     Write-FUA  Read     Write     Write-FUA  Flush
 ---------------------------------------------------------------------------
 p0    ########  0         158838656  158838720 0         0          0
 p2     ########  ########  ########   ########  ########  ########   ########
 p3    ########  0         0          0         0         0          0
 p6    0         0         0          0         0         0          0
```

/*cx* show drivestatus

The **/*cx* show drivestatus** command shows a list of drives and their port assignment, status, the unit with which they are associated, their size in gigabytes and blocks, and the serial number assigned by the drive manufacturer. (Definitions of the drive statuses are available in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.)

Example:

```
 //localhost> /c2 show drivestatus
VPort Status     Unit Size      Type  Phy Encl-Slot    Model
--------------------------------------------------------------------------
p0    OK         u0   34.25 GB  SAS   -   /c2/e0/slt0  MAXTOR ATLAS15K2_36
p1    OK         u0   34.25 GB  SAS   -   /c2/e0/slt1  MAXTOR ATLAS15K2_36
p2    OK         u0   34.25 GB  SAS   -   /c2/e0/slt2  MAXTOR ATLAS15K2_36
p3    OK         u0   34.18 GB  SAS   -   /c2/e1/slt0  HITACHI HUS151436VL
p4    OK         u0   34.18 GB  SAS   -   /c2/e1/slt1  HITACHI HUS151436VL
p5    OK         u0   34.18 GB  SAS   -   /c2/e1/slt2  HITACHI HUS151436VL
p6    OK         u0   34.25 GB  SAS   -   /c2/e0/slt3  MAXTOR ATLAS15K2_36
p7    OK         u0   34.25 GB  SAS   -   /c2/e0/slt4  MAXTOR ATLAS15K2_36
p8    OK         u0   34.25 GB  SAS   -   /c2/e0/slt5  MAXTOR ATLAS15K2_36
p9    OK         u0   34.25 GB  SAS   -   /c2/e0/slt6  MAXTOR ATLAS15K2_36
p10   OK         u0   34.18 GB  SAS   -   /c2/e1/slt3  HITACHI HUS151436VL
p11   OK         u0   34.18 GB  SAS   -   /c2/e1/slt4  HITACHI HUS151436VL
p12   OK         u0   34.18 GB  SAS   -   /c2/e1/slt5  HITACHI HUS151436VL
p13   OK         u0   34.18 GB  SAS   -   /c2/e1/slt6  HITACHI HUS151436VL
p14   OK         u0   34.25 GB  SAS   -   /c2/e0/slt7  MAXTOR ATLAS15K2_36
p15   OK         u0   34.25 GB  SAS   -   /c2/e0/slt8  MAXTOR ATLAS15K2_36
p16   OK         u0   34.25 GB  SAS   -   /c2/e0/slt9  MAXTOR ATLAS15K2_36
p17   OK         u0   34.25 GB  SAS   -   /c2/e0/slt10 MAXTOR ATLAS15K2_36
```

```
p18   OK         u0   34.18 GB  SAS   -   /c2/e1/slt7  HITACHI HUS151436VL
p19   OK         u0   34.18 GB  SAS   -   /c2/e1/slt8  HITACHI HUS151436VL
p20   OK         u0   34.18 GB  SAS   -   /c2/e1/slt9  HITACHI HUS151436VL
p21   OK         u0   34.18 GB  SAS   -   /c2/e1/slt10 HITACHI HUS151436VL
p22   OK         u0   34.25 GB  SAS   -   /c2/e0/slt11 MAXTOR ATLAS15K2_36
p23   OK         u0   34.25 GB  SAS   -   /c2/e0/slt12 MAXTOR ATLAS15K2_36
p24   OK         -    34.25 GB  SAS   -   /c2/e0/slt13 MAXTOR ATLAS15K2_36
p25   OK         -    34.25 GB  SAS   -   /c2/e0/slt14 MAXTOR ATLAS15K2_36
p26   OK         -    34.18 GB  SAS   -   /c2/e1/slt11 HITACHI HUS151436VL
p27   OK         -    34.18 GB  SAS   -   /c2/e1/slt12 HITACHI HUS151436VL
p28   OK         -    34.18 GB  SAS   -   /c2/e1/slt13 HITACHI HUS151436VL
p29   OK         -    34.18 GB  SAS   -   /c2/e1/slt14 HITACHI HUS151436VL
p30   OK         -    34.25 GB  SAS   -   /c2/e0/slt15 MAXTOR ATLAS15K2_36
p31   OK         -    34.18 GB  SAS   -   /c2/e1/slt15 HITACHI HUS151436VL
```

/c*x* show firmware

The **/c*x* show firmware** command shows the firmware version of controller /c*x*.

Example:

```
//localhost> /c0 show firmware
/c0 Firmware Version = FE9X 3.03.06.X03
```

/c*x* show memory

The **/c*x* show memory** command shows the available memory on the controller.

> **Note:** Some memory is reserved for use by the controller, so the amount of memory available is less than the controller actually has installed. For example, the 9690SA controller has 512 MB of memory, of which 448 MB is available.

Example:

```
//localhost> /c2 show memory
/c2 Available Memory = 448MB
```

/c*x* show model

The **/c*x* show model** command shows the controller model of controller /c*x*.

Example:

```
//localhost> /c0 show model
/c0 Model = 9690SA-8E
```

/c*x* show monitor

The **/c*x* show monitor** command shows the monitor (firmware boot-loader) version of controller /c*x*.

Example:

```
//localhost> /c0 show monitor
/c0 Monitor Version = BLDR 2.x
```

/c*x* show numdrives

The **/c*x* show numdrives** command shows the number of drives currently managed by the specified controller /c*x*. This report does not include (logically) removed or exported drives.

Example:

```
//localhost> /c0 show numdrives
/c0 Number of Drives = 5
```

/c*x* show numports

The **/c*x* show numports** command shows the total number of physical connections made to the controller and the maximum connections possible for the controller.

Example for a 9650SE-16ML with no drives attached:

```
//localhost> /c0 show numports

/c0 Number of Ports = 16
```

Example for 9690SA-8E with 8 dual-port SAS drives:

```
//localhost> /c3 show numports
/c3 Connections = 16 of 128
```

/c*x* show numunits

The **/c*x* show numunits** command shows the number of units currently managed by the specified controller /c*x*. This report does not include off-line units (or removed units).

Example:

```
//localhost> /c0 show numunits
/c0 Number of Units = 1
```

/c*x* show pcb

The **/c*x* show pcb** command shows the Printed Circuit Board (PCB) version of the specified controller /c*x*.

Example:

```
//localhost> /c0 show pcb
/c0 PCB Version = RevX
```

/*cx* show pchip

The **/*cx* show pchip** command shows the PCI Interface Chip (PCHIP) version of the specified controller /c*x*.

Example:

```
//localhost> /c0 show pchip
/c0 PCHIP Version = 1.x
```

/*cx* show serial

The **/*cx* show serial** command shows the serial number of the specified controller /c*x*.

Example:

```
//localhost> /c0 show serial
/c0 Serial Number = F12705A3240009
```

/*cx* show spinup

The **/*cx* show spinup** command shows the number of concurrent SAS and SATA disks that spin up when the system is powered up, after waiting for the number of seconds specified with the `set stagger` command. Spinup does not work with SAS or SATA disks attached to an expander.

Example:

```
//localhost> /c0 show spinup
/c0 Disk Spinup Policy = 1
```

/*cx* show stagger

The **/*cx* show stagger** command shows the time delay between each group of spinups at power up. Spinup does not work with SAS or SATA disks attached to an expander.

Example:

```
//localhost> /c0 show stagger
/c0 Spinup Stagger Time Policy (sec) = 2
```

/*cx* show unitstatus

The **/*cx* show unitstatus** command presents a list of units currently managed by the specified controller /c*x*, and shows their types, capacity, status, and unit policies.

Possible statuses include: OK, VERIFYING, VERIFY-PAUSED, INITIALIZING, INIT-PAUSED, REBUILDING, REBUILD-PAUSED, DEGRADED, MIGRATING, MIGRATE-PAUSED, RECOVERY, INOPERABLE, and UNKNOWN. (Definitions of the unit statuses are available in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.)

Note: If an asterisk (*) appears next to the status of a unit, there is an error on one of the drives in the unit. This feature provides a diagnostic capability for potential problem drives. The error might not be a repeated error, and can be caused by an ECC error, SMART failure, or a device error. Rescanning the controller clears the drive error status when the condition no longer exists.

Example:

```
 //localhost> /c2 show unitstatus

  Unit  UnitType  Status     %RCmpl  %V/I/M  Stripe  Size(GB)  Cache  AVrfy
  -------------------------------------------------------------------------
  u0    RAID-5    OK           -       -       64K     596.004   ON     OFF
  u1    RAID-0    OK           -       -       64K     298.002   ON     OFF
  u2    SPARE     OK           -       -       -       149.042   -      OFF
  u3    RAID-1    OK           -       -       -       149.001   ON     OFF
```

/cx show all

The **/*cx* show all** command shows the current setting of all of the following attributes on the specified controller: achip, allunitstatus, autocarve, bios, driver, drivestatus, firmware, memory, model, monitor, numports, numunits, numdrives, ondegrade, pcb, pchip, serial, spinup, stagger, and unitstatus.

Example for 9750-8e:

```
/c1 Driver Version = 5.01.00.018
/c1 Model = 9750-8e
/c1 Available Memory = 488MB
/c1 Firmware Version = FH9X 5.11.00.008
/c1 Bios Version = BE9X 5.11.00.002
/c1 Boot Loader Version = BT9X 6.00.00.003
/c1 Serial Number = C297BP269
/c1 PCB Version = Rev 001
/c1 PCHIP Version = B2
/c1 ACHIP Version = 05000900
/c1 Controller Phys = 8
/c1 Connections = 23 of 128
/c1 Drives = 23 of 128
/c1 Units = 3 of 128
/c1 Active Drives = 17 of 128
/c1 Active Units = 3 of 32
/c1 Max Drives Per Unit = 32
/c1 Total Optimal Units = 3
/c1 Not Optimal Units = 0
/c1 Disk Spinup Policy = 1
/c1 Spinup Stagger Time Policy (sec) = 1
/c1 Auto-Carving Policy = off
/c1 Auto-Carving Size = 2048 GB
/c1 Auto-Rebuild Policy = on
/c1 Rebuild Mode = Adaptive
/c1 Rebuild Rate = 1
```

```
/c1 Verify Mode = Adaptive
/c1 Verify Rate = 1
/c1 Controller Bus Type = PCIe
/c1 Controller Bus Width = 8 lanes
/c1 Controller Bus Speed = 2.5 Gbps/lane

Unit  UnitType  Status        %RCmpl  %V/I/M  Stripe  Size(GB)  Cache  AVrfy
----------------------------------------------------------------------------
u0    RAID-6    OK             -       -       256K    1923.11   RiW    ON
u1    RAID-5    OK             -       -       256K    167.588   RiW    ON
u2    RAID-1    OK             -       -       -       65.1826   RiW    ON

VPort Status         Unit Size      Type  Phy Encl-Slot    Model
----------------------------------------------------------------------------
p8    OK            u2   68.36 GB  SAS   -   /c1/e0/slt0  HITACHI HUS153073VL
p9    OK            u2   68.36 GB  SAS   -   /c1/e0/slt1  HITACHI HUS153073VL
p10    OK            -    68.36 GB  SAS   -   /c1/e0/slt2  SEAGATE ST373455SS
p11    OK            -    68.36 GB  SAS   -   /c1/e0/slt3  SEAGATE ST373455SS
p12   OK            u1   34.18 GB  SAS   -   /c1/e0/slt4  HITACHI HUS151436VL
p13   OK            u1   34.18 GB  SAS   -   /c1/e0/slt5  HITACHI HUS151436VL
p14   OK            u1   34.18 GB  SAS   -   /c1/e0/slt6  HITACHI HUS151436VL
p15   OK            u1   34.18 GB  SAS   -   /c1/e0/slt7  HITACHI HUS151436VL
p16   OK            u1   34.18 GB  SAS   -   /c1/e0/slt8  HITACHI HUS151436VL
p17   OK            u1   34.18 GB  SAS   -   /c1/e0/slt9  HITACHI HUS151436VL
p18   OK            -    279.39 GB SAS   -   /c1/e0/slt10 SEAGATE ST3300656SS
p19   OK            -    279.39 GB SAS   -   /c1/e0/slt11 SEAGATE ST3300656SS
p20   OK            -    279.39 GB SAS   -   /c1/e0/slt12 SEAGATE ST3300655SS
p21   OK            u0   279.39 GB SAS   -   /c1/e0/slt13 SEAGATE ST3300655SS
p22    OK            -    279.39 GB SAS   -   /c1/e0/slt14 FUJITSU MBA3300RC
p23   OK            u0   279.39 GB SAS   -   /c1/e0/slt16 SEAGATE ST3300655SS
p24   OK            u0   279.39 GB SAS   -   /c1/e0/slt17 SEAGATE ST3300655SS
p25   OK            u0   279.39 GB SAS   -   /c1/e0/slt18 SEAGATE ST3300655SS
p26   OK            u0   279.39 GB SAS   -   /c1/e0/slt19 SEAGATE ST3300655SS
p27   OK            u0   279.39 GB SAS   -   /c1/e0/slt20 SEAGATE ST3300655SS
p28   OK            u0   279.39 GB SAS   -   /c1/e0/slt21 SEAGATE ST3300655SS
p29   OK            u0   279.39 GB SAS   -   /c1/e0/slt22 SEAGATE ST3300655SS
p30   OK            u0   279.39 GB SAS   -   /c1/e0/slt23 SEAGATE ST3300655SS

Name  OnlineState  BBUReady  Status    Volt     Temp     Hours  LastCapTest
----------------------------------------------------------------------------
bbu   On           Yes       OK        OK       OK       136    xx-xxx-xxxx
```

/cx show alarms [reverse]

Asynchronous event notifications (also referred to as AENs or controller alarms) are originated by controller firmware or an SES attached enclosure and captured by the 3ware device drivers. These events reflect warnings, errors, and/or informative messages. These events are stored in a finite queue inside the kernel and can be listed by CLI and 3DM2. They are also stored in the operating system events log.

The **/*cx* show alarms** command shows all available events on a given controller. The default is to list the events in ascending order, that is, the oldest event messages appear at the top, and the most recent event messages appear at the bottom. You can use the [**reverse**] attribute to list the most recent event message at the top.

Example: Typical output looks like:

```
 //localhost> /c1 show alarms

 Ctl  Date                        Severity  AEN Message
 ---------------------------------------------------------------------------
 c0   [Fri Mar 21 2008 14:19:00]  WARNING   Drive removed: port=1
 c0   [Fri Mar 21 2008 14:19:00]  ERROR     Degraded unit: unit=1, port=1
 c0   [Fri Mar 21 2008 14:19:25]  INFO      Drive inserted: port=1
 c0   [Fri Mar 21 2008 14:19:25]  INFO      Unit operational: unit=1
 c0   [Fri Mar 21 2008 14:28:18]  INFO      Migration started: unit=0
 c0   [Sat Mar 22 2008 05:16:49]  INFO      Migration completed: unit=0
 c0   [Tue Apr 01 2008 12:34:02]  WARNING   Drive removed: port=1
 c0   [Tue Apr 01 2008 12:34:22]  ERROR     Unit inoperable: unit=1
 c0   [Tue Apr 01 2008 12:34:23]  INFO      Drive inserted: port=1
 c0   [Tue Apr 01 2008 12:34:23]  INFO      Unit operational: unit=1
```

/cx show events [reverse]

The **/*cx* show events** command is the same as “/cx show alarms [reverse]”. See details above.

/cx show AENs [reverse]

The **/*cx* show AENS** command is the same as “/cx show alarms [reverse]”. See details above.

/cx show diag

The **/*cx* show diag** command extracts controller diagnostics for technical support usage. The output contains general information about the controller, followed by two logs. The first is the *diagnostic log* and the second is the *controller log*. The diagnostic log contains output related to any anomaly or error in the system, while the controller log is a snapshot of recent controller activity. The diagnostic log contains persistent and usually less recent data than the controller log.

Note that some characters might not be printable or rendered correctly (not readable). You can save the output from this command to a file, where it can be communicated to technical support or further studied with Linux utilities such as od(1).

In order to redirect the output you must run the following command from a command line, not from within the tw_cli shell.

```
tw_cli /c0 show diag > diag.txt
```

For more information, see “Outputting the CLI to a Text File” on page 9.

/cx show phy

The **/*cx* show phy** command shows a list of the phys with related information for the specified controller.

In the following example, the column *Device Type* indicates whether the connected device is an enclosure, or a SATA or SAS drive. The *Device* column is the device ID or handle. There are three Link Speed columns: *Supported* denotes the link speed capability of the phy/device, *Enable* denotes the current link speed setting, and *Control* denotes the link control setting.

Example of 9690SA-8E connected to drives in an enclosure:

```
// localhost> /c3 show phy
                             Device            --- Link Speed (Gbps) ---
Phy     SAS Address          Type     Device   Supported  Enabled  Control
--------------------------------------------------------------------------
phy0    500050e000030232     ENCL     N/A      1.5-3.0    3.0      Auto
phy1    500050e000030232     ENCL     N/A      1.5-3.0    3.0      Auto
phy2    500050e000030232     ENCL     N/A      1.5-3.0    3.0      Auto
phy3    500050e000030232     ENCL     N/A      1.5-3.0    3.0      Auto
phy4    500050e000030236     ENCL     N/A      1.5-3.0    3.0      Auto
phy5    500050e000030236     ENCL     N/A      1.5-3.0    3.0      Auto
phy6    500050e000030236     ENCL     N/A      1.5-3.0    3.0      Auto
phy7    500050e000030236     ENCL     N/A      1.5-3.0    3.0      Auto
```

In the previous example, for phy1, the link speeds supported are 1.5 Gb/s and 3.0 Gb/s. The current link speed for phy1 is 3.0 Gbps, and the link control setting is *Auto*. The link control setting could be either 1.5, 3.0, or Auto. *Auto* denotes *Automatic Negotiation*, where the best negotiated speed possible for that link is used.

(Note that if SAS 2.0 is used with a 9750 controller, the link speeds can be up to 6.0 Gb/s.)

Example of 9690SA-8I with direct attached drives:

```
//localhost> /c3 show phy
                             Device            --- Link Speed (Gbps) ---
Phy     SAS Address          Type     Device   Supported  Enabled  Limit
--------------------------------------------------------------------------
 phy0    500050e000000002     SATA     /c3/p0     1.5-3.0    3.0   Auto
 phy1    500050e000000002     SATA     /c3/p1     1.5-3.0    3.0   Auto
 phy2    500050e000000002     SATA     /c3/p2     1.5-3.0    3.0   Auto
 phy3    500050e000000002     SATA     /c3/p3     1.5-3.0    3.0   Auto
 phy4    -                    -        -          1.5-3.0    -     Auto
 phy5    -                    -        -          1.5-3.0    -     Auto
 phy6    500050e000000006     SAS      /c3/p6     1.5-3.0    3.0   Auto
 phy7    -                    -        -          1.5-3.0    -     Auto
```

/cx show rebuild

Background tasks can be scheduled to run at times that are most convenient for your organization.

Rebuild is one of the supported background tasks. Migrate and initialize are other background tasks that follow the same schedule as rebuild. Other background tasks for which there are separate schedules are verify and selftest. For each background task, up to seven time periods can be registered, known as slots 1 through 7. You can manage each task schedule with a set of commands including **add**, **del**, **show** and **set** a task. Background task schedules have a slot ID, start-day-time, duration, and status attributes.

For details about setting up a schedule for background rebuild tasks, see “Setting Up a Rebuild Schedule” on page 60.

Rebuild activity attempts to (re)synchronize all members of redundant units such as RAID 1, RAID 10, RAID 5, RAID 6, and RAID 50. You can start a rebuild manually, or it can start automatically if a spare has been defined. Scheduled rebuilds occur during the scheduled time slot, if the schedules are enabled. For in-depth information about rebuild and other background tasks, see “About Background Tasks” in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

The **/c*x* show rebuild** command shows the current rebuild background task schedule, as illustrated below.

```
//localhost> /c0 show rebuild
Rebuild Schedule for Controller /c0
========================================================
Slot    Day     Hour            Duration        Status
--------------------------------------------------------
1       Mon     2:00pm          10 hr(s)        disabled
2       Thu     7:00pm          18 hr(s)        disabled
3       -       -               -               disabled
4       -       -               -               disabled
5       -       -               -               disabled
6       Mon     1:00am           4 hr(s)        disabled
7       Sun     12:00am          1 hr(s)        disabled
```

A status of “disabled” indicates that the task schedule is disabled. In this case, the controller does not use the defined schedule timeslots. If you start the command manually, rebuilding starts within 10 to 15 minutes. Otherwise it begins automatically if a rebuild is needed and a proper spare drive is set up or if the auto rebuild feature is turned on and a suitable unconfigured drive is available.

If the rebuild schedule is enabled while a rebuild process is underway, the rebuild pauses until a scheduled time slot.

Example for 9750 controller:

If a unit is in the initialization state at noon on Wednesday, the rebuild schedule shown above is in use (with schedules disabled), and you use the show command, you see the following status:

```
/c0 show

Unit   UnitType  Status       %RCmpl %V/I/M  Stripe  Size(GB)  Cache   AVrfy
---------------------------------------------------------------------------
u0     RAID-50   INITIALIZING -      62%     256K    469.246    RiW     ON

VPort  Status  Unit  Size     Type    Phy   Encl-Slot   Model
---------------------------------------------------------------------------
p8     OK      u0    34.18 GB SAS     -     /c0/e0/slt0 HITACHI HUS151436VL
p9     OK      u0    34.18 GB SAS     -     /c0/e0/slt1 HITACHI HUS151436VL
p10    OK      u0    34.18 GB SAS     -     /c0/e0/slt2 HITACHI HUS151436VL
p11    OK      u0    34.18 GB SAS     -     /c0/e0/slt3 HITACHI HUS151436VL
p12    OK      u0    34.18 GB SAS     -     /c0/e0/slt4 HITACHI HUS151436VL
p13    OK      u0    34.18 GB SAS     -     /c0/e0/slt5 HITACHI HUS151436VL
p14    OK      u0    34.18 GB SAS     -     /c0/e0/slt6 HITACHI HUS151436VL
p15    OK      u0    34.18 GB SAS     -     /c0/e0/slt7 HITACHI HUS151436VL
p16    OK      u0    34.18 GB SAS     -     /c0/e0/slt8 HITACHI HUS151436VL
p17    OK      u0    34.18 GB SAS     -     /c0/e0/slt9 HITACHI HUS151436VL
p18    OK      u0    34.18 GB SAS     -     /c0/e0/slt10 HITACHI HUS151436VL
p19    OK      u0    34.18 GB SAS     -     /c0/e0/slt11 HITACHI HUS151436VL
p20    OK      u0    34.18 GB SAS     -     /c0/e0/slt12 HITACHI HUS151436VL
p21    OK      u0    34.18 GB SAS     -     /c0/e0/slt13 HITACHI HUS151436VL
p22    OK      u0    34.18 GB SAS     -     /c0/e0/slt14 HITACHI HUS151436VL
p23    OK      u0    34.18 GB SAS     -     /c0/e0/slt15 HITACHI HUS151436VL
Name OnlineState   BBUReady   Status   Volt   Temp   Hours     LastCapTest
---------------------------------------------------------------------------
bbu    On          Yes        OK       OK     OK     117      18-Mar-2010
```

If you then enable the rebuild schedules, the unit initialization pauses until the next scheduled time slot, as the following examples indicate:

```
 //localhost> /c0 set rebuild=enable
 Enabling scheduled rebuilds on controller /c0 ...Done.

 //localhost> /c0 show rebuild
 Rebuild Schedule for Controller /c0
 ========================================================
 Slot    Day     Hour            Duration        Status
 --------------------------------------------------------
 1       Mon     2:00pm          10 hr(s)        enabled
 2       Thu     7:00pm          18 hr(s)        enabled
 3       -       -               -               -
 4       -       -               -               -
 5       -       -               -               -
 6       Mon     1:00am           4 hr(s)        enabled
 7       Sun     12:00am          1 hr(s)        enabled
```

```
/c0 show
Unit UnitType Status      %RCmpl  %V/I/M    Stripe Size(GB)  Cache   AVrfy
---------------------------------------------------------------------------
u0   RAID-50  INIT-PAUSED   -      63%       256K   469.246   RiW    ON

VPort Status Unit   Size      Type    Phy  Encl-Slot           Model
---------------------------------------------------------------------------
p8    OK     u0     34.18 GB  SAS     -    /c0/e0/slt0   HITACHI HUS151436VL
```

```
p9    OK     u0     34.18 GB  SAS     -    /c0/e0/slt1   HITACHI HUS151436VL
p10   OK     u0     34.18 GB  SAS     -    /c0/e0/slt2   HITACHI HUS151436VL
p11   OK     u0     34.18 GB  SAS     -    /c0/e0/slt3   HITACHI HUS151436VL
p12   OK     u0     34.18 GB  SAS     -    /c0/e0/slt4   HITACHI HUS151436VL
p13   OK     u0     34.18 GB  SAS     -    /c0/e0/slt5   HITACHI HUS151436VL
p14   OK     u0     34.18 GB  SAS     -    /c0/e0/slt6   HITACHI HUS151436VL
p15   OK     u0     34.18 GB  SAS     -    /c0/e0/slt7   HITACHI HUS151436VL
p16   OK     u0     34.18 GB  SAS     -    /c0/e0/slt8   HITACHI HUS151436VL
p17   OK     u0     34.18 GB  SAS     -    /c0/e0/slt9   HITACHI HUS151436VL
p18   OK     u0     34.18 GB  SAS     -    /c0/e0/slt10  HITACHI HUS151436VL
p19   OK     u0     34.18 GB  SAS     -    /c0/e0/slt11  HITACHI HUS151436VL
p20   OK     u0     34.18 GB  SAS     -    /c0/e0/slt12  HITACHI HUS151436VL
p21   OK     u0     34.18 GB  SAS     -    /c0/e0/slt13  HITACHI HUS151436VL
p22   OK     u0     34.18 GB  SAS     -    /c0/e0/slt14  HITACHI HUS151436VL
p23   OK     u0     34.18 GB  SAS     -    /c0/e0/slt15  HITACHI HUS151436VL

Name OnlineState BBUReady  Status  Volt  Temp  Hours  LastCapTest
---------------------------------------------------------------------------
bbu  On          Yes       OK      OK    OK    117    18-Mar-2010
```

/cx show rebuildmode

The **/cx show rebuildmode** command shows the current rebuild mode setting of the specified controller. The rebuild mode has two settings: *Adaptive* and *Low latency.*

Rebuild mode works with the rebuild task rate (see “/cx show rebuildrate” on page 49).

The *Adaptive* setting is the default rebuild mode. It allows the firmware to adjust the interaction of rebuild tasks with host I/Os to maximize the speed of both host I/O and rebuild tasks. The *Low latency* setting minimizes latency (delay) in reading data from a RAID unit by slowing the rebuild task process. For some applications, such as video server applications and audio applications, use the Low latency setting to minimize the latency of read commands so that users do not perceive a lag when viewing video or listening to audio.

For a more complete discussion of background task modes, see “Working with the Background Task Mode” in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Example:

```
 //localhost> /c1 show rebuildmode
 /c1 Rebuild background task mode = Low Latency
```

Related commands:

/cx set rebuildmode=<adaptive|lowlatency>

/cx set rebuildrate=<1..5>

/cx show rebuildrate

/cx show rebuildrate

The **/*cx* show rebuildrate** command shows the current rebuild task rate of the specified controller. The rebuild task rate sets the rebuild execution priority relative to I/O operations.

This task rate is in the range of [1..5], where 5 denotes the setting of fastest background task and slowest I/O, as follows:

5 = fastest rebuild; slowest I/O

4 = faster rebuild; slower I/O

3 = balanced between rebuild and I/O

2 = faster I/O; slower rebuild

1 = fastest I/O; slowest rebuild

Example:

```
 //localhost> /c1 show rebuildrate
 /c1 Rebuild background task rate = 4 (Faster Rebuild; slower I/O)
```

Related commands:

/cx set rebuildmode=<adaptive|lowlatency>
/cx set rebuildrate=<1..5>
/cx show rebuildmode

/cx show selftest

Background tasks allow you to schedule a regular time when they occur.

Selftest is one of the supported background tasks. Rebuild and verify are other background tasks for which there are separate schedules. Migrate and initialize are additional background tasks that follow the same schedule as rebuild. For each background task, up to seven time periods can be registered, known as slots 1 through 7. Each task schedule can be managed by a set of commands including **add**, **del**, show and **set** a task. Background task schedules have a slot id, start-day-time, duration, and status attributes.

For details about setting up a schedule for background selftest tasks, see “Setting Up a Selftest Schedule” on page 61.

Selftest activity provides Self Monitoring Analysis and Reporting (SMART). Self tests are checked once each day by default.

SMART activity instructs the controller to check certain SMART-supported thresholds by the disk vendor. An AEN is logged to the alarms page if a drive reports a SMART failure.

The **show selftest** command shows the current selftest background task schedule as illustrated below. Selftests do not have a time duration since they are completed momentarily.

```
//localhost> /c1 show selftest
Selftest Schedule for Controller /c1
========================================================
Slot    Day     Hour             SMART
--------------------------------------------------------
1       Sun     12:00am         enabled
2       Mon     12:00am         enabled
3       Tue     12:00am         enabled
4       Wed     12:00am         enabled
5       Thu     12:00am         enabled
6       Fri     12:00am         enabled
7       Sat     12:00am         enabled
```

/cx show verify

3ware controllers support background tasks and allow you to schedule a regular time when they occur. Verify is one of the supported background tasks, and the **/c*x* show verify** command shows you the current verify schedule.

The Verify Task Schedule can be either *basic* or *advanced*. (For details about the associated commands, see "/cx set verify=advanced|basic|1..5" on page 66).

The *basic* Verify Task Schedule sets a single, weekly day and time for verification to occur, and is designed for use with the autoverification of units. The *advanced* Verify Task Schedule provides more control, with settings for a maximum of seven time periods or slots known as 1 through 7.

For the advanced Verify Task Schedule, up to seven time periods can be registered, known as slots 1 through 7. You can manage this task schedule with a set of commands including **add**, **del**, **show,** and **set** a task. When you add a schedule you can set start day, start hour, and duration attributes. Rebuilds, migrations, and initializations follow similar schedule formats.

For details about setting up a schedule for verify tasks, see "Setting Up a Verify Schedule" on page 60.

For details about setting a basic verify schedule, see "/cx set verify=basic [pref=ddd:hh]" on page 66.

Verify activity verifies all units based on their unit type. Verifying RAID 1 involves checking that both drives contain the same data. On RAID 5 and RAID 6, the parity information is used to verify data integrity. If any parity mismatches are found, the array is automatically background initialized. RAID 10 and 50 are composite types and follow their respective array types. Nonredundant units such as RAID 0 and single are also verified verified by doing a media scan and reporting an unreadable sectors. (For information about the initialization process, see the user guide that came with your 3ware RAID controller.)

Example 1: **Advanced Verify Schedule**

When verify is enabled and set to *advanced*, the **show verify** command shows the scheduling as follow:

```
//localhost> /c1 show verify
 Verify Schedule for Controller /c1

Verify Schedule for Controller /c1
========================================================
Slot    Day     Hour            Duration        AdvVerify
--------------------------------------------------------
1       Sun     12:00am         24 hr(s)        on
2       Mon     12:00am         24 hr(s)        on
3       Tue     12:00am         24 hr(s)        on
4       Wed     12:00am         24 hr(s)        on
5       Thu     12:00am         24 hr(s)        on
6       Fri     12:00am         24 hr(s)        on
7       Sat     12:00am         24 hr(s)        on
```

Example 2: Basic Verify Schedule

When verify is set to *basic*, the **/cx show verify** command shows the basic verify schedule as illustrated below:

```
 //localhost> /c1 show verify
 /c1 basic verify weekly preferred start: Friday 12:00am
```

/cx show verifymode

The **/*cx* show verifymode** shows the current rebuild mode setting of the specified controller. The verify mode has two settings: **Adaptive** and **Low latency**.

Verify mode works with the verify task rate (see “/cx show verifyrate” on page 52).

The **Adaptive** setting is the default verify mode. It allows the firmware to adjust the interaction of verify tasks with host I/Os to maximize the speed of both host I/O and verify tasks. The **Low Latency** setting minimizes latency (delay) in reading data from a RAID unit by slowing down the verify task process. For some applications, such as video server applications and audio applications, it is important to minimize the latency of read commands, so that users do not perceive a lag when viewing video or listening to audio.

For a more complete discussion of background task modes, see “Working with the Background Task Mode” in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*

Example:

```
//localhost> /c1 show verifymode
/c1 Verify background task mode = Low Latency
```

Related commands:

/cx set verifymode=<adaptive|lowlatency>

/cx set verifyrate=<1..5>

/cx show verifyrate

/cx show verifyrate

The **/*cx* show verifyrate** command shows the current verify task rate of the specified controller. The verify task rate sets the verify execution priority relative to I/O operations.

This task rate is in the range of [1..5], where 5 denotes the setting of fastest background task and slowest I/O, as follows:

5 = fastest verify; slowest I/O

4 = faster verify; slower I/O

3 = balanced between verify and I/O

2 = faster I/O; slower verify

1 = fastest I/O; slowest verify

Example:

```
//localhost> /c1 show verifyrate
/c1 Verify task rate = 4 (faster verify; slower I/O)
```

Related commands:

/cx set verifymode=<adaptive|lowlatency>

/cx set verifyrate=<1..5>

/cx show verifymode

/cx add type=<RaidType> disk=<p:-p> [stripe=size] [noscan] [group=<3|4|5|6|7|8|9|10|11|12|13|14|15|16>] [nowrcache] [nordcache| rdcachebasic] [autoverify] [noqpolicy] [ignoreECC] [name=string] [storsave=<protect|balance|perform>] [rapidrecovery=all|rebuild|disable] [v0=n|vol=a:b:c:d]

The **/cx add** command allows you to create a unit on the specified controller. You specify *RAIDType*, *disks*, and optional *stripe* size. By default, the new unit has the following options: 256k stripe size, autoverify is enabled, write cache is enabled, Intelligent read cache is enabled, a storsave policy of balance is set, a Rapid RAID Recovery policy of *All* is set, and the drive queuing policy is enabled. In case of RAID 50, you can also specify the layout of the unit by specifying the number of disks per disk group with the *group* attribute.

Note: By default, write cache is enabled. However, if the controller does not have a BBU installed, a message warns you that without a BBU, you could experience a possible loss of data in the event of a power failure.

Enabling write cache improves write performance greatly, but you are at risk of losing data if a power failure occurs when data is still in the cache. A recommended practice is to use a BBU and uninterruptible power supply (UPS) to safeguard against power loss.

/cx is the controller name, for example /c0, /c1, and so forth.

type=*RaidType* specifies the type of RAID unit to be created. Possible unit types include raid0, raid1, raid5, raid6 , raid10, raid50, single, and spare.

Example: `type=raid5`

Newly created units automatically receive a unique serial number. In addition, you can assign the unit a name.

Note: You cannot change the unit’s serial number.

disk=*p:-p* consists of a list of ports or virtual ports (disks) to be used in the construction of the specified unit type. You can specify one or more ports. Indicate multiple ports by using a colon (:). Indicate a range of ports by using a dash. You can combine dashes and colons, if appropriate. For example `disk=0:1:2-5:9:12` indicates port 0, 1, 2 through 5 (inclusive), 9, and 12.

stripe=*size* consists of the stripe size to be used. The following table illustrates the supported and applicable stripes on unit types. Stripe size units are in KB (kilobytes). If no stripe size is specified, 256K is used by default, if applicable. If you need to change the stripe size after the unit is created, you can do so by either migrating or recreating the unit.

Table 6: Supported Stripe Sizes (KB)

R0	R1	R5	R6	R10	R50	Single
16	N/A	16		16	16	N/A
64	—	64	64	64	64	—
256	—	256	256	256	256	—

group=*3*|*4*|*5*|*6*|*7*|*8*|*9*|*10*|*11*|*12/13*|*14*|*15*|*16* indicates the number of disks per group for a RAID 50 type. (You can use this attribute only when type=raid50.)

Note that a RAID 50 is a multitier array. At the bottom-most layer, N number of disks per group are used to form the RAID 5 layer. These RAID 5 arrays are then integrated into a RAID 0. This attribute allows you to specify the number of disks in the RAID 5 level. Valid values are 3 through 16. However, no more than 4 RAID 5 subunits are allowed in a RAID 50 unit.

A sufficient number of disks are required for a given pattern or disk group. For example, given 6 disks, specifying 3 creates 2 RAID 5 arrays. With 12 disks, specifying 3 creates 4 RAID 5 arrays under the RAID 0 level. With only 6 disks, a grouping of 6 is not allowed because you are basically creating a single RAID 5 unit.

The default RAID 50 grouping varies, based on number of disks. For 6 and 9 disks, default grouping is 3. For 8 disks, the default grouping is 4. For 10 disks, the default grouping is 5, and for 12 disks, the disks can be grouped into groups of 3, 4, or 6 drives (the group of 4 drives is set by default because it provides the best of net capacity and performance). For 15 disks, the disks can be grouped into 5 drives (3 drive groups would make 5 subunits; you can have a maximum of 4 subunits). For 16 disks, the disks can be grouped into groups of 4 or 8 drives.

noscan attribute instructs the CLI not to notify the operating system of the creation of the new unit. By default, the CLI informs the operating system.

nowrcache attribute instructs the CLI to disable the write cache on the newly created unit. By default, the write cache is enabled for best performance. If there is not a BBU or UPS installed, you can avoid the possibility of data loss in the event of a power loss, by setting nowrcache.

nordcache attribute instructs the CLI to disable the read cache on the newly created unit. Enabling the read cache increases performance. The **rdcachebasic** attribute instructs the CLI to set the read cache mode on the newly created unit to Basic. By default (if you do not set a read cache attribute), the read cache mode is set to Intelligent. For more information, see "/cx/ux set rdcache=basic|intelligent|off" on page 82.

autoverify attribute enables the autoverify attribute on the unit that is to be created. For more details on this feature, see "/cx/ux set autoverify=on|off" on page 81. Autoverify is set to *on* by default for a new unit.

noqpolicy attribute instructs the CLI to disable the drive command queuing on the newly created unit. The default is for the qpolicy to be on (in other words, noqpolicy is not specified). When drive command queuing is disabled, the performance of a unit might be degraded. For a spare unit, drive queuing is not used, so the noqpolicy cannot be set. During unit creation, specifying ***noqpolicy*** for a spare returns an error. (If the spare unit is used to rebuild a degraded unit, the spare unit adopts the qpolicy of the degraded unit.) For more about drive queuing, see "/cx/ux show qpolicy" on page 75 and "/cx/ux set qpolicy=on|off" on page 84.

ignoreECC attribute enables the ignoreECC/OverwriteECC attribute on the unit that is to be created. For more details on this feature, see "/cx/ux set ignoreECC=on|off" on page 83. IgnoreECC applies only to redundant units (RAID 1, 5, 6, 10 and 50).

name=*string* attribute allows you to name the new unit. The string can be up to 21 characters and cannot contain spaces. To use reserved characters (<, >, !, &, etc.), put double quotes (" ") around the name string. You can change the name after the unit has been created. For more information, see *"/cx/ux set name=string" on page 83* and "/cx/ux show name" on page 75.

storsave=protect|balance|perform attribute allows you to set the storsave policy of the new unit For more information, see "/cx/ux set storsave=protect|balance|perform [quiet]" on page 84.

rapidrecovery=*all|rebuild|disable* attribute specifies the Rapid RAID Recovery setting for the unit being created. Rapid Raid Recovery can accelerate the rebuild process, and it can accelerate initialize and verify tasks that might occur in response to an unclean system shutdown. Setting this option to *all* applies this policy to both these situations. Setting it to *rebuild* applies it only to rebuild tasks. If the policy is set to *disable*, then the time required to complete these tasks remains unchanged.

Notes: After the **rapidrecovery** policy has been disabled for a unit, it cannot be changed again.

There is some system overhead from setting rapidrecovery to *all.* If you have a BBU, you can set rapid recovery to *rebuild* because a BBU provides protection against data loss in the event of an unclean shutdown.

Rapid RAID Recovery is not supported over migration.

v0=*n* or **vol=*a:b:c:d*** can be used to divide the unit up into multiple volumes.

v0=*n* can be used if you only want two volumes, in which case **v0=*n*** is used to define the size of the first volume, and the second volume uses the remaining space. One way in which this can be useful is if you want to create a special volume to function as a boot volume, with a separate volume for data.

vol=*a:b:c:d* can be used to specify sizes for up to four volumes.

Use values that are positive integers in units of gigabytes (GB), with a maximum of 32 TB. If you specify a size that exceeds the size of the unit, the volume is left “uncarved.”

Both **v0=*n*** or **vol=*a:b:c:d*** work with autocarving, if that feature is enabled. When autocarving is used, **v0=*n*** and **vol=*a:b:c:d*** are used to specify the size of the first few volumes, after which the autocarve size is used for additional volumes. (For more about autocarving, see “/cx set autocarve=on|off” on page 68 and “/cx set carvesize=<1024..32768>” on page 69.)

Note: If the total size of the specified volumes (up to four) exceeds the size of the unit, the volumes that exceeded the array’s size boundary are not carved.

Example of RAID 5 unit created with first volume set to 10 GB:

```
//localhost> /c0 add type=raid5 disk=2-5 v0=10
Creating new unit on Controller /c0 ... Done.
The new unit is /c0/u0.
Setting write cache=ON for the new unit ... Done.
Setting default Command Queuing Policy for unit /c0/u0 to [on]
... Done.
```

After the unit creation, a subsequent **show** command for the unit shows the the volume sizes:

```
//localhost> /c0/u0 show

Unit    UnitType  Status %RCmpl %V/I/M VPort  Stripe Size(GB)
--------------------------------------------------------------
u0       RAID-5   OK      -       -      -     256K    1117.56
u0-0     DISK     OK      -       -      p2    -       372.519
u0-1     DISK      OK      -       -      p3    -      372.519
u0-2     DISK      OK      -       -      p4    -      372.519
u0-3     DISK      OK      -       -      p5    -      372.519
u0/v0    Volume    -       -       -      -     -      10
u0/v1    Volume    -       -       -      -     -      1107.56
```

Example of RAID 0 unit created with volume sizes set to 2000, 500, 1024, and 700 GB:

The example below combines autocarving and **vol=*a:b:c:d***. Notice that the last volume (u0/v5) is odd-sized (247.188 GB).

Volumes 0 through 3 are carved using the first four sizes, as specified. Volumes 4, 5, and 6 are the autocarved volumes (1024 GB each). Volume 6 is the remainder of the carve size.

```
 //localhost> /c2 add type=raid0 disk=0:1:2:4:5:6:
7 vol=2000:500:1024:700
Creating new unit on controller /c2 ...  Done. The new unit is /
c2/u0.
Setting default Command Queuing Policy for unit /c2/u0 to [on]
... Done.
Setting write cache=ON for the new unit ... Done.
```

After the unit creation, a subsequent **show** command for the unit shows the volume sizes:

```
//localhost> /c2/u0 show

Unit     UnitType  Status         %RCmpl  %V/I/M  Port  Stripe  Size(GB)
------------------------------------------------------------------------
u0       RAID-0    OK             -       -       -     256K    6519.19
u0-0     DISK      OK             -       -       p0    -       931.312
u0-1     DISK      OK             -       -       p1    -       931.312
u0-2     DISK      OK             -       -       p2    -       931.312
u0-3     DISK      OK             -       -       p4    -       931.312
u0-4     DISK      OK             -       -       p5    -       931.312
u0-5     DISK      OK             -       -       p6    -       931.312
u0-6     DISK      OK             -       -       p7    -       931.312
u0/v0    Volume    -              -       -       -     -       2000
u0/v1    Volume    -              -       -       -     -       500
u0/v2    Volume    -              -       -       -     -       1024
u0/v3    Volume    -              -       -       -     -       700
u0/v4    Volume    -              -       -       -     -       1024
u0/v5    Volume    -              -       -       -     -       1024
u0/v6    Volume    -              -       -       -     -       247.188
```

/cx rescan [noscan]

The **/cx rescan** command instructs the controller to rescan all ports or vports, and phys and reconstitute all units. The controller updates its list of disks, and attempts to read every Disk Configuration Block (DCB) in order to reassemble its view of logical units. Any newly found units or drives are listed.

noscan is used to prevent the operating system from being notified of the unit discovery. The default is to inform the operating system.

Note: If you are adding new drives, add them physically before issuing the rescan commands. If you want to hot-swap drives without first powering down the system, use hot-swap bays. This helps prevent system hangs and electrical damage.

Example:

```
 //localhost> /c1 rescan
```

```
Rescanning controller /c1 for units and drives ...Done
Found following unit(s): [/c1/u3]
Found following drive(s): [/c1/p7, /c1/p8]
```

/cx commit

The **/cx commit** command applies only to the Windows operating system. It commits all changes if a faster shutdown method is needed when running certain database applications. This command has no effect and is not required with other operating systems such as Linux and FreeBSD.

/cx flush

The **/cx flush** command forces the controller to write all cached data to disk for the specified controller.

/cx update fw=filename_with_path [force]

The **/cx update** command installs the specified firmware image to the corresponding controller.

Note: Before issuing this command, copy the firmware image to the system that contains your 3ware controller. You can obtain the firmware image from the LSI website: http://www.lsi.com/channel/ChannelDownloads.

Important: Before you update the firmware on your controller, please follow these recommendations:

1) Back up your data. Updating the firmware can render the device driver and/or management tools incompatible.

2) Make sure you have a copy of the current firmware image so that you can roll back to it, if required.

3) Close all applications before beginning the update of the firmware.

fw=*filename_with_path* attribute allows you to specify the firmware image file name along with its absolute path.

Note: *filename_with_path* must not have spaces in the directory names of its path (as Windows allows).

The new image specified by this *filename_with_path* is checked for compatibility with the current controller, current driver, and current application versions. A recommendation is then made as to whether an update is needed, and you are asked to confirm whether you want to continue. If you confirm that you want to continue, the new firmware image is downloaded to the specified controller.

Reboot the system so that the new firmware image takes effect.

> **Note:** The prom image number vary for different controllers. Prom0006.img is for the 9650SE, prom0008.img is for the 9690SA, and prom0011.img is for the 9750.

Example:

```
 //localhost> /c0 update fw=/tmp/prom0006.img
Warning: Updating the firmware can render the device driver and/or management
tools incompatible. Before you update the firmware, it is recommended that
you:

1) Back up your data.
2) Make sure you have a copy of the current firmware image so that you can
roll back, if necessary.
3) Close all applications.

 Examining compatibility data from firmware image and /c0 ...
 Done.
 New-Firmware        Current-Firmware    Current-Driver    Current-API
 ----------------------------------------------------------------------
 FE9X 3.05.00.005    FE9X 3.05.00.005    2.26.04.007       2.01.00.008

 Current firmware version is the same as the new firmware.
 Recommendation: No need to update.

 Given the above recommendation...
 Do you want to continue ? Y|N [N]: y
 Downloading the firmware from file /tmp/prom0006.img ... Done.
 The new image will take effect after reboot.
```

The **force** attribute is optional. If you include it, the warning message is suppressed, as well as the prompt to proceed. Compatibility checks are not bypassed. If the image to be downloaded is not compatible, an error message is shown. If the image to be downloaded is compatible, a message indicates the downloading of the image.

/c*x* add rebuild=ddd:hh:duration

The **/cx add rebuild** command adds a new task slot to the Rebuild Task Schedule on the day *ddd* (where ddd is Sun, Mon, Tue, Wed, Thu, Fri, or Sat), at the hour *hh* (range 0 .. 23), for a duration of *duration* (range 1 .. 24) hours. A maximum of seven rebuild task slots can be included in the schedule. This command fails if an (empty) task slot is not available.

Example:

```
 //localhost> /c1 add rebuild=Sun:16:3
Adding scheduled rebuild to slot 7 for [Sun, 4:00PM, 3hr(s)] ... Done
```

In this example, a rebuild task slot is added to the schedule so that rebuilds can be executed on Sundays at 16 hours (4:00 PM) for a duration of 3 hours.

Setting Up a Rebuild Schedule

Setting up a rebuild schedule requires several steps, and several different CLI commands in addition to **/c*x* add rebuild**.

To set up the rebuild schedule, follow this process:

1 Use the **/c*x* show rebuild** command to show the current schedule for rebuild tasks.

2 If any of the scheduled tasks do not match your desired schedule, use the **/c*x* del rebuild** command to remove them.

3 Use the **/c*x* add rebuild** command to create the rebuild schedule slots you want (described above.)

4 Use the **/c*x* set rebuild=enable** command to enable the schedule (this enables all rebuild schedule slots).

/c*x* add verify=ddd:hh:duration

The **/cx add verify** command adds a new task slot to the Verify Task Schedule on the day *ddd* (where ddd is Sun, Mon, Tue, Wed, Thu, Fri, or Sat), at hour *hh* (range 0 .. 23), for a duration of *duration* (range 1 .. 24) hours. A maximum of seven verify task slots can be included in the schedule. This command fails if an (empty) task slot is not available.

> **Note:** This Verify Task Schedule is used when /c*x* set verify=advanced. If you prefer a simpler verification schedule, consider using the ***/cx* set verify=basic** command to specify a weekly day and time and make sure that the autoverify policy is enabled for your RAID units. For more information, see “/cx set verify=basic [pref=ddd:hh]” on page 66.

Example:

```
//localhost> /c1 add verify=Sun:16:3
Adding scheduled verify to slot 3 for [Sun, 4:00PM, 3hr(s)] ... Done.
```

In this example, a verify task slot is added to the schedule so that verifies can be executed on Sundays at 16 hours (4:00 PM) for a duration of 3 hours.

Setting Up a Verify Schedule

Setting up a verify schedule requires several steps, and several different CLI commands in addition to **/cx add verify.**

To set up a verify schedule, follow this process:

1 Use the **/c*x* show verify** command to show the current schedule for verify tasks.

2. Use the **/c*x* del verify** command to remove any of the scheduled tasks which do not match your desired schedule.

3. Use the **/c*x* add verify** command to create the verify schedule slots you want (described above.)

4. Use the **/c*x* set verify=enable** command or the **/c*x* set verify=advanced** to enable the schedule (this enables all rebuild schedule slots).

5. Use the **/c*x*/ux set autoverify=on** command to turn on autoverify for each unit you want to follow the schedule.

Note: If you do not enable autoverify for units or start a verification manually, verifies will not run during your verify task schedule even if you use the **/c*x* set verify=basic** command, the **/c*x* set verify=advanced** command, or the **/cx set verify=enabled** command to enable the verify schedule.

/c*x* add selftest=ddd:hh

The **/cx add selftest** command adds a new task slot to the Selftest Task Schedule on the day *ddd* (where ddd is Sun, Mon, Tue, Wed, Thu, Fri, and Sat), at hour *hh* (range 0 .. 23). Notice that selftest runs to completion and, as such, no duration is provided. A maximum of seven selftest task slots can be included in the schedule. This command fails if an (empty) task slot is not available.

In order to run at the specified times, selftests must be enabled, using the command “/cx set selftest=enable|disable” on page 68.

Note: Adding selftests to the schedule is different from adding slots to the rebuild and verify schedules. Adding a selftest directly schedules the test and defines a time slot during which the task can occur.

Example:

```
//localhost> /c1 add selftest=Sun:16
Adding scheduled verify to slot 7 for [Sun, 4:00PM] ... Done.
```

In this example, a selftest background task is scheduled to run on Sundays at 16 hours (4:00 PM).

Setting Up a Selftest Schedule

Setting up a selftest schedule requires several steps, and several different CLI commands in addition to **/cx add selftest.**

To set up the selftest schedule, follow this process:

1. Use the **/c*x* show selftest** command to show the current schedule for selftest tasks.

2 Use the **/c*x* del selftest** command to remove any of the scheduled tasks which do not match your desired schedule.

3 Use the **/c*x* add selftest** command to create the selftest schedule slots you want (described above.)

4 Use the **/c*x* set selftest=enable** command to enable the schedule (this enables all selftest schedule slots).

/c*x* del rebuild=slot_id

The **/cx del rebuild** command removes the rebuild background task slot *slot_id* from the Rebuild Task Schedule.

Example:

```
//localhost> /c1 del rebuild=2
```

removes the rebuild background task in slot 2.

/c*x* del verify=slot_id

The **/cx del verify** command removes the verify background task slot *slot_id* from the Verify Task Schedule.

Example:

```
//localhost> /c1 del verify=3
```

removes verify background task in slot 3.

/c*x* del selftest=slot_id

The **/cx del selftest** command removes (or unregisters) the selftest background task slot *slot_id* from the Self Test Task Schedule.

Example:

```
//localhost> /c1 del selftest=3
```

Removes the selftest background task in slot 3.

/c*x* set dpmstat=on|off

The **/cx set dpmstat** command allows you to enable or disable the Drive Performance Monitor (DPM).

By setting **dpmstat** to *on*, you can enable the gathering of statistics for drives when I/O is running. These statistics can be helpful when troubleshooting performance problems.

You can see whether the Performance Monitor is currently running and also see a statistics summary by using the command "/cx show dpmstat [type=inst|ra|ext]" on page 36.

For a description of each of the statistics that can be gathered and viewed, see "/cx/px show dpmstat type=inst|ra|lct|histdata|ext" on page 98.

DPM is disabled by default since there is overhead in maintaining the statistics. DPM is also disabled following a reboot or powerup.

Note that turning off DPM does not clear the statistical data that has been recorded. To clear the data, use the command "/cx/px set dpmstat=clear [type=ra|lct|ext]" on page 101.

For more information, see "Drive Performance Monitoring" in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Example:

```
//localhost> /c0 set dpmstat=off
Setting Drive Performance Monitoring on /c0 to [off]... Done.
```

/cx set rebuild=enable|disable|1..5

The **/cx set rebuild** command enables or disables the Rebuild Task Schedule defined for controller **/cx** and sets the priority of rebuild versus I/O operations. When the schedule is enabled, rebuild tasks only run during the time slots scheduled for rebuilds. If a rebuild is taking place when the schedule is enabled, it pauses until the next scheduled time.

The priority of rebuild versus I/O operations is specified with [1..5], where 5 is more resources and 1 the least. Setting the value to 5 gives maximum processing time to rebuilds rather than I/O. Setting the value to 1 gives maximum processing time to I/O rather than rebuilds.

5 = fastest rebuild; slowest I/O

4 = faster rebuild; slower I/O

3 = balanced between rebuild and I/O

2 = faster I/O; slower rebuild

1 = fastest I/O; slowest rebuild

/cx set rebuildmode=<adaptive|lowlatency>

The **/cx set rebuildmode** command sets the rebuild mode. The rebuild mode has two settings: **Adaptive** and **Low Latency**.

Rebuild mode works with the rebuild task rate (see "/cx set rebuildrate=<1..5>" on page 64).

The **Adaptive** setting is the default rebuild mode. It allows the firmware to adjust the interaction of rebuild tasks with host I/Os to maximize the speed of both host I/O and rebuild tasks. When a rebuild background task is active, if the task rate is set to a fast rebuild rate (i.e., low I/O rate), the system latency increases and performance can be negatively affected, especially for applications such as video server applications and audio applications. The **Low Latency** setting minimizes the latency (delay) in reading data from the RAID unit by slowing the rebuild task, which allows host Reads to complete, thus improving performance.

For a more complete discussion of background task modes, see “Working with the Background Task Mode” in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Important: Setting rebuildmode to 'low latency' and rebuildrate to '5' is not recommended when I/O is active, because in that case, the rebuild as a background task might never complete. Use this setting with care.

Example:

```
//localhost> /c1 set rebuildmode=lowlatency
Setting Rebuild background task mode of /c1 to [lowlatency] ... Done.
```

Related commands:

/cx show rebuildmode

/cx set rebuildrate=<1..5>

/cx show rebuildrate

/cx set rebuildrate=<1..5>

The **/cx set rebuildrate** command sets the rebuild task rate of the specified controller. The rebuild task rate sets the rebuild execution priority relative to I/O operations.

This task rate is in the range of [1..5], where 5 denotes the setting of fastest background task and slowest I/O, as follows:

5 = fastest rebuild; slowest I/O

4 = faster rebuild; slower I/O

3 = balanced between rebuild and I/O

2 = faster I/O; slower rebuild

1 = fastest I/O; slowest rebuild

Example:

```
//localhost> /c1 set rebuildrate=2
Setting Rebuild background task rate on /c1 to [2] (faster I/O) ... Done.
```

Related Commands

/cx show rebuildmode

/cx set rebuildmode=<adaptive|lowlatency>

/cx show rebuildmode

/cx set verify=enable|disable|1..5

The **/*cx* set verify** command enables or disables the advanced Verify Task Schedule defined for controller **/*cx*** and (when enabled) sets the priority of verification versus I/O operations. When the Verify Task Schedule is enabled, verify tasks are only run during the time slots identified in the verify task schedule. If a verify is taking place when the schedule is enabled, it pauses until the next scheduled time.

The priority of verify versus I/O operations is specified with [1..5], where 5 is more resources and 1 the least. Setting this value to 5 invokes fastest verify, and 1 invokes fastest I/O.

5 = fastest verify; slowest I/O

4 = faster verify; slower I/O

3 = balanced between verify and I/O

2 = faster I/O; slower verify

1 = fastest I/O; slowest verify

Enabling verify with this command is equivalent to using the **/*cx* set verify=advanced** command, while disabling verify with this command is equivalent to using the **/*cx* set verify=basic** command without specifying a preferred start day and time (the default of Friday at midnight is used.) For more information, see “/cx set verify=advanced|basic|1..5” on page 66.

Note: If you want verifications to occur automatically, when enabling the verify schedule, you must also enable the autoverify setting for the units to be verified. For more information see “/cx/ux set autoverify=on|off” on page 81.

You can view the verify schedule to be enabled or disabled with the command “/cx show verify” on page 50. You can add verify task slots to the schedule by using the command “/cx add verify=ddd:hh:duration” on page 60. You can remove verify task slots from the schedule with the “/cx del verify=slot_id” on page 62.

/cx set verify=advanced|basic|1..5

The **/cx set verify=advanced|basic|1..5** command is effectively the same as the **set verify=enabled|disabled** command. Setting verify to *advanced* enables the advanced Verify Task Schedule, which can include a series of up to seven days and times. Setting verify to *basic* creates a weekly schedule with one specific day and time, and disables the series of scheduling slots associated with the advanced Verify Task Schedule. For more about the basic schedule, see "/cx set verify=basic [pref=ddd:hh]", below.

The priority of verify versus I/O operations is specified with [1..5], where 5 is more resources and 1 the least. Setting this value to 1 invokes fastest I/O, and 5 invokes fastest verify.

For information on the verify schedule, see "/cx add verify=ddd:hh:duration" on page 60

/cx set verify=basic [pref=ddd:hh]

Using the **verify=basic** option allows you to set a basic verify schedule that starts each week at the same date and time. With **verify=basic**, you can specify your preferred day and time, or you can omit the day and time and use the default of Friday at midnight.

When you set **verify=basic**, the series of scheduled days and times associated with the advanced Verify Task Schedule is ignored.

Verify=basic is intended to be used with the autoverify policy for RAID units to insure that a verification of the unit occurs on a regular basis.

Example:

```
 //localhost> /c3 set verify=basic pref=Fri:23

 Setting /c3 basic verify preferred start time to [Fri, 11:00PM]
... Done.
```

/cx set verifymode=<adaptive|lowlatency>

The **/cx set verifymode** command sets the verify mode. The verify mode has two settings: **Adaptive** and **Low Latency**.

Verify mode works with the verify task rate (see "/cx set verifyrate=<1..5>" on page 67).

The **Adaptive** setting is the default verify mode. It allows the firmware to adjust the interaction of verify tasks with host I/Os to maximize the speed of both host I/O and verify tasks.

When a verify background task is active, if the task rate is set to a fast verify rate (i.e., low I/O rate), the system latency increases and performance can be negatively affected, especially for applications such as video server applications and audio applications. The **Low Latency** setting minimizes the latency (delay) in reading data from the RAID unit by slowing down the rebuild task, which allows host Reads to complete, thus improving performance.

For a more complete discussion of background task modes, see "Working with the Background Task Mode" in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

⚠ **Important:** Setting verifymode to *low latency* and verifyrate to *5* is not recommended when I/O is active because, in that case, the verify as a background task might never complete. Use this setting with care.

Example:

```
 //localhost> /c1 set verifymode=lowlatency
 Setting Verify background task mode of /c1 to [lowlatency] ... Done.
```

Related commands:

/cx show verifymode
/cx set verifyrate=<1..5>
/cx show verifyrate

/cx set verifyrate=<1..5>

The **/cx set verifyrate** command sets the verify task rate of the specified controller. The verify task rate sets the verify execution priority relative to I/O operations.

This task rate is in the range of [1..5], where 5 denotes the setting of fastest background task and slowest I/O, as follows:

5 = fastest verify; slowest I/O

4 = faster verify; slower I/O

3 = balanced between verify and I/O

2 = faster I/O; slower verify

1 = fastest I/O; slowest verify

Example:

```
 //localhost> /c1 set verifyrate=2
 Setting Verify background task rate on /c1 to [2] (faster I/O)
... Done.
```

Related commands:

/cx show verifyrate
/cx set verifymode=<adaptive|lowlatency>
/cx show verifymode

/cx set selftest=enable|disable

The **/cx set self-test** command enables or disables the specified controller's SMART self test..

Example:

```
 //localhost> /c0 selftest=enable
```

enables the selftest on controller c0.

/cx set spinup=nn

The **/cx set spinup** command allows you to set a controller-based Disk Spinup Policy that specifies how many drives can spin up at one time. The value must be a positive integer between 1 and the number of disks/ports supported on the controller (4, 8, or 12). The default is 1.

This policy is used to stagger spinups of disks at boot time in order to spread the power consumption on the power supply. For example, given a spinup policy of two, the controller spins up two disks at a time, pause, and then spin up another two disks. The amount of time to pause can be specified with the Spinup Stagger Time Policy (/cx set stagger=nn).

Not all drives support staggered spinup. If you enable staggered spinup and have drives that do not support it, the setting is ignored.

/cx set stagger=nn

The **/cx set stagger** command allows you to set a controller-based Disk Spinup Stagger Time Policy that specifies the delay between spin-ups. The value must be a positive integer between 0 s and 60 s, where *s* is *seconds*. This policy, with Disk Spinup Policy, specifies how the controller spins up disks at boot time. The default is 6 s.

/cx set autocarve=on|off

The **/cx set autocarve** command allows you to set the autocarve policy to *on* or *off***.** By default, autocarve is *off*.

When the autocarve policy is set to *on*, any unit larger than the carvesize is created or migrated into one or more carvesize volumes and a remaining volume. Each volume can then be treated as an individual disk with its own file system. The default carvesize is 2 TB.

This command is useful for operating systems limited to 2-TB file systems.

For example, using the 2-TB default carvesize, a 3-TB unit is configured into one 2-TB volume and one 1-TB volume. A 5-TB unit is configured into two 2-TB volumes and one 1-TB volume.

When autocarve policy is set to *off*, all new units are created as a single large volume. If the operating system can only recognize up to 2-TBs, space over 2-TB is not available.

Example:

```
 //localhost> /c0 set autocarve=on
 Setting Autocarving Policy on /c0 to on ... Done.
```

/cx set carvesize=<1024..32768>

The **/cx set carvesize** command allows you to set the carve size in GB. This command works together with autocarve. See “/cx set autocarve=on|off” above for details.

Example:

```
//localhost> /c0 set carvesize=2000
 Setting Auto-Carving Size on /c0 to 2000 GB ... Done.
```

/cx set autorebuild=on|off

The **/cx set autorebuild** command turns the Autorebuild policy on or off. By default, autorebuild is on.

If the policy is on, the firmware selects drives to use for rebuilding a degraded unit using the following priority order.

1. Smallest usable spare.

2. Smallest usable unconfigured (available) drive.

3. Smallest usable failed drive.

Note: Failed drives can be drives that have mechanically failed, or they can be drives that have been disconnected from the controller long enough to cause a drive timeout error and for the controller to classify them as failed.

Enabling Autorebuild allows you to add a drive to the controller and have it be available for a rebuild as soon as you tell the controller to rescan, without having to specify it as a spare. It also means that if you accidentally disconnect a drive (causing the controller to respond to it as a failed drive) and then reconnect it, the controller automatically tries to use it again.

If the policy is off, spares are the only candidates for rebuild operations.

Example:

```
//localhost> /c0 set autorebuild=enable
Setting Auto-Rebuild Policy on /c0 to enable ... Done.
```

/cx set autodetect=on|off disk=<p:-p>|all

The **/cx set autodetect** command is associated with the staggered spinup feature when hot-swapping drives. When staggered spinup is enabled (see command **/cx set spinup** and **/cx set stagger**), during a reset or power on, the controller spins up all detected drives with a delay between each spinup, allowing the spread of power consumption on the power supply. When a drive is hot-swapped, (as opposed to when it has just been powered on or reset), the default behavior of the system is to automatically detect and immediately spin up the drives. This command can change the default behavior and set the controller to do a staggered spinup for hot-swapped drives.

Note: The autodetect setting cannot be shown in CLI, 3DM2, or 3BM.

autodetect=on|off enables or disables automatic detection of drives on the controller’s ports for staggered spin-up.

disk=<p:-p>|all specifies one or many disks (that is, drives, ports, or vports). If a port is empty (no drive is inserted), the echo message of the command refers to a port. If there is already a drive inserted, the message refers to a disk. The following example shows that autodetect has been set to *off* to initiate staggered spin-up during hot-swapping, where port 3 is empty and ports 5 and 6 contain newly-inserted drives.

Example:

```
//localhost>> /c0 set autodetect=off disk=3:5-6
Setting Auto-Detect on /c0 to [off] for port [3] and for disk
[5,6]... Done
```

If **disk=all**, then all of the drives or ports for that controller are specified. This setting is only for direct attached drives and has no effect on drives behind an expander.

Example:

```
//localhost>> /c0 set autodetect=off disk=all
Setting Auto-Detect on /c2 to [off] for all disks/ports... Done.
```

Usage Scenario:

If you are hot-plugging a large number of drives at the same time and are concerned that you might overload the power supply, you can use this command as follows:

1 Issue the command (**set autodetect=off**) to disable automatic detection of the ports for staggered spinup.

2 Remove the drives from the specified ports if the ports are not empty.

3 Insert (or replace) the drives at the ports specified.

4 Issue the command (**set autodetect=on**) to enable autodetect of the ports with the newly inserted drives.

The preceding steps spin up the newly inserted drives in a staggered manner. Please note that the command takes longer for ports that do not have drives inserted, since the controller allows time for the empty ports to respond.

Unit Object Commands

Unit Object commands provide information and perform actions related to a specific unit, such as `/c0/u1` (unit 1 on controller 0). You can use unit object commands for a number of tasks, for example, to see the rebuild status, verify status, or initialize status of a unit; to start, stop, and resume verifies; to start and stop rebuilds; to set policies for the unit, and to perform other tasks related to the unit.

Syntax

```
/cx/ux show
/cx/ux show attribute [attribute ...] where attributes are:
    autoverify|initializestatus|wrcache|rdcache|name|
    qpolicy|rebuildstatus |serial|status|verifystatus|
    storsave|rapidrecovery |volumes|ignoreECC |identify|
    parity
/cx/ux show all
/cx/ux start rebuild disk=<p:-p...> [ignoreECC]
/cx/ux start verify
/cx/ux stop verify
/cx/ux flush
/cx/ux del [noscan] [quiet]
/cx/ux set autoverify=on|off
/cx/ux set wrcache=on|off [quiet]
/cx/ux set rdcache=basic|intelligent|off
/cx/ux set identify=on|off
/cx/ux set ignoreECC=on|off
/cx/ux set qpolicy=on|off
/cx/ux set name=string
/cx/ux set rapidrecovery=all|rebuild|disable [quiet]
```

```
/cx/ux set storsave=protect|balance|perform [quiet]
/cx/ux migrate type=RaidType [disk=p:-p]
    [group=3|4|5|6|7|8|9|10|11|12|13|14|15|16]
    [stripe=size] [noscan] [nocache] [autoverify] RaidType =
    {raid0, raid1, raid5, raid6, raid10, raid50, single}
/cx/ux remove [noscan] [quiet]
```

/cx/ux show

The **/cx/ux show** command shows summary information for the specified unit. If the unit consists of subunits, as in the case of RAID 10 and RAID 50, then each subunit is further presented. If the Autocarving policy was on at the time the unit was created, and the unit is over the carve size, multiple volumes were created and are listed at the end of the summary information. Similarly, if the unit was created with a boot volume, this is also shown as the first volume (v0).

Note: In the output of unit information tables that follows, the column *VPort* might be *Port*, depending on the applicable controller.

Example:

```
//localhost> /c0/u1 show

Unit     UnitType  Status       %RCmpl  %V/I/M  VPort  Stripe  Size(GB)
------------------------------------------------------------------------
u1       RAID-0    OK             -       -       -     64K     3576.06
u1-0     DISK      OK             -       -       p0    -       298.01
u1-1     DISK      OK             -       -       p1    -       298.01
u1-2     DISK      OK             -       -       p2    -       298.01
u1-3     DISK      OK             -       -       p3    -       298.01
u1-4     DISK      OK             -       -       p4    -       298.01
u1-5     DISK      OK             -       -       p5    -       298.01
u1-6     DISK      OK             -       -       p6    -       298.01
u1-7     DISK      OK             -       -       p7    -       298.01
u1-8     DISK      OK             -       -       p8    -       298.01
u1-9     DISK      OK             -       -       p9    -       298.01
u1-10    DISK      OK             -       -       p10   -       298.01
u1-11    DISK      OK             -       -       p11   -       298.01
u1/v0    Volume    -              -       -       -     -       2047.00
u1/v1    Volume    -              -       -       -     -       1529.06
```

One application of the **/cx/u*x* show** command is to determine which subunit of a degraded unit has caused the unit to degrade and which disk within that subunit is the source of degradation. Another application is to determine the source and destination units during a migration.

The unit information shows the percentage completion of the processes associated with the unit with *%RCompl* (percent Rebuild completion) and *%V/I/M* (percent Verifying, Initializing, or Migrating).

Unlike other unit types, RAID 6 units have two parity drives and can tolerate up to two drive failures. As a result, an added notation is used to describe *%RCompl* and *%V/I/M*, and these are (A) and (P). (A) denotes the percentage completion of the active process and (P) denotes that the percentage completion of the paused process.

Example:

```
/localhost> /c0 show unitstatus

Unit  UnitType   Status         %RCmpl  %V/I/M  Stripe  Size(GB) Cache  AVrfy
------------------------------------------------------------------------------
u0    RAID-6     REBUILD-VERIFY 50%(A)  70%(P)  256k     298.22   RiW     OFF
```

In the preceding example, the RAID 6 unit (u0) is in the Rebuild-Verify state. The rebuild is currently active at 50 percent complete, while the verify is paused at 70 percent complete.

For the unit output:

```
//localhost> /c0/u0 show

Unit     UnitType  Status         %RCmpl  %V/I/M   Port  Stripe  Size(GB)
------------------------------------------------------------------------
u0       RAID-6    REBUILD-VERIFY 50%(A)  70%(P)   -     64K     2683.80
u0-0     DISK      OK             -       -        p0    -       298.20
u0-1     DISK      OK             -       -        p1    -       298.20
u0-2     DISK      OK             -       -        p2    -       298.20
u0-3     DISK      REBUILDING     80%     -        p3    -       298.20
u0-4     DISK      OK             -       -        p4    -       298.20
u0-5     DISK      OK             -       -        p5    -       298.20
u0-6     DISK      OK             -       -        p6    -       298.20
u0-7     DISK      OK             -       -        p7    -       298.20
u0-8     DISK      REBUILD-PAUSE  20%     -        p8    -       298.20
u0-9     DISK      OK             -       -        p9    -       298.20
u0-10    DISK      OK             -       -        p10   -       298.20
u0-11    DISK      OK             -       -        p11   -       298.20
```

In the preceding example, the RAID 6 unit (u0) has 2 parity drives. Currently, it has two REBUILDING drives; one is in the active rebuilding state and another is in the paused rebuild state. The unit is also in the paused VERIFY state. Similar to the output of the **/cx show unitstatus** command, the top-level unit status and percentage show the composite unit status and composite rebuild percentage.

/cx/ux show attribute [attribute ...]

The **/cx/ux show attribute** command shows the current setting of one or more specified attributes. If you specify an invalid attribute, the loop terminates. Possible attributes are: initializestatus, name, autoverify, rdcache, wrcache, ignoreECC, identify, qpolicy, parity, rapidrecovery, rebuildstatus, serial, status, storsave, verifystatus, and volumes.

/c*x*/u*x* show autoverify

The **/cx/ux show autoverify** command shows the current autoverify setting of the specified unit.

Example:

```
//localhost> /c0/u0 show autoverify
/c0/u0 Auto Verify Policy = off
```

/c*x*/u*x* show wrcache

The **/cx/ux show wrcache** command shows the current write cache state of the specified unit.

Example:

```
//localhost> /c0/u0 show wrcache
/c0/u0 Write Cache State = on
```

/c*x*/u*x* show rdcache

The **/cx/ux show rdcache** command shows the current read cache state of the specified unit.

The state of the read cache can be either *Basic*, *Intelligent*, or *Off*. This command is supported with all RAID array types. For more information, see “/cx/ux set rdcache=basic|intelligent|off” on page 82

Example:

```
 //localhost> /c0/u0 show rdcache
 /c0/u0 Read Cache = Intelligent
```

/c*x*/u*x* show identify

The **/cx/ux show identify** command is related to the **/cx/ux set identify=on|off** command. It shows the identify status of the specified unit (either on or off).

Example:

```
//localhost> /c0/u0 show identify
/c0/u0 Identify status = on
```

/*cx*/u*x* show ignoreECC

The **/cx/ux show ignoreECC** command shows the current setting of the ignoreECC policy for the specified unit.

Example:

```
//localhost> /c0/u0 show ignoreECC
/c0/u0 Ignore ECC policy = off
```

/*cx*/u*x* show initializestatus

The **/cx/ux show initialize status** command shows the initializestatus (if any) of the specified unit.

Example:

```
 //localhost> /c0/u5 show initializestatus
 /c0/u5 is not initializing, its current state is OK
```

/*cx*/u*x* show name

The **/cx/ux show name** command shows the name (if any) of the specified unit.

Example:

```
 //localhost> /c0/u5 show name
 /c0/u5 name = Joe
```

/*cx*/u*x* show qpolicy

The **/cx/ux show qpolicy** command shows the queue policy set for the drives on unit **/cx**. If the queue policy is on, the firmware utilizes the drive’s queueing feature. However, the queue policy has no effect on drives that do not support native command queueing (NCQ).

For a spare drive, drive queuing is not meaningful or applicable, so this command does not show the queue policy for a spare.

Example:

```
//localhost> /c0/u5 show qpolicy
/c0/u5 Command Queuing Policy = on
```

/*cx*/u*x* show parity

The **/cx/ux show parity** command shows the number of parity drives for the specified unit. This attribute is only applicable or supported for RAID 6 units.

Example:

```
 //localhost /c0/u5 show parity
 /c0/u5 Parity Number = 2
```

/*cx*/u*x* show rapidrecovery

The **/cx/ux show rapidrecovery** command shows the Rapid RAID Recovery policy for the specified unit. This policy can be *all*, *rebuild*, or *disable*.

For information about the policy settings, see the description about the rapidrecovery attribute for the **/cx add** command here on page 53.

Example:

```
//localhost> /c0/u0 show rapidrecovery
/c1/u0 Rapid RAID Recovery policy setting = disable.
```

/*cx*/u*x* show rebuildstatus

The **/cx/ux show rebuildstatus** command shows the rebuildstatus (if any) of the specified unit.

Example:

```
//localhost> /c0/u5 show rebuildstatus
/c0/u5 is not rebuilding, its current state is OK
```

If the unit is in the process of migrating, the command returns the following:

```
//localhost> /c0/u5 show rebuildstatus
/c0/u5 is not rebuilding, its current state is MIGRATING
```

/*cx*/u*x* show serial

The **/cx/ux show serial** command shows the unique serial number of the specified unit.

Example:

```
//localhost> /c0/u5 show serial
/c0/u5 Serial Number = 12345678901234567890
```

/*cx*/u*x* show status

The **/cx/ux show status** command shows the status of the specified unit.

Possible statuses include: OK, VERIFYING, VERIFY-PAUSED, INITIALIZING, INIT-PAUSED, REBUILDING, REBUILD-PAUSED, DEGRADED, MIGRATING, MIGRATE-PAUSED, RECOVERY, INOPERABLE, and UNKNOWN. (Definitions of the unit statuses are available in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.)

Example:

```
//localhost> /c0/u0 show status
/c0/u5 status = OK
```

/c*x*/u*x* show storsave

The **/cx/ux show storsave** command shows the storsave policy on the unit.

For more information see, "/cx/ux set storsave=protect|balance|perform [quiet]" on page 84.

Example:

```
//localhost> /c0/u5 show storsave
/c0/u5 Command Storsave Policy = protect
```

/c*x*/u*x* show verifystatus

The **/cx/ux show verifystatus** command shows the verifystatus (if any) of the specified unit.

Example:

```
 //localhost> /c0/u5 show verifystatus
 /c0/u5 is not verifying, its current state is OK
```

/c*x*/u*x* show volumes

The **/cx/ux show volumes** command shows the number of volumes in the specified unit. Normally there is one volume unless autocarving is enabled and/or a boot volume was specified.

Example:

```
//localhost> /c0/u0 show volumes
/c0/u0 volume(s) = 1
```

/cx/ux show all

The **/cx/ux show all** command shows the current setting of all unit attributes.

Example:

```
 //localhost> /c0/u1 show all
 /c0/u1 status = OK
 /c0/u1 is not rebuilding, its current state is OK
 /c0/u1 is not verifying, its current state is OK
 /c0/u1 is not initializing, its current state is OK
 /c0/u1 Write Cache = on
 /c0/u1 Read Cache = Intelligent
 /c0/u1 volume(s) = 2
 /c0/u1 name = myarray
 /c0/u1 serial number = C6CPR7JMF98DA8001DF0
 /c0/u1 Ignore ECC policy = on
 /c0/u1 Auto Verify Policy = on
 /co/u1 Storsave policy = protection
 /c0/u1 Command Queuing Policy = on
 /c0/u1 Rapid RAID Recovery setting = all
```

```
Unit     UnitType  Status        %RCmpl  %V/I/M  VPort  Stripe  Size(GB)
------------------------------------------------------------------------
u1       RAID-0    OK              -       -       -     64K     3576.06
u1-0     DISK      OK              -       -       p0    -       298.01
u1-1     DISK      OK              -       -       p1    -       298.01
u1-2     DISK      OK              -       -       p2    -       298.01
u1-3     DISK      OK              -       -       p3    -       298.01
u1-4     DISK      OK              -       -       p4    -       298.01
u1-5     DISK      OK              -       -       p5    -       298.01
u1-6     DISK      OK              -       -       p6    -       298.01
u1-7     DISK      OK              -       -       p7    -       298.01
u1-8     DISK      OK              -       -       p8    -       298.01
u1-9     DISK      OK              -       -       p9    -       298.01
u1-10    DISK      OK              -       -       p10   -       298.01
u1-11    DISK      OK              -       -       p11   -       298.01
u1/v0    Volume    -               -       -       -     -       2047.00
u1/v1    Volume    -               -       -       -     -       1529.06
```

/cx/ux remove [noscan] [quiet]

The **/cx/ux remove** command allows you to remove a unit. Removing a unit instructs the firmware to remove the specified unit from its list of managed units, but retains the Disk Configuration Block (DCB) metadata. A logically removed unit can be physically moved to a different controller or reinstalled at a later time.

noscan is used to prevent informing the operating system of this change. The default is to inform the operating system.

quiet is used for noninteractive mode. Confirmation statements are suppressed and the command is executed immediately. Using the quiet mode is useful for scripting purposes.

Example of interactive mode:

```
//localhost> /c0/u0 remove
Removing /c0/u0 will take the unit offline.
Do you want to continue?
Y|N [N]:
```

Note: After the unit is removed through the CLI, the unit can be physically removed. You can physically remove hot-swap bays while the system is online.

/cx/ux del [noscan] [quiet]

The **/cx/ux del** command allows you to delete a unit. Deleting a unit not only removes the specified unit from the controller's list of managed units, but also eliminates the Disk Configuration Block (DCB) metadata. After you delete a unit, ports (or disks) associated with the unit become part of the free pool of managed disks.

Warning: This is a destructive command and you must use it with care. If you execute this command, all data on the specified unit is lost.

noscan is used to prevent informing the operating system of this change. The default is to inform the operating system.

quiet is used for noninteractive mode. Confirmation statements are suppressed and the command is executed immediately. Using the quiet mode is useful for scripting purposes.

Example of interactive mode:

```
//localhost> /c0/u0 del
Deleting /c0/u0 will cause the data on the unit to be
permanently lost.
Do you want to continue ? Y|N [N]:
```

/cx/ux start rebuild disk=<p:-p...> [ignoreECC]

The **/cx/ux start rebuild** command allows you to rebuild a degraded unit by using the specified ***disk=p***. Rebuild applies only to redundant arrays such as RAID 1, RAID 5, RAID 6, RAID 10, and RAID 50.

During rebuild, bad sectors on the source disk cause the rebuild to fail. RAID 6 arrays are less susceptible to failing since two copies of the data exist. You can allow the operation to continue by using *ignoreECC*.

The rebuild process is a background task and changes the state of a unit to REBUILDING. Various show commands also show the percent completion as rebuilding progresses.

Note that the disk used to rebuild a unit (specified with *disk=p*) must be a SPARE or a unconfigured disk. You must first remove the degraded drive before starting the rebuild. See the command “/cx/px remove [quiet]” on page 101 for details. Also see the command “/cx rescan [noscan]” on page 57 to add new drives or to retry the original drive.

If you are rebuilding a RAID 50, RAID 6, or RAID 10 unit, multiple drives can be specified if more than one subunit is degraded.

When you issue this command, the specified rebuild begins if the rebuild schedule is disabled; otherwise, the rebuild pauses until the next scheduled rebuild. A file system check is recommended following rebuild when using the ignoreECC option.

/cx/ux start verify

Also referred to as a *manual verify*, the **/cx/ux start verify** command starts a background verification process on the specified unit **/c*x*/u*x***.

When you issue this command, the specified unit begins verification if the verify schedule is basic or disabled; otherwise it pauses until the next scheduled verify timeslot on the advanced schedule.

If verify=basic or is disabled, verification of the specified unit begins immediately. If verify=advanced, the verify pauses until the next timeslot on the advanced schedule. For more information, see “/cx set verify=advanced|basic|1..5” on page 66.

The following table summarizes how manual verify works.

Table 7: Manual Verify Behavior (/cx/ux start verify)

Command Setting	Action
Basic Verify Schedule (verify=basic)	Runs immediately
Advanced Verify Schedule (verify=advanced)	Follows Advanced Verify Schedule

Verify pauses if a rebuild, migration, or initialization is in progress and resumes after those operations are completed.

/cx/ux stop verify

The **/cx/ux stop verify** command stops a background verification process on the specified unit **/c*x*/u*x***.

/cx/ux flush

The **/cx/ux flush** command allows you to flush the write cache on the specified unit **/u*x*** associated with controller **/c*x***. Note that this command does not apply to spare unit types.

/c*x*/u*x* set autoverify=on|off

The **/cx/ux set autoverify** command allows you to turn on and turn off the autoverify operation on a specified unit **/cx/ux**.

By default, autoverify is *on***.** When autoverify is *on* and the basic verify schedule is used (verify=basic), a verify automatically runs at the basic verify time (Friday at midnight, by default). If the system is not on at that time, verification starts the next time the system is powered up. When the autoverify is *on* and the advanced verify schedule is used (verify=advanced), autoverify runs during the times specified with the advanced schedule. You can use the **show verify** command to show the existing schedule windows. For more information about using basic or advanced verify, see “/cx set verify=advanced|basic|1..5” on page 66.

Table 8: Autoverify Behavior (when enabled)

Command Setting	Action
Basic Verify Schedule (verify=basic)	Follows Basic Verify Schedule
Advanced Verify Schedule (verify=advanced)	Follows Advanced Verify Schedule

For more about setting up verify schedules, see “Setting Up a Verify Schedule” on page 60.

/cx/ux set wrcache=on|off [quiet]

The **/cx/ux set wrcache** command allows you to turn *on* or *off* the write cache for a specified unit **/cx/ux**. This command is supported on all controllers.

By default, write cache is *on*.

Write cache includes the disk drive cache and controller cache.

When write cache is *on*, data is stored in both the 3ware controller cache and the drive cache before the data is committed to disk. This allows the system to process multiple write commands at the same time, thus improving performance. However, when data is stored in cache, it can be lost if a power failure occurs. With a BBU installed, the data stored on the 3ware controller can be restored.

The **quiet** attribute turns off interactive mode, so that no confirmation is requested to proceed.

/cx/ux set rdcache=basic|intelligent|off

The **/cx/ux set rdcache** command allows you to set the read cache to either **Basic**, **Intelligent**, or **Off** on a specified unit. Setting this to **Intelligent** enables both **Intelligent Mode** features and **Basic Mode** features. Setting it to **Off** disables both.

Read Cache Basic Mode is used to store data that has been written recently to media and is likely to be frequently accessed, to the read cache on the controller. This improves read access times for applications such as a database that can take advantage of storage caching. The read cache can be disabled without reducing performance for applications that are write intensive, or that rarely read back data recently written.

Read Cache Intelligent Mode enables the Intelligent Read Prefectch (IRP) feature.

The Intelligent Read Prefetch feature includes a typical read-ahead caching method that is used to proactively retrieve data from media and store it locally on the controller so that it can be requested by the host. For example, the host might read blocks 1, 2, and 3. With the read-ahead caching included in IRP, the controller also retrieves and holds blocks 4, 5, and 6 in its cache in case the host requests the data. By loading a larger set of data into the cache, chances are improved that another request can be filled by data that is already in the cache. This can be helpful with applications that are sequential in nature, such as video on demand, video surveillance playback, and restoring from a disk-to-disk backup. Performance benefits of read-ahead are especially pronounced when the queue depth of the host is low. In addition, read-ahead caching also improves sequential read performance when the unit is degraded.

The Intelligent Read Prefetch (IRP) feature also includes an adaptive stream-management layer to improve performance with larger queue depths in multiple read-only or mixed read/write stream environments. The performance improvements can be expected for most RAID types regardless of the unit's operating state (normal, degraded, and so forth).

Example:

```
//localhost> /c0/u0 set rdcache=basic
Setting Read Cache Policy on /c0/u0 to [basic] ... Done.
```

/cx/ux set identify=on|off

This command requires a supported enclosure. For additional information about enclosure-related commands, see “Enclosure Object and Element Commands” on page 109.

The **/cx/ux set identify** command allows you to identify a unit within an enclosure by blinking the LEDs associated with the drive slots of the specified unit.

Example:

```
//localhost> /c0/u0 set identify=on
Sending Identify request for unit /c0/u0 to [on] ... Done.
```

/cx/ux set ignoreECC=on|off

The **/cx/ux set ignoreECC** command allows you to set the ignoreECC policy for a given unit.

When ignoreECC policy is set to **off,** if a rebuild process encounters bad sectors on the source disk, the rebuild fails. When ignoreECC is set to **on**, such errors are ignored, and the rebuild continues. When you use ignoreECC, a recommended practice is to run a file system check following the rebuild to insure data integrity.

By default, ignoreECC is **off**.

/cx/ux set name=string

The **/cx/ux set name** command allows you to name the unit with an arbitrary name. You can use this name with the unit serial number to cross-reference with the unit. The system does not check to ensure uniqueness of names, so be sure to assign different names to each unit.

Note: The unit’s serial number is automatically assigned when the unit is created and is not changeable.

/cx/ux set qpolicy=on|off

The **/cx/ux set qpolicy** command sets the queue policy for the drives on the unit. If the queue policy is **on**, the firmware utilizes the drive's queueing policy. However, the **/cx/ux set qpolicy** command has no effect on drives that do not support a queueing policy.

By default, qpolicy is **on**. This setting is only applicable for SATA drives that support native command queueing (NCQ) and has no effect on SAS units. For spare drives, drive queuing is not applicable.

Example:

```
//localhost> /c0/u5 set qpolicy = on
Setting Command Queuing Policy for unit /c0/u5 to [on] ... Done.
```

/cx/ux set rapidrecovery all|rebuild|disable [quiet]

The **/cx/ux set rapidrecovery** command sets the Rapid RAID Recovery policy for the specified redundant unit.

Rapid Raid Recovery can accelerate both the rebuild process and the initialize and verify tasks that can occur in response to an unclean system shutdown. Setting this option to *all* applies this policy to both these situations. Setting it to *rebuild* applies it only to rebuild tasks. If the policy is set to *disable*, then the time required to complete these tasks remains unchanged.

There is some system overhead from setting rapidrecovery to *all*. If you have a BBU, you can set rapid recovery to *rebuild*, because a BBU provides protection against data loss in the event of an unclean shutdown.

When this attribute is set, the policy remains in effect unless it is changed or disabled for the unit. **Note:** If the setting is disabled, it cannot be changed for the unit at a later time.

The quiet option is provided for scripting purposes, and applies only to the *disable* option. (**/cx/ux set rapidrecovery=disable quiet**)

Example:

```
 //localhost> /c0/u0 set rapidrecovery=all
 Setting Rapid RAID Recovery policy on /c1/u0 to [all] ... Done.
```

/cx/ux set storsave=protect|balance|perform [quiet]

The **/cx/ux set storsave** command sets the storsave policy to either **protect**, **balance**, or **perform** when the unit write cache is enabled. The default setting is balance when a BBU is installed, and protect when a BBU is not installed.

The storsave policy adjusts several factors that control the balance between protection and performance on a unit. There is a trade-off among the available settings. The following description about the settings can help you to decide which one is suitable to your application. For more information, refer to the discussion of this setting in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*, under “About StorSave Profile Levels”.

protect provides the maximum data protection among the controller settings. When storsave is set to **protect** mode, it means the following:

- When the unit becomes degraded, the write cache is disabled.
- Write journaling is enabled. All data flushing from controller cache is flushed to media.
- Incoming Force Unit Access (FUA) host requests are honored unless a BBU is installed and enabled, in which case they are ignored.

perform provides the maximum performance and least data protection of the three controller settings. When storsave is set to **perform** mode, it means the following:

- When the unit becomes degraded, the write cache is not disabled.
- Write journaling is disabled. All data flushing from controller cache is flushed to disk. If a BBU is present, specifying perform as the storsave setting essentially disables the BBU for this unit.
- Incoming FUA host requests are honored.

If you set the storsave policy to **perform**, a confirmation message warns you that there could be data loss in the event of a power failure.

balance provides more data protection than perform mode but less data protection than protect mode, and provides better performance than protect mode but lower performance than perform mode. When storsave is set to the **balance** mode, it means the following:

- When the unit becomes degraded, the write cache is not disabled.
- Write journaling is disabled if no BBU is present, and is enabled if a BBU is present. All data flushing from controller cache is flushed to media if a BBU is installed and enabled. Otherwise, data is flushed to disk only.
- Incoming FUA host requests are honored unless a BBU is installed and enabled, in which case, they are ignored.

quiet is used for noninteractive mode. Confirmation statements are suppressed and the command is executed immediately. Using *quiet* is useful for scripting purposes.

For additional information, see “Setting the StorSave Profile for a Unit” in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Example:

```
//localhost> /c0/u5 set storsave=protect
Setting Command Storsave Policy for unit /c0/u5 to [protect] ...
Done.
```

/cx/ux migrate type=RaidType [disk=p:-p] [group=3|4|5|6|7|8|9|10|11|12|13|14|15|16] [stripe=size] [noscan] [nocache] [autoverify]

The **/cx/ux migrate** command allows you to change the existing configuration of a unit by using **type=*RaidType***. You can make three types of changes:

- Increase the capacity
- Change the RAID level (with the same or increased capacity)
- Change the stripe size

The unit that results from the migration is subject to the same rules and policies that apply when creating a new unit with the **/cx add** command. For example, you must specify a valid number of disks and parameters.

The unit to be migrated must be in a normal state (not degraded, initializing, or rebuilding) before starting the migration.

Note: Rapid RAID Recovery is always disabled for units that are migrated.

The destination unit must use all source disks and potentially augment the number of disks in the **disk=*p:-p*** disk list. (An exception to this is when migrating a RAID 1 to a Single unit. For details, see the following note.) Unspecified parameters are assigned the default values, is applicable (stripe size of 256 KB, write cache enabled, autoverify enabled, and ignoreECC disabled). Both source name and serial number are carried over to the destination unit.

Note: A special case of this command occurs when the source unit has a type of RAID1 and destination unit has a type of Single. In this case, the migrate command splits both drives into two identical single disks. (If you do this, unmount the unit first before splitting the drives). The disk name is duplicated on the destination units, but the source unit serial number is not carried over to the new unit. The new destination unit has its own serial number. In this case, the disk-specifier of the migration command [**disk=*p:-p***] must not be included in the command because the source drives are the destination drives. Specifying more drives with the **disk=** option returns an error.

type=*RaidType* specifies the RAID type of the destination unit. Possible unit types include **raid0**, **raid1**, **raid5**, **raid6**, **raid10**, **raid50**, or **single**.

For example, **type=raid5** indicates the destination unit is RAID 5. The **type=single** is a special case of the migrate command. It splits the source unit RAID 1 into two Single units.

Note: You can only migrate a unit to a RAID level that has the same or more capacity as the existing one. You can migrate a four-drive RAID 5 unit to a four-drive RAID 0, but you cannot migrate a four-drive RAID 0 unit to a four-drive RAID 5 unless you add another drive, due to the need for additional storage capacity for parity bits.

The following table illustrates valid migration paths:

Table 9: Valid Migration Paths

Source	**Destination**						
	R0	**R1**	**R5**	**R6**	**R10**	**R50**	**Single**
R0	Yes	No	Yes	Yes	Yes	Yes	No
R1	Yes	No	Yes	Yes	Yes	Yes	Yes
R5	Yes	No	Yes	Yes	Yes	Yes	No
R6	Yes	No	Yes	Yes	Yes	Yes	No
R10	Yes	No	Yes	Yes	Yes	Yes	No
R50	Yes	No	Yes	Yes	Yes	Yes	No
Single	Yes	Yes	Yes	Yes	Yes	Yes	No
Spare	No	No	No	No	No	No	No

disk=*p:-p..* consists of a list of ports or VPorts (disks) to be used, in addition to the source disks, in the construction of the destination unit. You can specify one or more ports. You can specify Multiple ports by using a colon (:) or a dash (-) as port index separators. A dash indicates a range and can be mixed with colons. For example **disk=0:1:2-5:9:12** indicates port or VPort 0, 1, 2 through 5 (inclusive), 9 and 12.

group=*3|4|5|6|7|8|9|10|11|12|13|14|15|16* indicates the number of disks per group for a RAID 50 type. (You can only use this attribute when type=raid50.) Note that a RAID 50 is a multitier array. At the bottom-most layer, N number of disks per group are used to form the RAID 5 layer. These RAID 5 arrays are then integrated into a RAID 0. This attribute allows you to specify the number of disks in the RAID 5 level. Valid values are 3 through 16. For example **group=3** indicates 3 disks of RAID 5 at the bottom layer of RAID 50.

Note: You can have a maximum of four subunits in a RAID 50 unit

Note that a sufficient number of disks are required for a given pattern or disk group. For example, given 6 disks, specifying 3 creates two RAID 5 arrays. With 12 disks, specifying 3 creates four RAID 5 arrays under the RAID 0 level. With only 6 disks, a grouping of 6 is not allowed, because you are basically creating a RAID 5.

The default RAID 50 grouping varies based on number of disks. For 6 and 9 disks, default grouping is 3. For 8 disks, the default grouping is 4. For 10 disks, the default grouping is 5. For 12 disks, you can group the disks into groups of 3, 4, or 6 drives (the group of 4 drives is set by default as it provides the best of net capacity and performance). For 15 disks, you can group the disks into groups of 5 drives (3 drive groups make 5 subunits; you can have a maximum of 4 subunits). For 16 disks, you can group the disks into groups of 4 or 8 drives.

stripe=*size* consists of the stripe size to be used. The following table illustrates the supported and applicable stripes on the respective unit types and controller models. Stripe size units are in kilobytes (KB).

Table 10: Supported Stripe Sizes

R0	R1	R5	R6	R10	R50	Single
16	N/A	16	–	16	16	N/A
64	N/A	64	64	64	64	N/A
256	N/A	256	256	256	256	N/A

noscan attribute instructs the CLI not to notify the operating system of the creation of the new unit. By default, the CLI informs the operating system.

nocache attribute instructs the CLI to disable the write cache on the migrated unit. Enabling write cache increases write performance but at the risk of potential data loss in case of sudden power loss (unless a BBU or UPS is installed). By default, the cache is enabled. To avoid the possibility of data loss in the event of a sudden power loss, do not set nocache unless there is a BBU or UPS installed.

autoverify attribute enables the autoverify attribute on the unit to be migrated. For more details on this feature, see “/cx/ux set autoverify=on|off” on page 81.

Migration Process

In all cases of migration, the background migration process must be completed before the newly sized unit is available for use. You can continue using the original unit during this time. When the migration is finished, you must reboot if you are booted from the unit. For secondary storage, depending on your operating system, you might need to first unmount the unit, then use CLI commands to *remove* and *rescan* the unit so that the operating system can determine the new capacity, and then remount the unit. For details see "/cx/ux remove [noscan] [quiet]" on page 78 and "/cx rescan [noscan]" on page 57.

If necessary, you can resize the file system or add a new partition. For instructions, consult the documentation for your operating system.

⚠ **Warning:** It is important to allow migration to complete before adding drives to the unit. Making physical changes to the unit during migration can cause the migration process to stop, and can jeopardize the safety of your data.

Example of splitting a mirror

```
//localhost> /c1/u3 migrate type=single
Sending migration message to /c1/u3 ... Done.
```

In this case, the command requests that u3 be split into Single units. In this case, u3 is a RAID 1 and the Migrate command splits u3 into u3 and u*x*, each with a RAID type of Single.

⚠ **Warning:** Make sure that no I/O is pending and that the unit is unmounted before you split a mirror. If the RAID 1 is the boot device, you should boot from a different device before splitting the mirror.

Example of capacity expansion

```
//localhost> /c0/u3 migrate type=raid10 disk=10-11 stripe=16
Sending migration message to /c0/u3 ... Done.
```

In this case, the command indicates that the source unit is u3, and the destination unit has a RAID type of raid10 and has added the disks 10 and 11 to the disks in the existing unit u3.

Example of migrate output

The following is an example of how the CLI shows migrating units. In this example, the report indicates that `/c0/u3` is a migrating unit with 39 percent completion. The report also indicates that Source Unit `su0` is type RAID 1 and Destination Unit `du0` is type RAID 10.

```
3ware CLI> /c0 show

 Unit  UnitType  Status       %RCmpl  %V/I/M  Stripe  Size(GB)  Cache  AVrfy
 ---------------------------------------------------------------------------
 u0    RAID-5    OK            -       -       64K     596.004   RiW    OFF
 u2    SPARE     OK            -       -       -       149.042   -      OFF
 u3    Migrator  MIGRATING     -       39      -       149.001   RiW    OFF

 VPort   Status         Unit     Size        Blocks        Serial
 -----------------------------------------------------------------------
 p0     OK             u0     149.05 GB   312581808     WD-WCANM1771318
 p1     OK             u0     149.05 GB   312581808     WD-WCANM1757592
 p2     OK             u0     149.05 GB   312581808     WD-WCANM1782201
 p3     OK             u0     149.05 GB   312581808     WD-WCANM1753998
 p4     OK             u2     149.05 GB   312581808     WD-WCANM1766952
 p5     OK             u3     149.05 GB   312581808     WD-WCANM1882472
 p6     OK             u0     149.05 GB   312581808     WD-WCANM1883862
 p7     OK             u3     149.05 GB   312581808     WD-WCANM1778008
 p8     OK             -      149.05 GB   312581808     WD-WCANM1770998
 p9     NOT-PRESENT    -      -           -             -
 p10    OK             u3     149.05 GB   312581808     WD-WCANM1869003
 p11    OK             u3     149.05 GB   312581808     WD-WCANM1762464

 3ware CLI> /c0/u3 show

 Unit     UnitType  Status         %RCmpl  %V/I/M  Port  Stripe  Size(GB)
 ------------------------------------------------------------------------
 u3       Migrator  MIGRATING      -       39      -     -       -

 su3      RAID-1    OK             -       -       -     -       149.001
 su3-0    DISK      OK             -       -       p5    -       149.001
 su3-1    DISK      OK             -       -       p7    -       149.001
 su3/v0   Volume    -              -       -       -     -       149.001

 du3      RAID-10   OK             -       -       -     16K     298.002
 du3-0    RAID-1    OK             -       -       -     -       -
 du3-0-0  DISK      OK             -       -       p5    -       149.001
 du3-0-1  DISK      OK             -       -       p7    -       149.001
 du3-1    RAID-1    OK             -       -       -     -       -
 du3-1-0  DISK      OK             -       -       p10   -       149.001
 du3-1-1  DISK      OK             -       -       p11   -       149.001
 du3/v0   Volume    -              -       -       -     -       149.001
```

Example of migrate output for Single to RAID 1

The migration path from RAID type Single to RAID 1 is a special case. Because the single unit becomes a mirrored array, technically, this is not a migration. As a result, this command shows a different status than other migration paths. In addition, the status of the newly specified disk shows DEGRADED until the “migration/rebuild” is complete.

For example, below is a system with two migrating units, /c0/u0 and /c0/u1. Unit u0 is migrating from a RAID 10 to a RAID 0 unit, while unit u1 is migrating from Single to a RAID 1, initiated by the following commands:

```
/c0/u0 migrate type=raid0

/c0/u1 migrate type=raid1 disk=5
```

Note the difference in *UnitType* and *Status* of u0 and u1, even though they are both migrating units.

```
 3ware CLI> /c0 show

 Unit  UnitType  Status        %RCmpl  %V/I/M  Stripe  Size(GB)  Cache
AVrfy
-----------------------------------------------------------------------
----
 u0    Migrator  MIGRATING      -       26      -      298.002   RiW   OFF
 u1    RAID-1    REBUILD-PAUSED 0       -       -      372.519   OFF   OFF

 Port   Status           Unit   Size        Blocks        Serial
 ----------------------------------------------------------------------
--
 p0     OK              u0     149.05 GB   312581808     WD-WCANM1883862
 p1     OK              u0     149.05 GB   312581808     WD-WCANM1754124
 p2     OK              u0     372.61 GB   781422768     WD-WMAMY1661939
 p3     OK              u0     372.61 GB   781422768     WD-WMAMY1579179
 p4     OK              u1     372.61 GB   781422768     WD-WMAMY1662720
 p5     DEGRADED        u1     372.61 GB   781422768     WD-WMAMY1576310
 p6     NOT-PRESENT      -      -           -             -
 p7     NOT-PRESENT      -      -           -             -

 3ware CLI> /c0/u3 show

 Unit     UnitType  Status        %RCmpl  %V/I/M  Port  Stripe  Size(GB)
 ----------------------------------------------------------------------
--
 u0       Migrator  MIGRATING      -       26      -     -       -

 su0      RAID-10   OK             -       -       -    64K     298.002
 su0-0    RAID-1    OK             -       -       -     -       -
 su0-0-0  DISK      OK             -       -       p0   -       149.001
 su0-0-1  DISK      OK             -       -       p1   -       149.001
 su0-1    RAID-1    OK             -       -       -     -       -
 su0-1-0  DISK      OK             -       -       p2   -       149.001
 su0-1-1  DISK      OK             -       -       p3   -       149.001
 su0/v0   Volume    -              -       -       -    -       298.002

 du0      RAID-0    OK             -       -       -    64K     596.004
 du0-0    DISK      OK             -       -       p3   -       149.001
 du0-1    DISK      OK             -       -       p2   -       149.001
 du0-2    DISK      OK             -       -       p1   -       149.001
 du0-3    DISK      OK             -       -       p0   -       149.001
 du0/v0   Volume    -              -       -       -     -       N/A

 3ware CLI> /c0/u1 show

 Unit     UnitType  Status        %RCmpl  %V/I/M  Port  Stripe  Size(GB)
 ----------------------------------------------------------------------
--
 u1       RAID-1    REBUILD-PAUSED 0       -       -    -       372.519
 u1-0     DISK      OK             -       -       p4   -       372.519
 u1-1     DISK      DEGRADED       -       -       p5   -       372.519
 u1/v0    Volume    -              -       -       -    -       372.519
```

Port Object Commands

Port object messages are commands that provide information and perform actions related to a specific disk that is attached to a port (or virtual port), such as **/c0/p0**. You use port object commands for such tasks as viewing information about the status, model, or serial number of the drive.

Note that all references to *port* also apply to *VPort* for the commands in this section.

Syntax

```
/cx/px show
/cx/px show attribute [attribute ...]  where attributes are:
    capacity|firmware|identify|lspeed |model|ncq|
    serial|smart|status|identify|driveinfo|
    dpmstat type=instr|ra|lct|histdata|ext
/cx/px show all

/cx/px remove [noscan][quiet]
/cx/px set identify=on|off
/cx/px set dpmstate=clear [type=<ra|lct|ext>]
```

/cx/px show

The **/cx/px show** command shows summary information about the specified disk attached to port **/c*x*/p*x***.

Example for 9750 and 9690SA controllers:

```
 //localhost> /c3/p1 show

 VPort Status    Unit  Size       Type   Phy Encl-Slot    Model
 ------------------------------------------------------------------------
 p1    OK        u0   149.05 GB   SATA   0   -        WDC WD1600JS-22NCB1a
```

The preceeding output indicates that virtual port (VPort) 1 is associated with a SATA disk that has a status of OK and is part of unit 0. It also indicates that it is associated with controller phy 0, and is directly attached (that is, it is not in an enclosure with an expander).

To find the Block and Serial information, use the specific show attribute command (***/cx/px show capacity*** or ***/cx/px show serial***), or the ***show all*** command.

/cx/px show attribute [attribute ...]

The **/cx/px show attribute** command shows the current setting of the given attributes on the specified port or drive. You can request one or many attributes. If you specify an invalid attribute, the loop terminates. Possible attributes are: capacity, firmware, identify, lspeed, model, ncq, serial, smart (SATA only), and status.

/c*x*/p*x* show capacity

The **/cx/px show capacity** command shows the capacity of the drive attached to the specified port in two formats: GB and blocks. Note that the CLI shows capacity in GB that is computed based on division by 1000 (not 1024).

Example:

```
//localhost> /c0/p5 show capacity
149.05 GB (312581808 Blocks)
```

/cx/px show driveinfo

The **/cx/px show driveinfo** command shows the following information about the drive for 9750 and 9690SA controllers:

Drive Type can be either SAS or SATA.

Interface Type can be either Direct or Enclosure. The Interface Type indicates how the drive is connected to the controller.

Drive Ports indicates the number of physical ports on the drive. SAS drives are usually dual ported while SATA drives have only one port.

Drive Connections indicates the number of connections from the controller to the drive. There can be either one drive connection or two.

Additional information is available using the ***/cx/px*** show all command.

Example:

```
//localhost> /c3/p4 show driveinfo
/c3/p4 Drive Type = SAS
/c3/p4 Interface Type = Direct
/c3/p4 Drive Ports = 2
/c3/p4 Drive Connections = 1
```

/c*x*/p*x* show firmware

The **/cx/px show firmware** command shows the firmware version of the drive attached to the specified port.

Example:

```
//localhost> /c0/p5 show firmware
/c0/p5 Firmware Version = 65.13G65
```

/c*x*/p*x* show identify

The **/cx/px show identify** command requires a supported enclosure.

The **/cx/px show identify** command shows whether the LED of the drive attached to the specified port is set to **on** or **off**. For details, see “/cx/px set identify=on|off” on page 101.

Example:

```
//localhost> /c0/p5 show identify
/c0/p5 Identify Status = on
```

/c*x*/p*x* show lspeed

The **/cx/px show lspeed** command shows the maximum SATA link speed supported by the drive attached to the port and the present SATA link speed setting.

Example:

```
//localhost> /c0/p5 show lspeed
 /c0/p5 SATA Link Speed Supported = 3.0 Gb/s
 /c0/p5 SATA Link Speed = 3.0 Gb/s
```

/c*x*/p*x* show model

The **/cx/px show model** command shows the model of the drive attached to the specified port.

Example:

```
 //localhost> /c0/p5 show model
 /c0/p5 Model = WDC WD1600BB-00DAA0
```

/c*x*/p*x* show ncq

The **/cx/px show ncq** command shows the Native Command Queueing (NCQ) information for the drive attached to the specified port, including whether NCQ is supported by the drive, and whether it is enabled at the drive.

For queuing to be used, it must be enabled for the unit and supported by the drive.

Queuing information is not available for SAS drives.

Example:

```
//localhost> /c0/p5 show ncq
 /c0/p5 NCQ Supported = No
 /c0/p5 NCQ Enabled = No
```

/c*x*/p*x* show serial

The **/cx/px show serial** command shows the serial number of the drive attached to the specified port.

Example:

```
 //localhost> /c0/p5 show serial
 /c0/p5 Serial = WD-WMACK140649
```

/c*x*/p*x* show smart

The **/cx/px show smart** command extracts SMART data from a specified SATA disk. This command will output drive attributes in hex format without any decoding. (For additional information, please refer to AT Attachment standard.) Because the data is extracted directly from the disk, you can use this command to get the most recent data about a disk.

The **/cx/px show smart** command is currently only available for SATA drives. For SAS drives, limited attribute data is available through the commands listed below.

Since the SMARTA data is not decoded, you can use the commands below to get important drive status in a more meaningful way. For both SATA and SAS drives, you can get information with regard to temperature, spindle speed, reallocated sectors, and power-on hours:

- /cx/px show temperature
- /cx/px show spindlespd
- /cx/px show rasect
- /cx/px/ show pohrs

You can also use **/cx/px show all** to retrieve all of the drive attributes

> **Note:** 1) If the drive attached to the specified port is not present or if there are cabling problems affecting the drive, CLI returns an error. This can be one way of detecting whether a drive is present.

Example:

```
//localhost> /c0/p5 show smart

10 00 01 0F 00 C8 C8 00 00 00 00 00 00 00 03 03
00 DA B5 34 08 00 00 00 00 00 04 32 00 64 64 88
00 00 00 00 00 00 05 33 00 C7 C7 01 00 00 00 00
00 00 07 0F 00 C8 C8 00 00 00 00 00 00 00 09 32
00 42 42 2A 63 00 00 00 00 00 0A 13 00 64 64 00
00 00 00 00 00 00 0B 12 00 64 64 00 00 00 00 00
00 00 0C 32 00 64 64 88 00 00 00 00 00 00 BE 22
00 3A 2F 2A 00 00 00 00 00 00 C2 22 00 69 5E 2A
```

```
00 00 00 00 00 00 C4 32 00 C7 C7 01 00 00 00 00
00 00 C5 12 00 C8 C8 00 00 00 00 00 00 00 C6 10
00 C8 C8 00 00 00 00 00 00 00 C7 3E 00 C8 C8 01
00 00 00 00 00 00 C8 09 00 C8 C8 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 82 00 74 13 01 7B
03 00 01 00 02 3C 06 00 00 00 00 00 00 00 00 00
00 00 01 04 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

/c*x*/p*x* show status

The **/cx/px show shatus** command shows the status of the drive attached to the specified port. (Definitions of the drive statuses are available in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.)

Example:

```
 //localhost> /c0/p5 show status
 /c0/p5 Status = OK
```

Note: This command only returns the status pertaining to the drive of the specified port. Its intended use is not for determining the status of a drive relative to a unit (for that, please use “/cx/ux show” on page 72).

/cx/px show all

The **/cx/px show all** command shows all port-related attributes: status, model, serial, firmware, capacity, and SMART (for SATA drives).

Example for SATA drive:

```
//localhost> /c3/p3 show all
/c3/p3 Status = OK
/c3/p3 Model = ST3750640AS
/c3/p3 Firmware Version = 3.AAK
/c3/p3 Serial = 3QD0RGX6
/c3/p3 Capacity = 698.63 GB (1465149168 Blocks)
/c3/p3 WWN = 0000000000000000
/c3/p3 Drive Type = SATA
```

```
/c3/p3 Interface Type = Direct
/c3/p3 Drive Ports = 1
/c3/p3 Drive Connections = 1
/c3/p3 Link Speed Supported = 1.5 Gbps
/c3/p3 Link Speed = 1.5 Gbps
/c3/p3 Queuing Supported = Yes
/c3/p3 Queuing Enabled = Yes
/c3/p3 Reallocated Sectors = 0
/c3/p3 Power On Hours = 268
/c3/p3 Temperature = 36~C
/c3/p3 Spindle Speed = 7200 RPM
/c3/p3 Identify Status = N/A
/c3/p3 Belongs to Unit = N/A

/c3/p3 Drive Smart Data:
0A 00 01 0F 00 5E 59 B8 9A 24 0A 00 00 00 03 03
00 5E 5D 00 00 00 00 00 00 00 04 32 00 64 64 51
00 00 00 00 00 00 05 33 00 64 64 00 00 00 00 00
00 00 07 0F 00 4A 3E 88 3F 98 01 00 00 00 09 32
00 64 64 0C 01 00 00 00 00 00 0A 13 00 64 64 00
00 00 00 00 00 00 0C 32 00 64 64 52 00 00 00 00
00 00 BB 32 00 64 64 00 00 00 00 00 00 00 BD 3A
00 64 64 00 00 00 00 00 00 00 BE 22 00 40 38 24
00 1B 28 00 00 00 C2 22 00 24 2C 24 00 00 00 19
00 00 C3 1A 00 3B 38 68 2B 4E 00 00 00 00 C5 12
00 64 64 00 00 00 00 00 00 00 C6 10 00 64 64 00
00 00 00 00 00 00 C7 3E 00 C8 C8 00 00 00 00 00
00 00 C8 00 00 64 FD 00 00 00 00 00 00 00 CA 32
00 64 FD 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 82 00 AE 01 00 5B
03 00 01 00 01 CA 02 00 00 00 00 00 00 00 00 00
00 00 0B 01 00 00 02 07 07 07 07 06 07 07 07 00
00 00 00 00 00 00 00 01 3A 68 E2 4B 00 00 00 00
00 00 C5 AB 08 58 1D 00 00 00 00 00 00 00 00 00
00 00 00 00 3A 68 E2 4B 00 00 00 00 00 00 00 00
02 00 01 00 00 00 00 00 00 00 C5 60 F4 BC 00 00
00 00 30 00 00 00 00 00 00 00 0B 01 00 00 00 00
C4 55 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 CC
```

Example for SAS drive:

```
//localhost> /c1/p2 show all
```

```
/c1/p2 Status = OK
/c1/p2 Model = SEAGATE ST936701SS
/c1/p2 Firmware Version = 0002
/c1/p2 Serial = 3LC0DB25
/c1/p2 Capacity = 34.18 GB (71687371 Blocks)
/c1/p2 WWN = 5000c500003ac760
/c1/p2 Drive Type = SAS
/c1/p2 Interface Type = Direct
/c1/p2 Drive Ports = 2
/c1/p2 Drive Connections = 1
/c1/p2 Reallocated Sectors = 0
/c1/p2 Power On Hours = 0
/c1/p2 Temperature = 44 deg C
/c1/p2 Spindle Speed = 10000 RPM
/c1/p2 Link Speed Supported = 1.5 Gbps and 3.0 Gbps
/c1/p2 Link Speed = 3.0 Gbps
/c1/p2 Queuing Supported = Yes
/c1/p2 Queuing Enabled = Yes
/c1/p2 Identify Status = N/A
/c1/p2 Belongs to Unit = N/A
```

/cx/px show dpmstat type=inst|ra|lct|histdata|ext

The **/cx/px show dpmstat type** command allows you to request drive performance statistics of the specified type for the specified port. These statistics can be helpful when troubleshooting related problems.

type= specifies which statistics should be reported. The options are: *inst* for Instantaneous, *ra* for Running Average, *lct* for Long Command Times, *histdata* for Histogram Data, and *ext* for Extended Drive Statistics.

inst (Instantaneous). The inst is a measure of a short duration average.

ra (Running Average). Running average is a measure of long-term averages. The measure smooths the data, and results in older data fading from the average over time.

ext (Extended Drive Statistics). The extended drive statistics refers to statistics of a drive's read commands, write commands, write commands with Force Unit Access (FUA), flush commands, and a drive sectors's read, write, and write commands with FUA.

lct (Long Command Times). The lct is a collection of the commands with the longest read/write response time.

histdata (Histogram Data). The histogram categorizes the read/write execution times and groups them together based on time frames.

Summaries of the statistics for all drives on a controller are also available for the *inst*, *ra*, and *ext* statistics by using the command “/cx show dpmstat [type=inst|ra|ext]” on page 36. For more information, see “Drive Performance

Monitoring" in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Example of running average (RA) statistics

```
//localhost> /c0/p3 show dpmstat type=ra

                             Queue           Xfer         Resp
Port     Status    Unit   Depth   IOPs    Rate(MB/s)   Time(ms)
--------------------------------------------------------------
p3       OK        u0     0       435     25.249        2
```

Example of long command times (LCT) statistics

```
//localhost> /c0/p3 show dpmstat type=lct

Port   Status           Unit
------------------------------
p3     OK               u0
                     Resp
Date       Time      Time(ms) --------- CDB / ATA Task File (hex) -----------
----------------------------------------------------------------------------
2007-02-09 13:47:57  383.216  00 80 60 40 92 9f 8a 40 1a 00 00 00 00 00 00
2007-02-09 13:47:57  390.809  00 80 60 40 13 eb 30 40 26 00 00 00 00 00 00
2007-02-09 13:47:57  405.478  00 80 60 40 61 11 20 40 26 00 00 00 00 00 00
2007-02-09 13:47:57  410.379  00 80 60 40 cd 8b b9 40 23 00 00 00 00 00 00
2007-02-09 13:47:57  419.002  00 80 60 40 5e df d1 40 29 00 00 00 00 00 00
2007-02-09 13:47:57  444.250  00 80 60 40 8b c0 36 40 2e 00 00 00 00 00 00
2007-02-09 13:47:57  527.994  00 80 60 40 6e a5 b6 40 03 00 00 00 00 00 00
2007-02-09 13:47:57  569.429  00 80 60 40 3b e2 02 40 2d 00 00 00 00 00 00
2007-02-09 13:47:57  609.526  00 80 60 40 27 1c e9 40 2b 00 00 00 00 00 00
2007-02-09 13:47:57  612.051  00 80 60 40 dd 0b d1 40 2c 00 00 00 00 00 00
```

Note that in addition to the time and date stamps of the commands with the long response times, their corresponding CDB or ATA Task File is shown.

Example of histogram (histdata)

To list a histogram of IOPs grouped together based on response time associated with the specified port, use command /cx/px show dpmstat type=histdata.

```
//localhost> /c0/p3 show dpmstat type=histdata

Port   Status           Unit
------------------------------
p3     OK               u0

Bin     Response Time(ms)      IO Count
-----------------------------------------------
1       1                      0
2       2                      0
3       3                      0
4       4                      0
5       5                      0
```

```
 6       6                      0
 7       7                      0
 8       8                      0
 9       9                      0
 10      10                     0
 11      20                     204
 12      30                     190
 13      40                     161
 14      50                     136
 15      60                     130
 16      70                     112
 17      80                     94
 18      90                     80
 19      100                    540
 20      200                    95
 21      300                    42
 22      400                    11
 23      500                    2
 24      600                    2
 25      700                    0
 26      800                    0
 27      900                    0
 28      1000                   0
 29      2000                   0
 30      3000                   0
 31      4000                   0
 32      5000                   0
 33      6000                   0
 34      7000                   0
 35      8000                   0
 36      9000                   0
 37      10000                  0
 38      10000+                 0
```

Note that in the example above, there is a set of 38 “Bins” (shown in the first column) and each bin has associated with it a different Response Time category (shown in the second column). There are no commands with response times of 10 ms or less, and there are 204 commands with response times between 10 ms and 20 ms (bin 11). Each time that an I/O or command sends to a drive, the response time for that I/O increments the bin associated with that response time.

/cx/px remove [quiet]

The **/cx/px remove** command allows you to remove (or export) a port (or drive) **/cx/px**. The command instructs the firmware to remove the specified port from its pool of managed ports. When the drive is removed, the DCB (Disk Configuration Block) metadata remains on the attached disk. You can import (or re-introduce) the port by rescanning the controller.

quiet is for noninteractive mode.

Warning: Use caution when using this command because this operation degrades any redundant units. This command fails if you attempt to remove a drive from a nonredundant unit. After the drive is removed using the CLI, it can be removed physically, without powering down the system if a hot-swap bay is available. System hangs and damage can occur if a hot-swap bay is not used.

/cx/px set identify=on|off

The **/cx/px set identify** command requires a supported enclosure.

This command sets the LED status of the port to **on** or **off**. If identify is set to **on**, the firmware activates the setting of the corresponding LED of the port on the controller and causes it to blink.

Note: This command is equivalent to “/cx/ex/slotx set identify=on|off” on page 116.

Note: This command requires an enclosure with appropriate enclosure support. For additional information about enclosure-related commands, see “Enclosure Object and Element Commands” on page 109.

Example:

```
//localhost> /c0/p5 set identify=on
Setting Port Identify on /c0/p5 to [on] ... Done.
```

/cx/px set dpmstat=clear [type=ra|lct|ext]

The **/cx/px set dpmstat=clear** command allows you to clear the data buffers of accumulated statistics information. There are two reasons to clear this data:

- After dpmstat is enabled, statistics information continues to accumulate. Eventually, it can cause a buffer overflow, causing all statistics information to be rendered as ####.
- You want fresh data, such as when switching between benchmarking writes to benchmarking reads.

This command allows you to clear the statistics counters of the Drive Performance Monitor. The optional **type** attribute specifies which statistics should be cleared. The options are: *ra* for Running Average, *lct* for Long Command Times, and *ext* for Extended Drive Statistics. For more about these statistics, see “/cx/px show dpmstat type=inst|ra|lct|histdata|ext” on page 98.

Please note that if **type=ra**, both the Running Average and Histogram data are cleared. If **type=lct**, only the Long Command Times data is cleared. And if **type=ext**, the extended drive statistics are cleared. If no type is specified, the default is the same as **type=ra**. Note that there are no direct commands for clearing only histogram data, or for clearing instantaneous data.

Example of clearing Running Average and Histdata statistics:

```
 //localhost> /c0/p3 set dpmstat=clear type=ra
 Clearing Drive Performance Monitor running average data on /c0/
p3 ... Done.
 Please note this clears the Running Average and Histogram data.
```

Example of clearing when I/O traffic has been stopped

If I/O traffic to the drive has been stopped, after clearing, a subsequent request to show the running average statistics would show all zeros.

```
 //localhost> /c0/p3 show dpmstat type=ra

                               Queue           Xfer         Resp
 Port     Status    Unit   Depth   IOPs    Rate(MB/s)   Time(ms)
 --------------------------------------------------------------
 p3       OK        u0     0       0       0.000        0
```

Similarly, the listing for Histogram data would also be all zeros.

Phy Object Commands

These commands apply only to 9750 and 9690SA controllers.

Phy Object Commands are sent to an instance of a controller phy such as ***/c0/phy0***.

Syntax

```
/cx/phyx show
/cx/phyx set link=auto|1.5|3.0|6.0
```

/cx/phyx show

The **/cx/phyx show** command presents a summary report on the specified phy. In the following example, the link speed of the phy is shown in three columns:

Supported, Enabled, and Control. The Supported and Enabled values are set for the phy and are not changeable. The Control value is the link speed that can be set with the **/cx/phyx set link=auto|1.5|3.0|6.0** command. The default is *auto*.

Example:

```
 //localhost> /c3/phy0 show

                             Device           --- Link Speed (Gbps) ---
 Phy     SAS Address         Type     Device   Supported  Enabled  Control
 --------------------------------------------------------------------------
 phy0    2007020800153811    SATA     /c3/p1    1.5-3.0    3.0      1.5
```

/cx/phyx set link=auto|1.5|3.0|6.0

The **/cx/phyx set link** command sets the link speed for the specified phy. This controls the speed between the controller and the hard drive or enclosure to which it is connected. The possible values for SAS and SATA drives are: `auto, 1.5, 3.0,` or `6.0`. Speed is in gigabits per second and the default setting is auto.

Example:

```
//localhost> /c0/phy0 set link=1.5
 Sending link speed control of /c0/phy0 to [1.5 Gbps] ...  Done.
```

Note: After link speed control is set to a different value, you must reboot the system for the new link speed to take effect.

BBU Object Commands

Battery Backup Unit (BBU) Object Commands are commands that provide information and perform actions related to a specific BBU installed on a specific controller, such as **/c0/bbu**.

This object is only available on controllers on which a BBU is actually installed.

Syntax

Note: The BBU firmware version and bootloader version do not apply for 9750 controller models.

```
/cx/bbu show
```

```
/cx/bbu show attribute [attribute ...] where attributes are:
    batinst|bootloader|cap|fw|lasttest|pcb|ready|serial|
    status|temp|tempstat|tempval|volt
/cx/bbu show all

/cx/bbu test [quiet]
    Warning: Can take up to 24 hours to complete. Write cache
    will be disabled during the test.
/cx/bbu enable
/cx/bbu disable [quiet]
```

/cx/bbu show

The **/cx/bbu show** command presents a summary report on the specified BBU object.

Example:

```
//localhost> /c0/bbu show
Name  OnlineState BBUReady  Status    Volt     Temp     Hours  LastCapTest
----------------------------------------------------------------------------
bbu   ON          No        Testing   OK       OK       72     01-Apr-2010
```

The command output indicates that the battery capacity was last measured on 01-Apr-2010. The battery typically lasts for 72 hours from the last tested date. In this example, the BBU unit is currently testing the battery. Both voltage and temperature are normal. The BBU is not ready to backup the write cache on the controller (due to the testing). (For complete information about the BBU, see the user guide that came with your 3ware RAID controller).

Note: If the BBU is either not present or disabled, the following is shown after the command: **//localhost> /c0/bbu show**.

Error: (CLI:053) Battery Backup Unit is not present.

/cx/bbu show attribute [attribute ...]

The **/cx/bbu show attribute** command shows the current setting of one or more of the given attributes on the BBU board. You can specify one or many attributes. If you specify an invalid attribute, the loop terminates. Possible attributes are: batinst, bootloader, cap, fw, lasttest, pcb, ready, status, serial, temp, volt.

/*cx*/bbu show batinst

The **/cx/bbu show batinst** command shows the date when the current battery was installed.

/*cx*/bbu show bootloader

The **/cx/bbu show bootloader** command shows the BBU's boot loader version.

Note that the BBU bootloader version is not applicable for 9750 models.

/*cx*/bbu show cap

The **/cx/bbu show cap** command shows the battery capacity in hours.

Note: A battery test should be run every four weeks in order to get a reliable estimate of battery capacity, and to determine when it needs to be replaced (an AEN is also issued as a reminder). You can use the command ***/cx*/bbu show lasttest** to check the date of the last test. For information about running a test, see “/cx/bbu test [quiet]” on page 108.

/*cx*/bbu show fw

The **/cx/bbu show fw** command shows the BBU firmware version number.

Note that the BBU firmware version does not apply to 9750 models.

/*cx*/bbu show lasttest

The **/cx/bbu show lasttest** command shows the date the battery capacity was last measured. If the battery capacity test has never been run, then *xx*-*xxx*-*xxxx* is shown.

Note: The estimated BBU capacity hours shown is based on the measurement taken during the last test. For information about running a test, see “/cx/bbu test [quiet]” on page 108.

/*cx*/bbu show pcb

The **/cx/bbu show pcb** command shows the PCB revision number on the BBU.

/*cx*/bbu show serial

The **/cx/bbu show serial** command shows the BBU serial number.

/*cx*/bbu show status

The **/cx/bbu show status** command shows the status of the BBU. Possible values are as follows:

Testing. A battery test is currently in progress. This test can take up to 24 hours to complete. During the test, the BBU is **not** capable of backup operation and the write cache might be disabled, deending on the unit's Storsave setting. If the test is completed without detection of a BBU error and the BBU status changes to WeakBat or OK, the write cache is re-enabled. If a Fault, Failed, or Error occurs during the test, the write cache remains in the disabled state until you resolve the problem.

Charging. The BBU is currently charging the battery. The BBU automatically starts charging whenever necessary. During charging, the BBU is **not** capable of backup operation and the write cache might be disabled, depending on the unit's Storsave setting. After the test is completed successfully and the BBU status changes to OK, the write cache is re-enabled. If a FAULT or ERROR occurs during the test, the write cache remains in the disabled state until you resolve the problem.

Fault. A battery fault is detected. The BBU is not capable of backup operation and the write cache might be disabled, depending on the unit's Storsave setting. To re-enable write cache, replace the battery and/or the BBU board as soon as possible.

Error. A BBU error is detected. The BBU is not capable of backup operation and the write cache might be disabled, depending on the unit's Storsave setting. To re-enable write cache, replace the battery and/or the Battery Backup Unit as soon as possible.

Failed. The battery failed a test. In this state, the BBU is not capable of backup operation and the write cache is disabled. To re-enable write cache, replace the battery and/or the BBU as soon as possible.

WeakBat. The BBU is functioning normally and is online and capable of backing up the write cache. However, the battery is weak and needs to be replaced.

OK. The BBU is ready, online, and capable of backing up the write cache. The unit's write cache is automatically reenabled, if applicable.

A dash (-) indicates that a battery or a BBU is not installed.

/*cx*/bbu show temp

The **/cx/bbu show temp** command shows the temperature status of the battery. The status can be OK, HIGH, LOW, TOO-HIGH, and TOO-LOW. The HIGH and LOW are in warning range. TOO-HIGH and TOO-LOW are out of the operating range and indicate the need to replace the battery. (Contact LSI to obtain a replacement battery.)

This command is equivalent to the command /cx/bbu show tempstat.

Example:

```
//localhost> /c0/bbu show temp
 /c0/bbu Battery Temperature Status = OK
```

/*cx*/bbu show tempstat

This command is equivalent to the command /cx/bbu show temp.

/*cx*/bbu show tempval

The **/cx/bbu show tempval** command shows the temperature of the BBU in Celsius.

Example:

```
//localhost> /c0/bbu show tempval
 /c0/bbu Battery Temperature Value = 24 deg C
```

/*cx*/bbu show volt

The **/cx/bbu show volt** command shows the voltage status of the battery. The status can be OK, HIGH, LOW, TOO-HIGH, and TOO-LOW. The HIGH and LOW are in warning range. TOO-HIGH and TOO-LOW are out of the operating range and indicate the need to replace the battery. (Contact LSI to obtain a replacement battery.)

/cx/bbu show all

The **/cx/bbu show all** command shows the current settings of all BBU-related attributes: ready, status, batinst, lasttest, volt, temp, cap, serial, fw, pcb, bootloader.

Example:

```
 //localhost> /c1/bbu show all
/c1/bbu Firmware Version = BBU: 2.00.00.023
/c1/bbu Serial Number = L319003B7460719
/c1/bbu BBU Ready = Yes
/c1/bbu BBU Status = OK
/c1/bbu Battery Voltage = OK
```

```
/c1/bbu Battery Temperature Status = OK
/c1/bbu Battery Temperature Value = 25 deg C
/c1/bbu Estimated Backup Capacity = 241 Hours
/c1/bbu Last Capacity Test = 22-Jun-2008
/c1/bbu Battery Installation Date = 20-Jun-2008
/c1/bbu Bootloader Version = BBU 0.02.00.002
/c1/bbu PCB Revision = 65
```

/cx/bbu test [quiet]

The **/cx/bbu test** command starts the battery capacity test. The test can take up to 24 hours to complete. During the test, the BBU is not capable of backup operation and the write cache of all units attached to that controller is disabled. After the test is completed successfully and the BBU status returns to OK, the write cache is re-enabled.

Note: Once started, the test can not be terminated before it completes. Write cache cannot be enabled until the test completes.

Asynchronous Event Notification (AEN) messages are also generated by controllers to notify you of the command status.

You can check for AENs with the controller alarms command **/cx show alarms [reverse]** or with the commands **/cx show events [reverse]** or **/cx show AENs [reverse]**. Using the *reverse* attribute lists the most recent AEN message at the top of the list. (For a list of all AENs, see the user guide that came with your 3ware RAID controller.)

/cx/bbu enable

The **/cx/bbu enable** command enables BBU detection on the controller. If the BBU is Ready, the controller utilizes BBU functionality in the event of a power failure.

/cx/bbu disable [quiet]

The **/cx/bbu disable** command disables BBU detection on the controller. When disabled, the controller ignores the existence of the BBU and shows that no BBU is installed even if a BBU is physically attached.

Enclosure Object and Element Commands

Enclosure object commands provide information and perform actions related to a specific enclosure, such as **/c0/e0** and its elements, for example, **/c0/e0/slot0**. Enclosure object elements include slot, fan, temperature sensor, power supply, and alarm elements.

Note: The command descriptions of this section show the syntax of enclosure commands for 9750 and 9690SA controllers, which specify the controller ID and the enclosure ID. For the 9650SE, simply drop the prepended controller name in the command. For example, use **/e0** instead of **/c1/e0**.

The following table summarizes the supported controllers, protocols, configurations, and enclosure elements.

Table 11: Enclosure protocol, syntax, and supported elements

Controller		**9650SE**		**9750 and 9690SA**
Configuration/Protocol		**CCU/SAF-TE**	**SES I^{2}C backplanes**	**SES-2**
Syntax		***/ex***	***/ex***	***/cx/ex***
Enclosure Element Supported	**Slot**	**Y**	**Y**	**Y**
	Fan	**Y**	**Y**	**Y**
	Temperature Sensor	**Y**	**Y**	**Y**
	Power Supply	**N**	**Y**	**Y**
	Alarm	**N**	**Y**	**Y**

Syntax

```
/cx/ex show
/cx/ex show attribute [attribute ...] where attributes are:
    controllers|diag|protocol|slots|fans|temp|pwrs|alarms
/cx/ex show all

/cx/ex/slotx show
/cx/ex/slotx show identify
/cx/ex/slotx set identify=on|off

/cx/ex/fanx show
/cx/ex/fanx show identify
```

```
/cx/ex/fanx set identify=on|off
/cx/ex/fanx set speed=<0|1|2|3|4|5|6|7>

/cx/ex/pwrsx show
/cx/ex/pwrsx show identify
/cx/ex/pwrsx set identify=on|off

/cx/ex/tempx show
/cx/ex/tempx show identify
/cx/ex/tempx set identify=on|off

/cx/ex/almx show
/cx/ex/almx set alarm=mute|unmute|off
```

/cx/ex show

The **/cx/ex show** command applies to 9750 and 9690SA controllers. For the 9650SE and CCU enclosure, simply drop the prepended controller name in the command and use /*ex*.

The **/cx/ex show** command shows summary information on the specified enclosure /**cx/ex.** This report consists of several parts, depending on the available elements of the enclosures. Typically, the summary consists of the **Enclosure** section listing the set of enclosures, a **Fan** section, a **Temperature Sensor** section, a **Power Supply** section, a **Slot** section, and an **Alarm** section.

Example:

```
 //localhost> /c0/e0 show
 Encl        Status
 ---------------------------
 /c0/e0      OK

 Fan         Status          State   Step   RPM     Identify
 ------------------------------------------------------------
 fan0        OK              ON      1      2670    Off
 fan1        OK              ON      1      9500    Off
 fan2        OK              ON      1      8540    Off
 fan3        OK              ON      1      2830    Off
 fan4        OK              ON      1      9120    Off
 fan5        OK              ON      1      8330    Off

 TempSensor    Status         Temperature     Identify
 --------------------------------------------------------
 temp0         OK             41C(105F)       Off
 temp1         OK             38C(100F)       Off
 temp2         OK             34C(93F)        Off
 temp3         OK             38C(100F)       Off
 temp4         OK             38C(100F)       Off
 temp5         OK             34C(93F)        Off
 temp6         NOT-INSTALLED  -               Off
 temp7         NOT-INSTALLED  -               Off

 PowerSupply  Status         State  Voltage        Current        Identify
 ---------------------------------------------------------------------------
```

```
pwrs0        OK             on     OK            OK             Off
pwrs1        OK             on     OK            OK             Off

Slot      Status          VPort         Identify
--------------------------------------------------
slot0     OK              /c0/p0        Off
slot1     NO-DEVICE       -             Off
slot2     OK              /c0/p1        Off
slot3     OK              /c0/p2        Off
slot4     OK              /c0/p3        Off
slot5     OK              /c0/p4        Off
slot6     OK              /c0/p5        Off
slot7     OK              /c0/p6        Off
slot8     OK              /c0/p7        Off
slot9     OK              /c0/p8        Off
slot10    OK              /c0/p9        Off
slot11    NO-DEVICE       -             Off

Alarm     Status         State          Audibility
--------------------------------------------------
alm0      OK             OFF            UNMUTE
```

/cx/ex show attribute [attribute ...]

The **/cx/ex show attribute** command applies to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /*ex*.

The **/cx/ex show attribute** command shows the current setting of one or more attributes. You can specify one or many attributes. If you specify an invalid attribute, the loop terminates. Possible attributes are: controllers, slots, fans, temp, pwrs (power supply), and alms (alarms).

/*cx*/*ex* show controllers

The **/cx/ex show controllers** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /*ex*. This command is primarily useful for 9650SE controllers, where the enclosure number might not already be known.

The **/cx/ex show controllers** command lists the controller associated with enclosure **/cx/ex**.

Example:

```
//localhost> /e0 show controllers
e0 connects to controller /c0
```

/cx/ex/ show diag=helptext

The **/cx/ex show diag=helptext** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex show diag=helptext** command allows you to view the enclosure diagnostic log. What is reported by this log varies depending upon the manufacturer of the enclosure. The enclosure diagnostic log might be requested by 3ware Customer Support to help troubleshoot problems on your enclosure.

/cx/e*x* show slots

The **/cx/ex show slots** command applies only to 9750 and 9690SA controllers. For the 9650SE and CCU enclosure, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex show slots** command shows the slots in enclosure **/c*x*/e*x*** and their associated information. The Slot column lists the slot IDs, the Status column lists the status of each slot, the (V)Port column shows the associated port or virtual port of each slot, and the Identify column lists the Identify setting of the slots

Example:

```
//localhost> /c0/e0 show slots

Slot      Status          (V)Port      Identify
----------------------------------------------------
slot0     OK              /c0/p0        No
slot1     OK              /c0/p1        Yes
slot2     NO-DEVICE       -             No
slot3     NO-DEVICE       -             No
```

/cx/e*x* show fans

The **/cx/ex show fans** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex show fans** command lists the fans in enclosure **/cx/ex** and shows their status, as shown in the example below.

The Status column lists the status of each fan. The State column indicates whether the fan is *On* or *Off*. Speed is shown by two columns. One shows the Step (level) and the other shows the RPM (revolutions per minute). There are seven speed levels:

0 - Off
1 - Lowest

2 - Low
3 - Medium-low
4 - Medium
5 - Medium-high
6 - High
7 - Highest

The Identify column lists the Identify setting of the fans.

Example:

```
//localhost> /c0/e0 show fans
                                    ---Speed---
Fan         Status          State   Step   RPM     Identify
------------------------------------------------------------
fan0        OK              ON      1      2670    Off
fan1        OK              ON      1      9370    Off
fan2        OK              ON      1      8540    Off
fan3        OK              ON      1      2810    Off
fan4        OK              ON      1      9240    Off
fan5        OK              ON      1      8330    Off
```

/*cx*/*ex* show temp

The **/cx/ex show temp** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /*ex*.

The **/cx/ex show temp** command lists the temperature sensors in enclosure **/cx/ex** and the current temperature.

The maximum temperature for successful use of a drive should be noted in the documentation for the drive.

The TempSensor column lists the temperature sensor IDs, the Status column lists the status of each temperature sensor, the Temperature column lists the temperature at the sensors, and the Identify column lists the Identify setting of the temperature sensors

Example:

```
//localhost> /c0/e0 show temp
TempSensor    Status        Temperature     Identify
--------------------------------------------------------
temp0         OK             41C(105F)       Off
temp1         OK             37C(98F)        Off
temp2         OK             34C(93F)        Off
temp3         OK             38C(100F)       Off
temp4         OK             38C(100F)       Off
temp5         OK             34C(93F)        Off
temp6         NOT-INSTALLED  -               Off
temp7         NOT-INSTALLED  -               Off
```

/*cx*/*ex* show pwrs

The **/cx/ex show pwrs** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /*ex*.

The **/cx/ex show pwrs** command shows a summary of power supplies with their respective information for the specified enclosure.

The PowerSupply column lists the IDs of the power supply units, the Status column lists the status of each power supply, the State column indicate if the unit is ON or OFF, the Voltage and Current columns indicate whether the voltage or current is under or over the required thresholds, and the Identify column lists the Identify setting of the power supplies.

Example:

```
//localhost> /c0/e0 show pwrs

PowerSupply  Status    State  Voltage    Current      Identify
--------------------------------------------------------------
pwrs0        OK        on     OK          OK             Off
pwrs1        OK        on     OK          OK             Off
```

/*cx*/*ex* show alarms

The **/cx/ex show alarms** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /*ex*.

Note that in this command, *alarms* can be abbreviated to *alms*. For example, **/cx/ex show alms.**

The **/cx/ex show alarms** command shows a summary of the alarms within the specified enclosure. The Alarm column lists the alarm units' IDs, the Status column lists the status of each alarm, the State column indicates whether the alarm unit is ON or OFF, and the Audibility column indicates whether the alarm is Muted or Unmuted.

Example:

```
//localhost> /c0/e0 show alarms
Alarm       Status     State      Audibility
---------------------------------------------------
alm0        OK         OFF        UNMUTE
```

/cx/ex show all

The **/cx/ex/show all** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/show all** command shows the current settings of all attributes for enclosure **/cx/ex**.

/cx/ex/slotx show

The **/cx/ex/slotx show** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/slotx show** command shows information about the specified **/slot*x*** on the specified enclosure **/ex.** The slot name is followed by its status. If the slot contains a drive and no fault is detected, the status is OK. If the slot is empty the status indicates NO-DEVICE. The port that is correlated to the slot is indicated in the next column. If the slot is empty, then a dash (-) is shown in the Port column. The final column shows the Identify setting for the specified slot. The following is an example of the output:

Example:

```
//localhost> /c0/e0/slot1 show
Slot      Status          Port          Identify
----------------------------------------------------
slot1     OK              /c0/p1        Yes
```

/cx/ex/slotx show identify

The **/cx/ex/slotx show identify** applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/slotx show identify** command shows the identify status of the specified slot. The status can be either *on* or *off*. If identify is *on*, the LED associated with the slot blinks. If the enclosure does not support Slot Identify, this command returns *N/A*.

Example:

```
//localhost> /c0/e0/slot1 show identify
/c0/e0/slot1 Identify status = on
```

/cx/ex/slotx set identify=on|off

The **/cx/ex/slotx set identify** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

If the enclosure supports Slot Identify, this command identifies the specified slot by blinking the LED associated with it, or turns off identification of the LED for this slot.

Setting identify to **on** causes the LED associated with that slot to blink.

Note: This command is equivalent to "/cx/px set identify=on|off" on page 101.

Example:

```
//localhost> /c0/e0/slot1 set identify=on
Setting Slot Identify /c0/e0/slot0 to [on] ... Done.
```

/cx/ex/fanx show

The **/cx/ex/fanx show** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/fanx show** command shows the information about the specified enclosure fan **/fan*x*** in the specified enclosure **/c*x*/e*x***. The fan name is followed by its status. If a fan is on and no fault has been detected, the status indicates OK.

Example:

```
//localhost> /c0/e0/fan0 show
                                    ---Speed---
Fan         Status          State   Step   RPM     Identify
------------------------------------------------------------
fan0        OK              ON      1      2700    Off
```

/cx/ex/fanx show identify

The **/cx/ex/fanx show identify** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/fanx show identify** command shows the identify status of the specified fan. The status can be either **on** or **off**. If identify is **on**, the LED associated with the fan blinks. If the enclosure does not support Fan Identify, this command returns **N/A**.

Example:

```
//localhost> /c0/e0/fan1 show identify
/c0/e0/fan1 Identify status = on
```

/cx/ex/fanx set identify=on|off

The **/cx/ex/fanx set identify** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

If the enclosure supports Fan Identify and there is an LED associated with the fan, this command causes the LED associated with the fan to blink, or turns off identification of the LED for this fan.

Example:

```
//localhost> /c0/e0/fan1 set identify=on
Setting Fan Identify on /c0/e0/fan1 to [on] ... Done.
```

/cx/ex/fanx set speed=<0..7>

The **/cx/ex/fanx set speed** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/fanx set speed** command sets the speed level of the specified enclosure fan. The speed level is a number in the range of <0 . . 7>, as follows:
0 – Off
1 – Lowest
2 – Low
3 – Medium-low
4 – Medium
5 – Medium-high
6 – High
7 – Highest

Example:

```
//localhost> /c0/e0/fan1 set speed=1
Setting Fan Speed on /c0/e0/fan1 to [1] ... Done.
```

/cx/ex/pwrsx show

The **/cx/ex/pwrsx show** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/pwrsx show** command shows the information about the specified power supply element **/pwrs*x*** in the specified enclosure **c*x*/e*x***. The power supply name is followed by its status. The possible status values are OK, FAIL, NOT-INSTALLED, and OFF. The possible values for voltage are OK, OVER-VOLTAGE, and UNDER-VOLTAGE. The possible values for current are OK and OVER-CURRENT. In either case, OVER means over the set threshold of the voltage or current.

If a power supply is on and no fault has been detected, the status indicates OK.

Example:

```
 //localhost> /c0/e0/pwrs0 show

 PowerSupply  Status    State  Voltage   Current   Identify
 ------------------------------------------------------------
 pwrs0        OK        on     OK        OK        Off
```

/cx/ex/pwrsx show identify

The **/cx/ex/pwrsx show identify** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /*ex*.

The **/cx/ex/pwrsx show identify** command shows the identify status of the specified power supply element. The status can be either **on** or **off**. If identify is on, the LED associated with the power supply blinks. If the enclosure does not support Power Supply Identify, this command returns N/A.

Example:

```
 //localhost> /c0/e0/pwrs1 show identify
 /c0/e0/pwrs1 Identify status = on
```

/cx/ex/pwrsx set identify=on|off

The **/cx/ex/pwrsx set identify** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /*ex*.

If the enclosure supports Power Supply Identify, this command causes the LED associated with the power supply to blink, or turns off identification of the LED for this power supply.

Example:

```
 //localhost> /c0/e0/pwrs1 set identify=on

 Sending Identify request to Power Supply /c0/e0/pwrs1 to [on]
... Done.
```

/cx/ex/tempx show

The **/cx/ex/tempx show** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/tempx show** command shows the information about the specified temperature sensor element **/temp*x*** in the specified enclosure **c*x*/e*x***. The possible status values are OK, OVER-WARNING, OVER-FAIL, UNDER-WARNING, UNDER-FAIL, where OVER denotes over-temperature and UNDER denotes under-temperature. For more information about these statuses, see “Temp Sensor Status” in the *3ware SATA+SAS RAID Controller Card Software User Guide, Version 10.2*.

Example:

```
 //localhost> /c0/e0/temp0 show
 TempSensor    Status         Temperature     Identify
 --------------------------------------------------------
 temp0         OK             42C(107F)       Off
```

/cx/ex/tempx show identify

The **/cx/ex/tempx show identify** command applies only to 9750 and 9690SA controllers. For the 9650SE and CCU enclosure, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/tempx show identify** command shows the identify status of the specified temp sensor. The status can be either **on** or **off**. If identify is **on**, the LED associated with the temp sensor blinks. If the enclosure does not support Temperature Sensor Identify, this command returns N/A.

Example:

```
 //localhost> /c0/e0/temp1 show identify
 /c0/e0/temp1 Identify status = on
```

/cx/ex/tempx set identify=on|off

The **/cx/ex/tempx set identify** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

If the enclosure supports Temperature Sensor Identify, this command causes the LED associated with the temp sensor to blink, or turns off identification of the LED for this temp sensor.

Example:

```
 //localhost> /c0/e0/temp1 set identify=on

 Setting Temperature Sensor Identify on /c0/e0/temp1 to [on] ...
Done.
```

/cx/ex/almx show

The **/cx/ex/almx show** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/almx show** command shows information about the specified enclosure alarm. The possible status values are OK, FAIL, NOT-INSTALLED, and ACTIVATED. The status values are described below. The possible values for State are ON and OFF. The possible values for Audibility are UNMUTE and MUTED.

Possible status values and their descriptions are as follows:

OK – Alarm device is functional and operational.

FAIL – Alarm device has malfunctioned and is not operational.

NOT-INSTALLED – Alarm device has not been installed.

ACTIVATED - Alarm device is functional, and an error condition has been detected. This is a visual indication for the alarm, in addition to the sound. If you mute the sound, the visual indication remains.

Example:

```
//localhost> /c0/e0/alm0 show
Alarm       Status            State      Audibility
---------------------------------------------------
alm0        ACTIVATED         ON        UNMUTE
```

/cx/ex/almx set alarm=mute|unmute|off

The **/cx/ex/almx set alarm** command applies only to 9750 and 9690SA controllers. For the 9650SE, simply drop the prepended controller name in the command and use /e*x*.

The **/cx/ex/almx set alarm** command controls the audibility and state of the enclosure alarm. It provides the ability to silence an activated alarm. It also gives you the option to mute or unmute the alarm setting.

You can also use this command to prevent an audible alarm from sounding, in the case where a known condition will set off the alarm, by muting the alarm in advance.

If an error condition or degraded state is detected, the enclosure alarm or buzzer sounds. To silence the alarm, you can either set the state of the alarm to **off**, or you can mute the alarm.

Note: Some enclosures support alarms but not the mute/unmute function. For these enclosures, using this command to set the alarm to **mute** returns an error message indicating that the feature is not supported. For these enclosures, the alarm is not mutable; however, it can be turned **off**.

If you set this command to **unmute** for an enclosure that does not support mute, the command appear to complete and does not report an error. However in this case, there is no mute setting to change to unmute.

Example:

```
 //localhost> /c0/e0/alm0 set alarm=unmute
 Setting alarm audibility setting of /c0/e0/alm0 to [unmute] ...
Done.
```

/cx/ex update fw=filename_with_path [sep=n] [force]

The **/cx/ex update** command applies only to 9750 controllers.

The **/cx/ex update** command downloads the specified expander firmware image to the target SEP (Storage Enclosure Processor) expander that supports the SES-2 (SCSI Enclosure Services) standard for enclosure management. (CCU enclosures with SAF-TE protocol are not supported.)

For details about working with this command, see the LSI 3ware KnowledgeBase. Go to http://kb.lsi.com and refer to article # 15803.

/cx/ex show firmware

The **/cx/ex show firmware** command lists the SEP and corresponding firmware version in the specified expander. This command applies only to 9750 controllers.

Example:

```
//localhost > /c1/e0 show firmware
/c1/e0 SEP=0, Firmware Version = 90.00.03.15
```

Help Commands

The Help commands provides brief on-line help.

You can get overview help by typing `Help` at the top-level prompt. This lists a brief definition of commands. (For an example, see the discussion of the command “help” on page 124.)

You can also get help with specific commands, by typing `help` before an object name, or by typing a question mark (`?`) at the point in a command where you are uncertain of the attributes.

Help with specific commands

If you type the help command at the top level, you are considered to be working in the Shell Object, and the help command provides help on the Shell commands focus, show, flush, rescan, and commit. Using the help command on objects (such as **/c*x*, /c*x*/u*x*, /c*x*/p*x*, /c*x*/bbu, /e*x*, /e*x*/slot*x*, /e*x*/fan*x***, and **/e*x*/temp*x***), shows all possible subcommands associated with the object.

For example: Help on the controller object **/cx**, lists all the subcommands associated with the controller **/cx**, as follows:

```
//localhost> help /cx
/cx show
/cx show attribute [attribute ...]   where attribute is:
    achip|allunitstatus|autocarve(9KSX/SE/SA)
    |bios|driver|firmware|autorebuild(9KSX/SE only)
    |carvesize(9KSX/SE/SA|drivestatus|
    ctlbus(9KSX/SE/SA)|memory|model|monitor|numdrives|
    numports|numunits|unitstatus||
    pcb|pchip|serial|spinup|stagger
/cx show all  where all means Attributes and configurations.
/cx show diag
/cx show

/cx show rebuild                         (9000 series)
/cx show rebuildmode                     (9KSE/SA)
/cx show rebuildrate                     (9KSE/SA)
/cx show verify                          (9000 series)
/cx show verifymode                      (9KSE/SA)
/cx show verifyrate                      (9KSE/SA)
/cx show selftest                        (9000 series)
/cx show phy                          (9750 and 9690SA only)
/cx show dpmstat [type=<inst|ra|ext>]
           (9000 series for type=inst and type=ra; 9KSE/SA
    for type=ext)
/cx add type=<RaidType> disk=<p:-p..> [stripe=<Stripe>]
    [noscan][nocache|nowrcache][nordcache|rdcachebasic]
    [group=<3|4|5|6|7|8|9|10|11|12|13|14|15|16>]
    (group=13-16 9750/9690SA)[name=string (9000 series)]
    [ignoreECC][autoverify][noqpolicy][v0=n|vol=a:b:c:d]
    (n,a,b,c,d = size of volume in GB) (9000 series)
    [storsave=<protect|balance|perform>(9KSX/SE/SA)
    [rapidrecovery=(all|rebuild|disable)] (9KSE/SA only)
    RaidType={raid0, raid1, raid5, raid10, raid50, single,
    spare, raid6 (9750, 9690SA, and 9650SE)}
/cx add rebuild=ddd:hh:duration            (9000 series)
/cx add verify=ddd:hh:duration             (9000 series)
/cx add selftest=ddd:hh                    (9000 series)

/cx del rebuild=slot_id                    (9000 series)
/cx del verify=slot_id                     (9000 series)
/cx del selftest=slot_id                   (9000 series)

/cx set spinup=nn                          (9000 series)
/cx set stagger=nn                         (9000 series)
/cx set autocarve=on|off                   (9000 series)
/cx set carvesize=<1024..32768>         (9KSX/SE/SA only)
/cx set rebuild=enable|disable|<1..5>
                        (enable|disable for 9000 series)
/cx set rebuildmode=<adaptive|lowlatency>  (9KSE/SA only)
/cx set rebuildrate=<1..5>                 (9KSE/SA only)
/cx set verify=enable|disable|<1..5>
                        (enable|disable for 9000 series)
/cx set verifymode=<adaptive|lowlatency>  (9KSE/SA only)
/cx set verifyrate=<1..5>                 (9KSE/SA only)
/cx set selftest=enable|disable [task=SMART](9000 series)
/cx set autorebuild=on|off             (9KSX/SE/SA only)
/cx set autodetect=on|off disk=<p:-p>|all  (9000 series)
/cx set dpmstat=on|off                     (9000 series)
/cx update fw=filename_with_path [force]   (9000 series)
/cx flush
/cx commit          (Windows only) (Also known as shutdown)
/cx rescan [noscan]
//localhost>
```

Help with attributes

As you work with specific objects or commands, you can also use the question mark character (?) to get help.

For example: If you type the command **/c0 show** and then need help to determine specific attribute syntax, you can type *?* to get help, as follows:

```
//localhost> /c0 show ?

/cx show
/cx show attribute [attribute ...]    where attribute is:
    achip|allunitstatus|autocarve(9000 series)|
    bios|carvesize(9000series)|
    driver|drivestatus|firmware|memory|model|
    monitor|numdrives|numports|numunits|ctlbus(9000 series
    SX/SE/SA only)|serial|pcb|
    pchip|spinup|stagger|unitstatus|
/cx show all where all means attributes and configurations.
/cx show diag
/cx show alarms [reverse]
/cx show rebuild                           (9000 only)
/cx show verify                            (9000 only)
/cx show selftest                          (9000 only)
//localhost>
```

help

The help command provides a table of contents to help with the overall navigation of the CLI commands.

For example:

Typical output is similar to the following example.

```
//localhost> help
Copyright (c) 2010 LSI
LSI/3ware CLI (version 2.00.11.010)


Commands  Description
-------------------------------------------------------------------
focus     Changes from one object to another.  For Interactive Mode Only!
show      Displays information about controller(s), unit(s) and port(s).
flush     Flush write cache data to units in the system.
rescan    Rescan all empty ports for new unit(s) and disk(s).
update    Update controller firmware from an image file.
commit    Commit dirty DCB to storage on controller(s).     (Windows only)
/cx       Controller specific commands.
/cx/ux    Unit specific commands.
/cx/px    Port specific commands.
/cx/phyx  Phy specific commands.
/cx/bbu   BBU specific commands.                               (9000 only)
/cx/ex    Enclosure specific commands.                       (9690SA only)
/ex       Enclosure specific commands.                      (9KSX/SE only)

Certain commands are qualified with constraints of controller type/model
support.  Please consult the tw_cli documentation for explanation of the
controller-qualifiers.

Type help <command> to get more details about a particular command.
For more detail information see tw_cli's documentation.
```

help focus

The **help focus** command provides specific focus-related help, illustrating various ways to use the focus command. See the section “Shell Object Commands” on page 25 for more information.

help show

The **help show** command provides specific show-related help, illustrating various ways to use the show command. It provides reports on Controllers, Units, and Drives. See the section “Shell Object Commands” on page 25 for more information.

help flush

The **help flush** command provides specific flush-related help, illustrating various ways to use the flush command. See the section “Shell Object Commands” on page 25 for more information.

help rescan

The **help rescan** command provides specific rescan-related help, illustrating various ways to use the rescan command. See the section “Shell Object Commands” on page 25 for more information.

help update

The **help update** command provides specific update-related help. See “Shell Object Commands” on page 25 for more information.

help commit

The **help commit** command provides specific commit-related help, illustrating various ways to use the commit command. See the section “Shell Object Commands” on page 25 for more information.

help /c*x*

The **help /cx** command provides specific controller **/c*x***-related help, illustrating various commands associated with the controller **/c*x***. See the section “Controller Object Commands” on page 30 for more information.

help /c*x*/phy*x*

The **help /cx/phy x** command provides specific /cx/phyx-related help, illustrating various ways to use the /cx/phyx command. See “Phy Object Commands” on page 102.

help /c*x*/u*x*

The **help /cx/ux** command provides specific unit **/c*x*/u*x***-related help, illustrating various commands to use on a unit **/c*x*/u*x***. See the section “Unit Object Commands” on page 71 for more information.

help /c*x*/p*x*

The **help /cx/px** command provides specific **/c*x*/p*x***-related help, illustrating various ways to use the **/c*x*/p*x*** command. See the section “Port Object Commands” on page 92 for more information.

help /cx/bbu

The **help /cx/bbu** command provides specific **/c*x*/bbu**-related help, illustrating various ways to use the **/c*x*/bbu** command. See the section “BBU Object Commands” on page 103 for more information.

help /c*x*/e*x*

The **help /cx/ex** command provides specific enclosure cx/ex-related help, illustrating various commands associated with the enclosure cx/ex. See the section “Enclosure Object and Element Commands” on page 109 for more information.

help /c*x*/e*x*/slot*x*

The **help /cx/ex/slotx** command provides specific slot cx/ex/slotx-related help, illustrating various ways to use cx/ex/slotx. See the section “Enclosure Object and Element Commands” on page 109 for more information.

help /c*x*/e*x*/fan*x*

help /cx/ex/fanx command provides specific fan cx/ex/fanx-related help, illustrating various ways to use the cx/ex/fanx command. See the section “Enclosure Object and Element Commands” on page 109 for more information.

help /c*x*/e*x*/temp*x*

help /cx/ex/tempx command provides specific temperature sensor cx/ex/tempx-related help, illustrating various ways to use the cx/ex/tempx command. See the section “Enclosure Object and Element Commands” on page 109 for more information.

help /c*x*/e*x*/pwrs*x*

help /cx/ex/pwrsx command provides specific power supply /cx/ex/pwrsx-related help, illustrating various ways to use the /cx/ex/pwrsx command. See the section “Enclosure Object and Element Commands” on page 109 for more information.

help /c*x*/e*x*/alm*x*

help /cx/ex/almx command provides specific enclosure alarm /cx/ex/almx-related help, illustrating various ways to use the /cx/ex/almx command. See the section “Enclosure Object and Element Commands” on page 109 for more information.

Command Logging

Both the CLI and 3DM2 have a logging function that makes an entry into a log file for each command line that makes a change to the controller configuration (for example, add/delete units).

This logging function is enabled by default for CLI. It can be turned on for 3DM2, through the 3DM2 web interface.

You might be asked to supply this log file to the LSI technical support team for troubleshooting.

Location of the Log File

The log file name is **tw_mgmt.log**.

For Windows Vista, Server 2008, and Windows 7

The log file is stored in

\ProgramData\3ware

Note that *ProgramData* is a hidden folder by default. To show it in Windows Explorer, type `c:\ProgramData` in the location field at the top of the Explorer

Window. To make the folder permanently visible, select **Organize > Folder and Search Options** from the Explorer menu, choose the **View** tab, and select the **Show hidden files and folders** option in **Advance settings**.

For all previous versions of Windows (XP, Server 2003, etc.)

The log file is stored in the following location:

\Documents and Settings\All Users\Application Data\3ware

For Linux, FreeBSD, Mac OS, and OpenSolaris

The log file is in the following directory:

/var/log

Disabling and enabling command logging

You can disable or enable logging of controller commands by setting the environment variable TW_CLI_LOG to ON or OFF. The method for setting the environment variable depends on the operating system.

For Linux, FreeBSD, Mac OS, and OpenSolaris

The command you use to set the environment variable depends on the type of shell.

> **Important**: To set the environment variable, use the same shell you are using to run the CLI. If you set it in a different shell window and then terminate that shell, the change reverts to the original condition.

- **If Bash, ksh, or sh, use**

  ```
  export TW_CLI_LOG=OFF
  ```

  or

  ```
  export TW_CLI_LOG=ON
  ```

- **If csh (C-shell), use**

  ```
  setenv TW_CLI_LOG OFF
  ```

  or

  ```
  setenv TW_CLI_LOG ON
  ```

Note: Setting the environment variable according to the preceding description is not persistent across reboot, because the the shell terminates when you power down the system, and defaults are reset on powerup. To set an environment variable that persists, set a global variable in a login config file (such as .rc or .cshrc) that sets the variable to the desired state when the system powers up. For details, see the manpage for the shell you are using.

For Windows

Under Windows, you set the environment variable through **My Computer > Properties**.

1 Click the **Start** button, right-click **My Computer**, and choose **Properties**.

2 In the **Properties** dialog box, click the **Advanced** tab.

3 On the **Advanced** tab, click the **Environment Variables** button.

You can add a new variable by clicking **New**, or edit an existing variable by selecting TW_CLI_LOG in the list and clicking **Edit**.

4 If this is the first time you are creating the environment variable, and you want to disable command logging, add the variable TW_CLI_LOG and specify the value as OFF. (Command logging is on by default.)

5 If the environment variable already exists, you can enable or disable it by editing the value and changing it to ON or OFF, as desired.

6 Restart your system for the new environment variable setting to take effect.

Return Code

While informative messages are written to standard output, error messages are written to standard error. On success, 0 is returned. On failure, 1 is returned.

To view the return code for Linux, at the shell command prompt, type:

```
echo $?
```

The screen reports either a 0 or a 1, depending on whether the command is successful.

For example, if you have a 3ware controller with an ID of 0, you can type the following command:

```
tw_cli /c0 show
(c0 information shown here)
echo $?
0
```

If you type the following

```
tw_cli /c7 show
error: (CLI003) specified controller does not exist.
echo $?
1
```

This example fails (returns 1) because there is no controller 7.

To view the return code for Windows, in a command window type:

```
tw_cli /c0 show
```

(c0 info shown here)

```
if errorlevel 0 echo 0
0


tw_cli /c7 show
error....
if errorlevel 1 echo 1
1
```

This example fails (returns 1) because there is no controller 7.