



3ware[®] SAS/SATA RAID Controller

Command Line Interface
**Version 9.5.2—Supports the 9000 Series
(9690SA, 9650SE, 9590SE, 9550SX(U), and 9500S)**

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CLI Guide

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About this CLI Guide

3ware SAS/SATA RAID Controller CLI Guide, Version 9.5.2 provides instructions for configuring and maintaining your 3ware controller using 3ware's command line interface (CLI).

This guide assumes that you have already installed your 3ware RAID controller in your system. If you have not yet done so, see the installation guide that came with your 3ware RAID controller for instructions.

LSI makes a number of 3ware controller models, including 9000-series (9690SA, 9650SE, 9590SE, 9550SX(U), and 9500S), and earlier 7000/8000 series boards. The Command Syntax described in this document supports all of those boards, although not all commands are supported on every controller. When a command is not supported for all controllers, the specific model numbers that it applies to are indicated with the command.

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

There are often multiple ways to accomplish the same configuration and maintenance tasks for your 3ware controller. While this manual includes instructions for performing tasks using the command line interface, you can also use the following applications:

- 3ware BIOS Manager
- 3DM[®]2 (3ware Disk Manager)

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

1

Introduction to the 3ware Command Line Interface

The 3ware SATA RAID Controller Command Line Interface (CLI) manages multiple 7000, 8000, and 9000-series 3ware ATA and Serial ATA RAID controllers via a command line or script.



Note: Some CLI commands are supported only for particular models of 3ware RAID controllers. Wherever possible, commands are labeled to indicate when they are supported for only a subset of controllers.

For example, commands that apply only to 3ware 9000 series controllers are labeled as such and are not supported for 3ware 7000/8000 controllers.

Within the 9000 series, some commands apply to only to models 9690SA and 9650SE, some apply to 9690SA, 9650SE, 9590SE, and 9550SX(U), but not to 9500S, and are so labeled. A few commands apply only to models 9500S, and are labeled as such.

If a command is labeled as applying to the SX controller, it is available for both 9550SX and 9550SXU.

You may need to install particular firmware and drivers for some features to take effect. See the Release Notes for details.



Important!

For all of the functions of the 3ware CLI to work properly, you must have the proper CLI, firmware, and driver versions installed. Check <http://www.3ware.com/support> for the latest versions and upgrade instructions.

This chapter includes the following sections:

- “Features of the CLI” on page 3
- “Installing the 3ware CLI” on page 3
- “Working with 3ware CLI” on page 7
- “Understanding RAID Levels and Concepts” on page 10

Features of the CLI

3ware CLI is a command line interface for managing 3ware RAID Controllers. It provides controller, logical unit, drive, enclosure, and BBU (Battery Backup Unit) management. It can be used in both interactive and batch mode, providing higher level API (application programming interface) functionalities.

You can use the CLI to view unit status and version information and perform maintenance functions such as adding or removing drives. 3ware CLI also includes advanced features for creating and deleting RAID units online.

For a summary of what you can do using the CLI, see “Common Tasks Mapped to CLI Commands” on page 20.

Supported Operating Systems

The 9.5.2 version of the 3ware CLI is supported under the following operating systems:

- **Windows®.** Windows XP, Windows Server 2003, Windows Server 2008, and Vista, (32-bit and 64-bit versions of each).
- **Linux®.** Redhat, SuSE, both 32-bit and 64-bit.
- **FreeBSD®,** both 32-bit and 64-bit.
- **VMware ESX 3.x Server**
- **OpenSolaris**

For specific versions of Linux, FreeBSD, OpenSolaris, and VMWare that are supported, see the Release Notes and the file versions.txt, available on the CD.

Installing the 3ware CLI



Warning!

If you have a 7000/8000 controller and are using 3DM, as opposed to 3DM2, LSI does not recommend installing both 3DM and CLI on the same system. Conflicts may occur. For example, if both are installed, alarms will be captured only by 3DM. You should use either CLI or 3DM to manage your 3ware RAID controllers.

This is not an issue for 3DM 2, which works with the 9000-series controllers. It can be installed with CLI.

Installing the 3ware CLI on Windows

3ware CLI can be installed or run directly from the 3ware software CD, or the latest version can be downloaded from the 3ware web site, <http://www.3ware.com>. 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`.

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**.

Step through the pages of 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 the version of the operating system you are using.

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, CLI will prompt and then exit 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**.
- Or, open a console window, change to the directory where `tw_cli` is located, and at the command prompt, enter
`tw_cli`
- OR, double-click the CLI icon in a folder.

The CLI prompt is displayed in a DOS console window.

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

3ware CLI can be installed or run directly from the 3ware software CD, or the latest version can be downloaded from the 3ware web site, <http://www.3ware.com>.

To install 3ware CLI on Linux, FreeBSD, or OpenSolaris

Do one of the following:

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

CLI is located on the 3ware CD in the following directories:

```
/packages/cli/freebsd
/packages/cli/linux
/packages/cli/OpenSolaris
```

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



Notes:

The installation location needs to be in the environment path for root to execute the CLI without using complete paths (i.e., if installed to `/usr/sbin/`, you can type `tw_cli` on the command line, otherwise you will have to type the complete path:

```
/home/user/tw_cli
```

The 3ware 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 the version of the operating system you are using.

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

For Linux

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

```
/packages/installers/tools/linux/x86
/packages/installers/tools/linux/x86_64
```

- Type (depending upon which directory you are in)

```
./setupLinux_x86.bin -console
or
./setupLinux_x64.bin -console
```

- Press Enter to begin installation.

For FreeBSD

- Navigate to the appropriate FreeBSD directory on the 3ware CD, depending on the FreeBSD version you have:
 - `/packages/installers/tools/freebsd/6.x/x86`
 - `/packages/installers/tools/freebsd/6.x/x86_64`
 - `/packages/installers/tools/freebsd/7.x/x86`
 - `/packages/installers/tools/freebsd/7.x/x86_64`
- Type the appropriate command, depending on the FreeBSD version you have:
 - `./setupFreeBSD6_x86.sh -console`
 - `./setupFreeBSD6_x64.sh -console`
 - `./setupFreeBSD7_x86.sh -console`
 - `./setupFreeBSD7_x64.sh -console`
- Press Enter to begin installation.

Step through the installation screens in text mode. On the 3ware Disk Management Tools screen, make sure that Command Line Interface (`tw_cli`) is selected.

The default directory location used by 3ware is `/opt/AMCC/CLI/tw_cli`.

For Linux and FreeBSD, more detailed information about using this installer is supplied in Appendix B of *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

For OpenSolaris, more detailed information is available in *3ware SAS/SATA RAID Software User Guide Addendum for OpenSolaris*.

For OpenSolaris

- Navigate to the following directory
 - `packages/installers/tools/OpenSolaris`
- Type:
 - `./setupSolaris_x86.bin -console`
- Press Enter to begin installation.

For OpenSolaris, more detailed information is available in *3ware SAS/SATA RAID Software User Guide Addendum for OpenSolaris*.

- **Use a GUI.** If you are using a graphical user interface, insert and mount the 3ware CD.

Under Linux, at the 3ware menu, click **Install Software**. If the 3ware menu does not appear automatically, open a command window and type `./autorun` from the CD directory.

Under FreeBSD or OpenSolaris, open a command window and use the setup commands described above the command line option, without the `-console` option

The installer application will start in graphical mode.

Step through the pages of the installation wizard. On the 3ware Disk Management Tools screen, make sure that Command Line Interface (`tw_cli`) is selected. The default directory location used by 3ware is `/opt/AMCC/CLI/tw_cli`.

For Linux and FreeBSD, more detailed information about using this installer is supplied in Appendix B of *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

For OpenSolaris, more detailed information is available in *3ware SAS/SATA RAID Software User Guide Addendum for OpenSolaris*.

Working with 3ware CLI

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

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

The next few topics shows examples of these different methods.

- “Using the command interface interactively” on page 7
- “Using a single command with output” on page 8
- “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 3ware CLI interactively, 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 Enter the following command:

```
tw_cli
```

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

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

```
//localhost>
```

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

For example,

```
//localhost> show
```

displays all controllers in the system and shows summary information about them, like this:

Ctl	Model	Ports	Drives	Units	NotOpt	RRate	VRate	BBU
c0	9690SA-4I4E	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 enter the command and the arguments.

Single commands can be useful when you want to perform a task such as redirecting the output of the command to a file. It also allows you to use the command line history to eliminate 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 which 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 executes the file `clicommand.txt`, and runs the CLI commands included in that file.

Scripting examples

Following is a scripting example for a 4-port controller using a text file called `config_unit.txt`, containing three commands. This example sets up a 4-port controller with two units, each with 2 drives mirrored. It then prints the configurations for verification. The commands included in the script file are:

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

Following is a scripting example for a 12-port controller using a text file called `config_unit.txt`, containing three commands. This example sets up a 12-port controller with two units: one with the first 2 drives mirrored, and another with the remaining drives in a RAID 5 array. It then prints the configurations for verification. The commands included in the script file are:

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

To run either of the scripts, enter:

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

Outputting the CLI to a Text File

You can have the output of the 3ware CLI, including errors, sent to a text file by adding `2>&1` to the end of the line. This could 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 through 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 **/cx/px show all**
- In commands, brackets around an item indicates 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 ...]***, or that

there is a range between two values from which you can pick a value, for example, `/cx set carvesize=[1024...2048]`.

- In commands, a vertical bar (|) indicates an 'or' situation where the user has 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 may 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 Inexpensive Disks) to increase your storage system's performance and provide fault tolerance (protection against data loss).

This section organizes information about RAID concepts and configuration levels into the following topics:

- “RAID Concepts” on page 10
- “Available RAID Configurations” on page 11
- “Determining What RAID Level to Use” on page 17

RAID Concepts

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

- **Arrays and Units.** In the storage industry, the term “array” is used to describe two or more disk drives that appear to the operating system as a single unit. When working with a 3ware RAID controller, “unit” is the term used to refer to an array of disks that is configured and managed through the 3ware software. Single-disk units can also be configured in the 3ware software.
- **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 3ware's TwinStor technology reads from both drives simultaneously.
- **Striping.** Striping across disks allows data to be written and accessed on more than one drive, at the same time. 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. Should a failure occur, the data on the failed drive can be reconstructed from the data on the other drives.
- **Hot Swap.** The process of exchanging a drive without having to shut down the system. This 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 later, either on the same controller, or a different one, and having it recognized as a unit. The disks may be attached to different ports than they were originally attached to, 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 information below provides a more in-depth explanation of the different RAID levels.

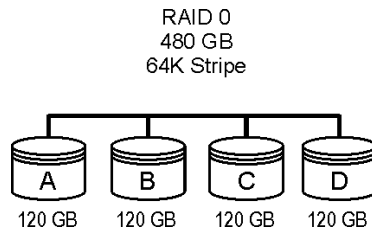
RAID 0

RAID 0 provides improved performance, but no fault tolerance. Since 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. The stripe size is configurable 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 additional precautions are taken to prevent system hangs and data loss.

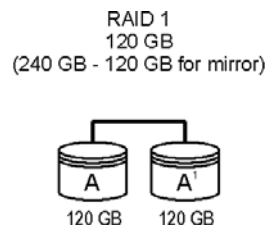
Figure 1. RAID 0 Configuration Example

RAID 1

RAID 1 provides fault tolerance and a speed advantage over non-RAID disks. RAID 1 is also 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 like web and database servers.

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

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

Figure 2. RAID 1 Configuration Example

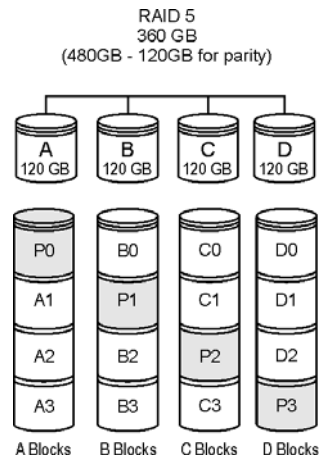
RAID 5

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 avoids throughput loss due to contention for the parity drive.

RAID 5 is able to tolerate 1 drive failure in the unit.

Figure 3. RAID 5 Configuration Example



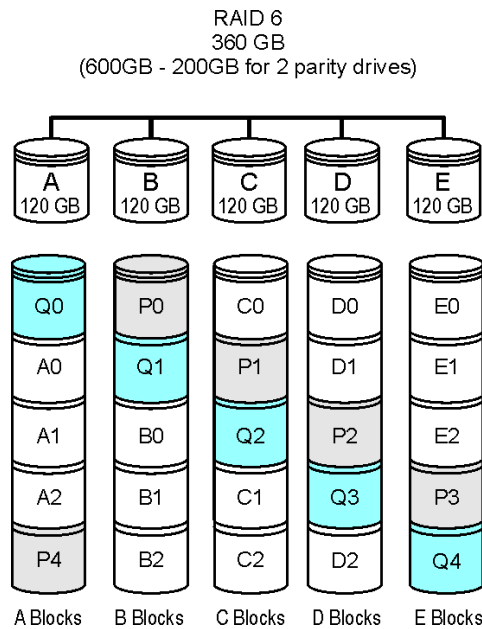
RAID 6

RAID 6 requires a 3ware 9650SE or 9690SA RAID controller.

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

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

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

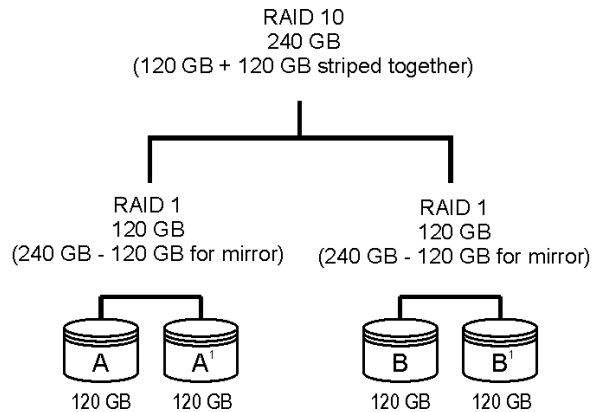
Figure 4. RAID 6 Configuration Example

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, thus the name RAID 10 (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 and striping the arrays.

In addition, RAID 10 arrays offer a higher degree of fault tolerance than RAID 1 and RAID 5, since the array can sustain multiple drive failures without data loss. For example, in a twelve-drive RAID 10 array, up to six drives can fail (half of each mirrored pair) and the array will continue to function. Please note that if both halves of a mirrored pair in the RAID 10 array fail, then all of the data will be lost.

Figure 5. RAID 10 Configuration Example

RAID 50

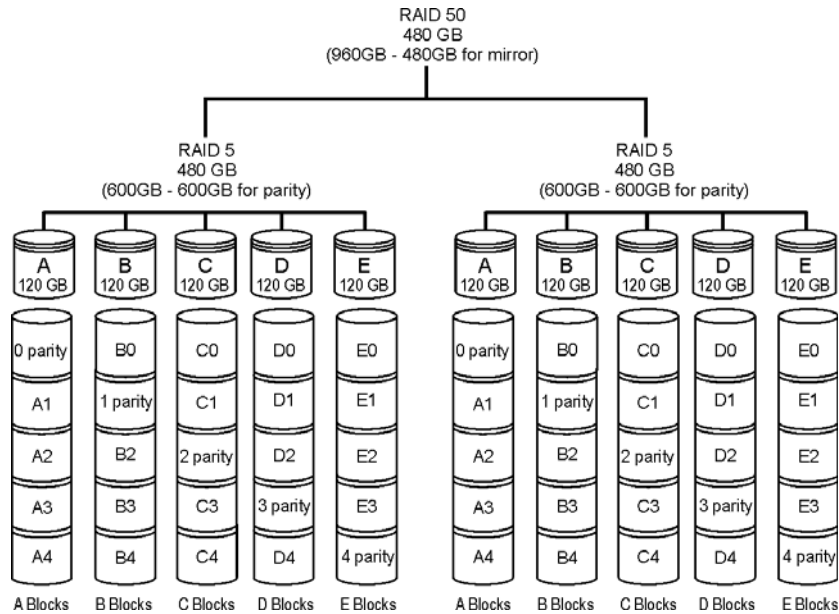
RAID 50 is a combination of RAID 5 with RAID 0. This array type provides fault tolerance and high performance. RAID 50 requires a minimum of six drives.

Several combinations are available with RAID 50. For example, on a 12-port controller, you can have a grouping of 3, 4, or 6 drives. A grouping of 3 means that the RAID 5 arrays used have 3 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 4 or 8 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, 8, or 6 drives, but not groups of 4 or 3.

In addition, RAID 50 arrays offer a higher degree of fault tolerance than RAID 1 and RAID 5, since the array can sustain multiple drive failures without data loss. For example, in a twelve-drive RAID 50 array, up to one drive in each RAID 5 set can fail and the array will continue to function. Please note that if two or more drives in a RAID 5 set fail, then all of the data will be lost.

Figure 6. RAID 50 Configuration Example



Single Disk

A single drive can be configured as a unit through 3ware software. (3BM, 3DM 2, or CLI). Like disks in other RAID configurations, single disks contain 3ware Disk Control Block (DCB) information and are seen by the OS as available units.

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

JBOD

A JBOD (acronym for “Just a Bunch of Disks”) is an unconfigured disk attached to your 3ware RAID controller. JBOD configuration is no longer supported in the 3ware 9000 series. LSI recommends that you use Single Disk as a replacement for JBOD, to take advantage of advanced features such as caching, OCE, and RLM.

JBOD units are not fault tolerant and therefore not recommended for high availability systems unless additional precautions are taken to prevent system hangs and data loss.

Hot Spare

A hot spare is a single drive, available online, so that a redundant unit can be automatically rebuilt in case of drive failure.

Determining What RAID Level to Use

Your choice of which type of RAID unit (array) to create will depend on your needs. You may wish 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 provides a brief summary of RAID type characteristics.

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	This type of unit 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	A combination of striped and mirrored units for fault tolerance and high performance.
RAID 50	A combination of RAID 5 and RAID 0. It provides high fault tolerance and performance.
Single Disk	Not a RAID type, but supported as a configuration. Provides for maximum disk capacity with no redundancy.

You can create one or more units, depending on the number of drives you have installed.

Table 3: Possible Configurations Based on Number of Drives

# Drives	Possible RAID Configurations
1	Single disk or hot spare
2	RAID 0 or RAID 1

Table 3: Possible Configurations Based on Number of Drives

# 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

To make the most efficient use of drive capacity, it is advisable to use drives of the same capacity in a unit. This is because the capacity of each drive is limited to the capacity of the smallest drive in the 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 so that drives from differing manufacturers are more likely to be able to be used 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 will be rounded down to 44 GB, and a 123 GB drive will be rounded down to 120 GB.



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

Support for Over 2 Terabytes

Legacy operating systems such as Windows 2000, Windows XP (32-bit), Windows 2003 (32-bit and 64-bit without SP1) Linux 2.4 and FreeBSD 4.x, do not recognize unit capacity in excess of 2 TB.

If the combined capacity of the drives to be connected to a unit exceeds 2 Terabytes (TB), you can enable auto-carving when you configure your units.

Auto-carving divides the available unit capacity into multiple chunks of 2 TB or smaller that can be addressed by the operating systems as separate volumes. The carve size is adjustable from 1024 GB to 2048 GB (default) prior to unit creation.

If a unit over 2 TB was created prior to enabling the auto-carve option, its capacity visible to the operating system will still be 2TB; no additional capacity will be registered. To change this, the unit has to be recreated.

You may also want to refer to Knowledgebase article # 13431, at <http://www.3ware.com/kb/article.aspx?id=13431>.

2

CLI Syntax Reference

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

Throughout this chapter the examples reflect the interactive method of executing 3ware CLI.



Note: The output of some commands varies somewhat for different types of controllers, and may vary if you have an enclosure attached. For most commands where this is the case, examples are provided to show the differences.

Common Tasks Mapped to CLI Commands

The table below lists many of the tasks people use to manage their RAID controllers and units, and 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	34
View controller policies and other details	/cx show [attribute] [attribute]	37
View drive performance statistics	/cx show dpmstat [type=inst ra ext]	39

Table 5: Common Tasks Mapped to CLI Commands

Task	CLI Command	Page
Set policies for a controller		
• Modify staggered spinup	/cx set stagger and /cx set spinup	77
• Disable write cache on unit degrade	/cx set ondegrade	77
• Enable/disable autocarving	/cx set autocarve	77
• Enable/disable autorebuild	/cx set autorebuild	78
• Set the autocarve volume size	/cx set carvesize	77
• Enable/disable drive performance monitoring statistics (dpmstat)	/cx set dpmstat	70
Unit Configuration Tasks		
View information about a unit	/cx/ux show	82
Create a new unit	/cx add	58
Create a hot spare	/cx add	58
Enable/disable unit write cache	/cx/ux set cache /cx/ux set wrcache	94
Enable Basic or Intelligent read cache, or disable both.	/cx/ux set rdcache	94
Set the queue policy	/cx/ux set qpolicy	96
Set the rapid RAID recovery policy	/cx/ux set rapidrecovery	97
Set the storsave profile	/cx/ux set storsave	97
Unit Configuration Changes		
Change RAID level	/cx/ux migrate	99
Change stripe size	/cx/ux migrate	99
Expand unit capacity	/cx/ux migrate	99
Delete a unit	/cx/ux del	89
Remove a unit (export)	/cx/ux remove	89
Name a unit	/cx/ux set name	96
Controller Maintenance Tasks		
Update controller with new firmware	/cx update	64
Add a time slot to a rebuild schedule	/cx add rebuild	66

Table 5: Common Tasks Mapped to CLI Commands

Task	CLI Command	Page
Add a time slot to a verify schedule	/cx add verify	67
Add a time slot to a selftest schedule	/cx add selftest	68
Enable/disable the rebuild/migrate schedule and set the task rate	/cx set rebuild	70
Enable/disable the verify schedule and set the task rate	/cx set verify	72
Set the verify schedule to advanced or basic	/cx set verify=advanced basic 1..5	73
Set the rebuild/migrate task rate	/cx set rebuildrate	72
Set the rebuild/migrate task mode	/cx set rebuildmode	71
Set the verify task rate	/cx set verifyrate	75
Set the verify task mode	/cx set verifymode	74
Set the basic verify start time and day	/cx set verify=basic [pref=ddd:hh]	74
Enable/disable the selftest schedule	/cx set selftest	76
View controller alarms	/cx show alarms /cx show events /cx show AENs	48
Unit Maintenance Tasks		
Start a rebuild	/cx/ux start rebuild	90
Start a verify	/cx/ux start verify	90
Pause/resume rebuild	/cx/ux pause rebuild and /cx/ux resume rebuild	92
Stop verify	/cx/ux stop verify	92
Enable/disable autoverify	/cx/ux set autoverify	92
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	115
Check if LED is set to on or off	/cx/px show identify	108
View information for specific drive	/cx/px show	106

Table 5: Common Tasks Mapped to CLI Commands

Task	CLI Command	Page
View the status of specific drive	/cx/px show status	109
Show statistics for the drive on a particular port	/cx/px show dpmstat type=inst ra lct histdata ext	112
Clear statistics counters for a particular drive	/cx/px set dpmstat=clear [type=ra lct ext]	115
PHY Tasks		
View details about link speed for a specified phy	/cx/phyx show	117
Set the link speed for a specified phy	/cx/phyx set link=auto 1.5 3.0	117
BBU Tasks		
Check on charge and condition of battery	/cx/bbu/ show status	120
Start a test of the battery	/cx/bbu test [quiet]	122
Enclosure Tasks		
View information about an enclosure and its components	/cx/ex show	124
Locate a drive slot in an enclosure by blinking an LED	/cx/ex/slotx set identify	129
Locate a fan in an enclosure by blinking an LED	/cx/ex/fanx set identify	130
Set the speed for a fan in an enclosure	/cx/ex/fanx set speed	130
Locate a power supply in an enclosure by blinking an LED	/cx/ex/pwrsx set identify	132
Locate a temperature sensor in an enclosure by blinking an LED	/cx/ex/tempx set identify	133
Turn off or mute an audible alarm in an enclosure	/cx/ex/almx set alarm	133

Terminology

3ware SAS/SATA RAID Controller CLI Guide, Version 9.5.2 uses the following terminology:

Logical Units. 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 will have sub-units. RAID 10 and RAID 50 are examples of three-tier units and as such will have sub-sub-units.

Port. 3ware controller models up to the 9650SE series have one or many ports (typically 4, 8, 12, 16, or 24). Each port can be attached to a single disk drive. On a controller such as the 9650SE with a multilane serial port connector, one connector supports four ports. On 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 9690SA controllers have 8 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. Each controller phy can be connected directly to a single drive, or can be connected through an expander to additional drives.

VPort. Connections from 3ware 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 is directly connected to the controller, or cascaded 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-ported 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, see the user guide that came with 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), BBUs (battery backup units), 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 or lack of—that is, the attribute is either specified, or not. 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 with 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).

Information about commands is organized by the object on which the commands act:

Shell Object Commands. Shell object commands set the focus or provide information (such as alarms, diagnostics, rebuild schedules, and so forth) about all controllers in the system. For details, see “Shell Object Commands” on page 26.

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 seeing alarms specific to a controller, creating schedules during which background tasks are run, and setting policies for the controller. You also use the controller object command `/cx add type` to create RAID arrays. For details, see “Controller Object Commands” on page 33.

Unit Object Commands. Unit object commands provide information and perform actions related to a specific unit on a specific controller. For example, you use unit object commands for such tasks as seeing the rebuild, verify, or initialize status of a unit, starting, stopping, and resuming verifies, starting and stopping rebuilds, and setting policies for the unit. You also use the

controller object command `/cx/ux migrate` to change the configuration of a RAID array. For details, see “Unit Object Commands” on page 81.

Phy Object Commands. Phy object commands provide information and perform actions related to a specific phy on a 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 seeing the status, model, or serial number of the drive. For details, see “Port Object Commands” on page 106.

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 118.

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 display help information for all commands and attributes. For details, see “Help Commands” on page 134.

Shell Object Commands

Shell object commands are either applicable to all the controllers in the system (such as `show`, `rescan`, `flush`, `commit`), or 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 will set the specified object in focus and change the prompt to reflect this. This allows you to enter a command that applies to the focus, instead of having to type 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 that, and you only have to type `show`. The concept is similar to being in a particular location in a file system and requesting a listing of the current directory.

object can have the following forms:

`/cx/ux` specifies the fully qualified URI (Universal Resource Identifier) of an object on controller `cx`, unit `ux`.

`..` specifies one level up (the parent object).

`/` 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>
```

The focus command is available by default. You can disable focus by setting `TW_CLI_INPUT_STYLE` to **old**. (See “Return Code” on page 142.)

commit

This command sends a commit command to all 3ware controllers in the system. For more information, see “`/cx commit`” on page 64.

flush

This command sends a flush command to all 3ware controllers in the system. For more information, see “/cx flush” on page 64.

rescan

This command sends a rescan command to all 3ware controllers in the system. For more information, see “/cx rescan [noscan]” on page 64.

show

This command shows a general summary of all detected controllers and enclosures.

The output of this command will vary, depending upon your controller model and whether there is an enclosure with an expander attached.

Note that the device drivers for the appropriate operating system should be loaded for the list to show all controllers. The intention is to provide a global view of the environment.

Example for controller without an enclosure and expander:

Typical output of the Show command for a controller looks like the following:

```
//localhost> show
Ctl  Model      Ports  Drives  Units  NotOpt  RRate  VRate  BBU
-----
c0   9590SE-4ME   4      4       1      0       2      5      -
```

The output above indicates that Controller 0 is a 9590SE model with 4 Ports, with 4 Drives detected (attached), total of 1 Unit, with no units in a NotOpt (Not Optimal) state, RRate (Rebuild Rate) of 2, VRate (Verify Rate) of 5, BBU of '-' (Not Applicable). Not Optimal refers to any state except OK and VERIFYING. Other states include VERIFY-PAUSED, INITIALIZING, INIT-PAUSED, REBUILDING, REBUILD-PAUSED, DEGRADED, MIGRATING, MIGRATE-PAUSED, RECOVERY, INOPERABLE, and UNKNOWN. RRate also applies to initializing, migrating, and recovery background tasks. (Definitions of the unit statuses are available in the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1.*)

Example for 9690SA-4I4E with enclosure and expander:

Typical output of the Show command for a system with an enclosure, expander, and a 9690SA-4I4E controller looks like the following:

```
//localhost> show
Ctl   Model           (V)Ports  Drives  Units  NotOpt  RRate  VRate  BBU
-----
c0    9690SA-4I4E     12        4       1      0       4      4      -

Encl   Slots  Drives  Fans  TSUnits  PSUnits
-----
/c0/e0  4      2      1     1        1
```

show alarms [reverse]

This command shows the controller alarms or events, also known as AEN (Asynchronous Event Notification) messages, of all controllers in the system. The default is to display the most recent messages at the bottom. The **reverse** attribute displays the most recent message at the top. For more information, see “/cx show alarms [reverse]” on page 48.

show events [reverse]

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

show AENs [reverse]

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

show diag

This command shows the diagnostic information of all controllers in the system. The enclosure diagnostic log may be requested by 3ware Customer Support to help troubleshoot problems on your controller.

show rebuild

This command displays all rebuild schedules for the 9000 series controllers in the system.

The rebuild rate is also applicable for initializing, migrating, and recovery background tasks.

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 66, and see the discussion of background tasks and schedules in *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

show selftest

This command displays all selftest schedules for the 9000 series controllers in the system.

Example:

```
//localhost> show selftest
```

```
Selftest Schedule for Controller /c0
```

```
=====
```

Slot	Day	Hour	UDMA	SMART
1	Sun	12:00am	enabled	enabled
2	Mon	12:00am	enabled	enabled
3	Tue	12:00am	enabled	enabled
4	Wed	12:00am	enabled	enabled
5	Thu	12:00am	enabled	enabled
6	Fri	12:00am	enabled	enabled
7	Sat	12:00am	enabled	enabled

For additional information about selftest schedules, see “/cx add selftest=ddd:hh” on page 68, and see the discussion of background tasks and schedules in *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

show ver

This command will show 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. See the Release Notes for details.

show verify

This command displays all verify schedules for the 9000 series controllers in the system. The output shown will be either the advanced or the basic verify schedule, depending upon which is enabled for each controller. Basic verify is only supported on the 9650SE and 9690SA controllers running 9.5.1 or later.

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 67, “/cx set verify=basic [pref=ddd:hh]” on page 74, and see the discussion of background tasks and schedules in *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

update fw=*filename_with_path* [force]

This command downloads the specified firmware image to the controllers that are compatible with it 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 64.

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 see 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(9000 series SX/SE/SA only)|
    autorebuild(9000 series SX/SE/SA only)|bios|
    carvesize(9000 series SX/SE/SA only)|
    ctlbus(9000 series SX/SE/SA only|
    dpmstat[type=inst|ra|ext](9000 series SX/SE/SA only;
    however type=ext is only for SE/SA)
    driver|drivestatus[pause[lines=n]]|firmware|
    memory|model|monitor|numdrives|numports|numunits|
    ondegrade(9500S only)|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                (9000 series)
/cx show rebuildmode            (9000 series SE/SA only)
/cx show rebuildrate            (9000 series SE/SA only)
/cx show verify                 (9000 series)
/cx show verifymode             (9000 series SE/SA only)
/cx show verifyrate             (9000 series SE/SA only)
/cx show selftest               (9000 series)
/cx show phy                     (9690SA only)

/cx add type=<RaidType>
    (RaidType={raid0,raid1,raid5,raid6(9650SE and higher
    only),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](9000 series)
    [v0=n|vol=a:b:c:d](n=size of first volume in GB)
    [rapidrecovery=all|rebuild|disable](9000 series SE/SA)
    [storsave=<protect|balance|perform>]
    (9000 series SX/SE/SA only)

```

```

/cx add rebuild=ddd:hh:duration (9000 series)
/cx add verify=ddd:hh:duration (9000 series)
/cx add selftest=ddd:hh (9000 series)

/cx set dpmstat=on|off (9000 series SX/SE/SA only)
/cx del rebuild=slot_id (9000 series)
/cx del verify=slot_id (9000 series)
/cx del selftest=slot_id (9000 series)
/cx set exportjbod=on|off (9000 series)
/cx set ondegrade=cacheoff|follow (9500S only)
/cx set spinup=nn (9000 series)
/cx set stagger=nn (9000 series)
/cx set autocarve=on|off (9000 series SX/SE/SA only)
/cx set carvesize=[1024...32768] (9000 series SX/SE/SA only)
/cx set rebuild=enable|disable|1..5 (9000 series)
/cx set rebuildmode=<adaptive|lowlatency> (9000 series SE/SA
only)
/cx set rebuildrate=<1..5> (9000 series SE/SA only)
/cx set autorebuild=on|off (9000 series SX/SE/SA only)
/cx set autodetect=on|off disk=<p:-p>|all
/cx set verify=enable|disable|1..5 (9000 series)
/cx set verify=advanced|basic|1..5 (9000 series SE/SA only)
/cx set verifymode=<adaptive|lowlatency> (9000 series SE/SA
only)
/cx set verifyrate=<1..5> (9000 series SE/SA only)
/cx set verify=basic [pref=ddd:hh] (9000 series SE/SA only)
/cx set selftest=enable|disable [task=UDMA|SMART](9000
series)

/cx flush
/cx update fw=filename_with_path [force] (9000 series)
/cx commit (Windows only. Also known as shutdown)
/cx start mediascan (7000/8000 only)
/cx stop mediascan (7000/8000 only)
/cx rescan [noscan]

```

/cx show

This command shows summary information on the specified controller /cx. This information is organized into a report containing two to three parts:

- A **Unit** summary 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 unit and 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 or terabytes, the write cache setting, the read cache setting (if supported by your controller) and the auto-verify 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 SAS/SATA RAID Software User Guide, Version 9.5.1*.



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 may not be a repeated error, and may be caused by an ECC error, SMART failure, or a device error. Rescanning the controller will clear the drive error status if the condition no longer exists.

For controllers with read cache support (9650SE and newer controllers with release 9.5.2 or later), the 'Cache' column displays 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 94.

For earlier controllers, the Cache column displays only the write cache setting of ON or OFF

For controller models up to the 9650SE series, the **Port** summary section lists all present ports and specifies the port number, disk status, unit affiliation, size (in gigabytes) and blocks (512 bytes), and the serial number assigned by the disk vendor.

For the 9690SA controller series, this section lists virtual ports, and specifies the VPort number, disk status, unit affiliation, drive type, phy number (if direct attached), the enclosure and slot (if expander attached), and model number of the drive.

The **BBU** summary lists details about the BBU, if one is installed. It includes a few important attributes such as hours left (in which the current BBU can

backup the controller write cache in the event of power loss), temperature, voltage, readiness, and so forth.

Additional attributes about controllers, units, ports and disks can be obtained by querying for them explicitly. For details, see the other show subcommands.

Example output for earlier controllers:

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

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

Port	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	u1	149.05 GB	312581808	WD-WCANM1869003
p11	OK	u1	149.05 GB	312581808	WD-WCANM1762464

Name	OnlineState	BBUReady	Status	Volt	Temp	Hours	LastCapTest
bbu	On	Yes	OK	OK	OK	241	22-Jun-2004

Example output for 9690SA controller:

Note that the port information is represented by VPort (virtual port) and Cache indicates 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 ...]

This command shows the current setting of the specified attributes on the specified controller. One or many attributes can be specified. Specifying an invalid attribute will terminate the loop. Possible attributes are: achip, allunitstatus, autocarve (9000 series SX/SE/SA only), autorebuild (9000 series SX/SE/SA only), bios, carvesize (9000 series SX/SE/SA only), driver, drivestatus, firmware, memory, model, monitor, numdrives, numports, numunits, ctlbus (9000 series SX/SE/SA only), ondegrade (9500S), pcb, pchip, qpolicy, serial, spinup (9000 series), stagger (9000 series), and unitstatus.

Example: To see the driver and firmware installed on controller 0, enter the following:

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

(In the sample output above, “x” will be replaced with the actual version number.)

/cx show achip

This command reports the ACHIP (ATA Interface Chip) version of the specified controller */cx*.

Example:

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

/cx show allunitstatus

This command presents a count of total and Not Optimal units managed by the specified controller */cx*. For more about the meaning of Not Optimal, see “Shell Object Commands” on page 26.

Example:

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

/cx show autocarve

This feature only applies to 9000 series SX/SE/SA controllers.

This command reports the Auto-Carve policy. If the policy is **on**, all newly created or migrated units larger than the carvesize will be automatically carved into multiples of carvesize volumes plus one remainder volume. Each volume can be treated as an individual drive with its own file system. The

default carvesize is 2TB. For more information see, “/cx show memory”, below.

For operating systems that support units larger than 2TB, there is no need to 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 recommended that you keep the policy **on** unless you know that your operating system supports disks that are larger than 2 TB.

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

Example:

```
//localhost> /c0 show autocarve  
/c0 Auto-Carving Policy = on
```

/cx show autorebuild

This feature only applies to 9000 series SX/SE/SA model controllers.

This command shows the Auto-Rebuild policy. If the policy is enabled, the firmware will select drives to use for rebuilding a degraded unit using the following priority order. For more information, see “/cx set autorebuild=on|off” on page 78.

1. Smallest usable spare.
2. Smallest usable unconfigured (available) drive.
3. Smallest usable failed drive.

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

Example:

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

/cx show bios

This command reports the BIOS version of controller /cx.

Example:

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

/cx show carvesize

This feature only applies to 9000 series SX/SE/SA model controllers.

This command shows the maximum size of the volumes that will be created if the autocarve policy is set to **on**. The carvesize can be set 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” above.

Example:

```
//localhost> /c0 show carvesize
/c0 Auto-Carving Size = 2000 GB
```

/cx show ctlbus

This feature only applies to 9000 series SX/SE/SA model controllers.

This command reports 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
```

/cx show driver

This command reports the device driver version associated with controller /cx.

Example:

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

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

This feature only applies to 9000 series SX/SE/SA model controller. The **type=ext** feature is only for SE/SA controllers.

This 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 will be displayed. The available options are: *inst* for Instantaneous, *ra* for Running Average, and *ext* for Extended Drive Statistics. If you do not specify a type, the display will show 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 smooth out the data, and results in older 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 FUA (Force Unit Access), 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 112.

Drive Performance Monitoring can be turned on and off using the command “/cx set dpmstat=on|off” on page 70.

Example of inst drive statistics:

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

Since 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 112.

In the configuration information displayed 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. The amount of statistics data in the buffer is determined by these configurations and the memory constraints of the system. 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
```

Port	Status	Unit	Queue Depth	IOPs	Xfer Rate(MB/s)	Resp 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 display 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
```

Port	Status	Unit	Queue		Xfer		Resp
			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 display 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 ...
```

Port	Sectors			Commands			
	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 this occurs, you may want to zero out the counters by using the clear command, “`/cx/px set dpmstat=clear [type=ra|lct|ext]`” on page 115.

Example of drive statistics overflow:

```
//localhost> /c3 show dpmstat type=ext
```

```
Extended Drive Statistics for /c3 ...
```

Port	Sectors			Commands			
	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

This command reports 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 SAS/SATA RAID Software User Guide, Version 9.5.1.*)

Example for 9650SE and earlier controllers:

```
//localhost> /c0 show drivestatus
```

Port	Status	Unit	Size	Blocks	Serial
p0	OK	u0	149.05 GB	312581808	3JS0TF14
p1	OK	u0	149.05 GB	312581808	3JS0TETZ
p2	OK	u1	149.05 GB	312581808	3JS0VG85
p3	OK	u1	149.05 GB	312581808	3JS0VGCY
p4	OK	u1	149.05 GB	312581808	3JS0VGGQ
p5	OK	u2	149.05 GB	312581808	3JS0VH1P
p6	OK	-	149.05 GB	312581808	3JS0TF0P
p7	OK	-	149.05 GB	312581808	3JS0VF43
p8	OK	-	149.05 GB	312581808	3JS0VG8D
p9	NOT-PRESENT	-	-	-	-
p10	NOT-PRESENT	-	-	-	-
p11	NOT-PRESENT	-	-	-	-

Example for 9690SA controller:

```
//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

/cx show exportjbod

This feature only applies to 9000 series controllers.

This command reports the current JBOD Export Policy: **on**, **off**, or **Not Supported**.

Example:

```
//localhost> /c0 show exportjbod
/c0 JBOD Export Policy = Not Supported.
//localhost> /c1 show exportjbod
/c1 JBOD Export Policy = on
```

/cx show firmware

This command reports the firmware version of controller /cx.

Example:

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

/cx show memory

This command reports the available memory on the controller.



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

Example:

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

/cx show model

This command reports the controller model of controller /cx.

Example:

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

/cx show monitor

This command reports the monitor (firmware boot-loader) version of controller /cx.

Example:

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

cx show numdrives

This command reports the number of drives currently managed by the specified controller /cx. This report does not include (logically) removed or exported drives.

On 9500S and earlier controllers, physically-removed disk(s) will still be counted. For a workaround, see “/cx/px show smart” on page 109.

Example:

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

/cx show numports

This command reports how many physical connections are made to the controller and the total number of physical ports 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
```

/cx show numunits

This command reports the number of units currently managed by the specified controller /cx. This report does not include off-line units (or removed units).

Example:

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

/cx show ondegrade

This feature only applies to 9500S controllers.

This command reports the write cache policy for degraded units. If the ondegrade policy is “Follow Unit Policy,” a unit write cache policy stays the same when the unit becomes degraded. If the ondegrade policy is off, a unit write cache policy will be forced to “off” when the unit becomes degraded.

Example:

```
//localhost> /c0 show ondegrade
/c0 Cache on Degraded Policy = Follow Unit Policy
```

/cx show pcb

This command reports the PCB (Printed Circuit Board) version of the specified controller /cx.

Example:

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

/cx show pchip

This command reports the PCHIP (PCI Interface Chip) version of the specified controller /cx.

Example:

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

/cx show serial

This command reports the serial number of the specified controller /cx.

Example:

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

/cx show spinup

This feature only applies to 9000 series controllers.

This command reports the number of concurrent SAS and SATA disks that will spin up when the system is powered on, 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

This feature only applies to 9000 series controllers.

This command reports the time delay between each group of spinups at the power on. 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

This command presents a list of units currently managed by the specified controller /cx, 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 SAS/SATA RAID Software User Guide, Version 9.5.1.*)



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 may not be a repeated error, and may be caused by an ECC error, SMART failure, or a device error. Rescanning the controller will clear the drive error status if 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

This 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 9650SE:

```
//localhost>> /c2 show all
-----
/c2 Driver Version = 2.26.08.004-2.6.22
/c2 Model = 9650SE-16ML
/c2 Available Memory = 224MB
/c2 Firmware Version = FE9X 4.05.00.026
/c2 Bios Version = BE9X 4.05.00.013
/c2 Boot Loader Version = BL9X 3.08.00.001
/c2 Serial Number = L322623A7320106
/c2 PCB Version = Rev 032
/c2 PCHIP Version = 2.00
/c2 ACHIP Version = 1.90
/c2 Number of Ports = 16
/c2 Number of Drives = 7
/c2 Number of Units = 1
/c2 Total Optimal Units = 0
/c2 Not Optimal Units = 1
/c2 JBOD Export Policy = on
/c2 Disk Spinup Policy = 4
/c2 Spinup Stagger Time Policy (sec) = 1
/c2 Auto-Carving Policy = on
/c2 Auto-Carving Size = 4000 GB
/c2 Auto-Rebuild Policy = on
/c2 Controller Bus Type = PCIE
/c2 Controller Bus Width = 8 lanes
/c2 Controller Bus Speed = 2.5 Gbps/lane

Unit  UnitType  Status      %RCmpl  %V/I/M  Stripe  Size(GB)  Cache  AVrfy
-----
u0    RAID-5    REBUILD-PAUSED  0%      -        64K     372.476   RiW    ON

Port  Status      Unit  Size      Blocks      Serial
-----
p0    NOT-PRESENT  -     -          -            -
p1    OK           u0    931.51 GB  1953525168  3QJ03W34
p2    OK           u0    931.51 GB  1953525168  GTA000PAGE2JKA
p3    OK           u0    74.53 GB   156301488   5RX6AMGL
p4    OK           u0    931.51 GB  1953525168  3QJ0392E
p5    OK           u0    931.51 GB  1953525168  GTA000PAG67AGA
p6    DEGRADED    u0    931.51 GB  1953525168  3QJ01PG6
p7    OK           -     931.51 GB  1953525168  GTA000PAGE1RSA
p8    NOT-PRESENT  -     -          -            -
p9    NOT-PRESENT  -     -          -            -
p10   NOT-PRESENT  -     -          -            -
p11   NOT-PRESENT  -     -          -            -
p12   NOT-PRESENT  -     -          -            -
p13   NOT-PRESENT  -     -          -            -
```

p14	NOT-PRESENT	-	-	-	-	-	-
p15	NOT-PRESENT	-	-	-	-	-	-

Name	OnlineState	BBUReady	Status	Volt	Temp	Hours	LastCapTest
-----	-----	-----	-----	-----	-----	-----	-----
bbu	On	Yes	OK	OK	OK	0	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 (9690SA or 9650SE only) and captured by the 3ware device drivers. These events reflect warnings, errors, and/or informative messages. These events are kept in a finite queue inside the kernel, and can be listed by CLI and 3DM 2. They are also stored in the operating system events log.

The **/cx show alarms** command displays all available events on a given controller. The default is to display 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 display the most recent event message at the top.

Events generated on 7000/8000 series controllers do not have dates, so you will see a '-' in the Date column. This means that it is not applicable. In addition, alarm messages on 7000/8000 controllers contain the severity in the message text, so the Severity column also shows a '-'.

Example: Typical output looks like:

```
//localhost> /cl 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]

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

/cx show AENs [reverse]

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

/cx show diag

This command extracts controller diagnostics suitable for technical support usage. Note that some characters might not be printable or rendered correctly (human readable). It is recommended to 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
```

/cx show phy

This command is only for 9690SA controllers.

It reports a list of the phys with related information for the specified controller. The 'Device Type' column indicates whether the connected device is an enclosure, or a drive of type SATA or SAS. 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
```

Phy	SAS Addresss	Device		--- Link Speed (Gbps) ---		
		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 above example, for phy1, the link speeds supported are 1.5 and 3.0 Gpbs. The current link speed for phy1 is 3.0 Gpbs, 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 will be used.

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

```
//localhost> /c3 show phy
```

Phy	SAS Addresss	Device		--- Link Speed (Gbps) ---		
		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

9000 series controllers support background tasks and allow you to schedule a regular time when they occur.

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 7 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 rebuild tasks, see “Setting Up a Rebuild Schedule” on page 66.

Rebuild activity attempts to (re)synchronize all members of redundant units such as RAID-1, RAID-10, RAID-5, RAID-6, and RAID-50. Rebuild can be started manually or automatically if a spare has been defined. Scheduled rebuilds will take place during the scheduled time slot, if enabled the schedules are enabled. For in depth information about rebuild and other background tasks, see “About Background Tasks” in the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

The **show rebuild** command displays the current rebuild background task schedule as illustrated below.

```
//localhost> /c1 show rebuild
Rebuild Schedule for Controller /c1
=====
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 will not use the defined schedule timeslots. If the rebuild command is entered manually, rebuilding will start within 10 to 15 minutes. It will begin automatically if a rebuild is needed and a proper spare drive is set up.

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

Example for 9650SE controller:

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

```
$ tw_cli /c1 show

Unit  UnitType  Status      %RCmpl %V/I/M  Stripe  Size(GB)  Cache  AVrfy
-----
u0    RAID-5    INITIALIZING  0      -       64K    521.466   RiW    OFF

Port  Status      Unit  Size      Blocks      Serial
-----
p0    NOT-PRESENT  -     -         -           -
p1    OK           u0    76.33 GB  160086528   Y2NXL7FE
p2    NOT-PRESENT  -     -         -           -
p3    OK           u0    76.33 GB  160086528   Y2NXLB9E
p4    NOT-PRESENT  -     -         -           -
p5    OK           u0    76.33 GB  160086528   Y2NXQPZE
p6    NOT-PRESENT  -     -         -           -
p7    OK           u0    76.33 GB  160086528   Y2NXM4VE
p8    OK           u0    74.53 GB  156301488   3JV3WTSE
p9    OK           u0    74.53 GB  156301488   3JV3WRHC
p10   OK           u0    74.53 GB  156301488   3JV3WQLQ
p11   OK           u0    74.53 GB  156301488   3JV3WQLZ

Name  OnlineState  BBUReady  Status  Volt  Temp  Hours  LastCapTest
-----
bbu   On           Yes       OK      OK   OK    0      xx-xxx-xxxx
```

If you then enable the rebuild schedules, the unit initialization will be paused until the next scheduled time slot, as reflected in the examples below:

```
//localhost> /c1 set rebuild=enable
Enabling scheduled rebuilds on controller /c1 ...Done.

//localhost> /c1 show rebuild
Rebuild Schedule for Controller /c1
=====
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

$ tw_cli /c1 show

Unit  UnitType  Status      %RCmpl %V/I/M  Stripe  Size(GB)  Cache  AVrfy
-----
u0    RAID-5    INIT-PAUSED  0      -        64K     521.466   ON     OFF

Port  Status      Unit  Size      Blocks      Serial
-----
p0    NOT-PRESENT -      -          -           -
p1    OK          u0    76.33 GB  160086528   Y2NXL7FE
p2    NOT-PRESENT -      -          -           -
p3    OK          u0    76.33 GB  160086528   Y2NXLB9E
p4    NOT-PRESENT -      -          -           -
p5    OK          u0    76.33 GB  160086528   Y2NXQPZE
p6    NOT-PRESENT -      -          -           -
p7    OK          u0    76.33 GB  160086528   Y2NXM4VE
p8    OK          u0    74.53 GB  156301488   3JV3WTSE
p9    OK          u0    74.53 GB  156301488   3JV3WRHC
p10   OK          u0    74.53 GB  156301488   3JV3WQLQ
p11   OK          u0    74.53 GB  156301488   3JV3WQLZ

Name  OnlineState  BBUReady  Status  Volt  Temp  Hours  LastCapTest
-----
bbu   On           Yes       OK      OK    OK    0      xx-xxx-xxxx
```

/cx show rebuildmode

This command is only supported on 9690SA controllers and 9650SE controllers.

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

Rebuild mode works in conjunction with the rebuild task rate (see “/cx show rebuildrate” on page 53).

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 down the rebuild 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 *9.5.2 Addendum to the 3ware SAS/SATA RAID Software User Guide*.

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

This 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 of the range [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

This command applies to the 7000, 8000, and 9000 models controllers.



Note: In previous versions of the CLI, 1 was incorrectly reported to be the fastest rebuild rate, and 5 was incorrectly reported to be the slowest—the opposite of the actual settings. In 9.5.2, the scale is reported correctly, as described above, with 5 the fastest rebuild rate.

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

9000 series controllers support background tasks and 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 7 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 68.

Selftest activity provides two types of selftests; UDMA (Ultra Direct Memory Access) and SMART (Self Monitoring Analysis and Reporting). Both self tests are checked once each day by default.



Note: UDMA mode is applicable only for PATA (parallel ATA) drives on earlier 3ware controllers. It is not applicable for SATA or SAS drives.

UDMA self test entails checking the current ATA bus speed (between controller and attached disk), which could have been throttled down during previous operations and increase the speed for best performance (usually one level higher). Possible speeds include 33, 66, 100 and 133 Mhz.

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. (SMART data is available only for SATA drives.)

The **show selftest** command displays 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      UDMA      SMART
-----
1      Sun   12:00am   enabled   enabled
2      Mon   12:00am   enabled   enabled
3      Tue   12:00am   enabled   enabled
4      Wed   12:00am   enabled   enabled
5      Thu   12:00am   enabled   enabled
6      Fri   12:00am   enabled   enabled
7      Sat   12:00am   enabled   enabled
```

/cx show verify

9000 series controllers support background tasks and allow you to schedule a regular time when they occur.

Verify is one of the supported background tasks, and **show verify** shows you the current verify schedule.

For 9650SE and 9690SA RAID controllers, the Verify Task Schedule can be either “basic” or “advanced.” (For details about the associated commands, see page 73).

The basic Verify Task Schedule sets a weekly day and time for verification to occur, and is designed to be used with the auto-verification of units.

The advanced Verify Task Schedule provides more control, and is equivalent to the Verify Task Schedule available for 9550SX and earlier 9000 RAID controllers.

For the advanced Verify Task Schedule, up to 7 time periods can be registered, known as slots 1 through 7. This task schedule can be managed by a set of commands including **add**, **del**, **show** and **set** a task. The task schedule has a slot id, start-day-time, duration, and status attributes. Rebuilds, migrations, and initializations follow similar background task schedules.

For details about setting up a schedule for verify tasks, see “Setting Up a Verify Schedule” on page 67.

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. RAID 10 and 50 are composite types and follow their respective array types. On 9000 series, non-redundant units such as RAID 0, single, and spare, are also verified (by reading and reporting un-readable sectors). If any parity mismatches are found, the array will be automatically background initialized. (For information about the initialization process, see the user guide that came with your 3ware RAID controller.)

Example 1: Advanced Verify Schedule

For 9550SX and earlier controllers, and when **verify=advanced** for 9650SE and 9690SA controllers running 9.5.1 or later, the **show verify** command displays the current verify background task schedule as illustrated below.

```
//localhost> /c1 show verify
Verify Schedule for Controller /c1
=====
Slot      Day      Hour      Duration      Status
-----
1         Mon      2:00am    4 hr(s)       disabled
2         -        -         -             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
```

A status of “disabled” indicates that the controller will not use the defined schedule timeslots and will start verifying within 10 to 15 minutes, if the verify command is entered manually, or it will begin automatically if the autoverify option is set. Rebuilds, migrations, and initializations will take priority over verifies.

Example 2: Basic Verify Schedule

For 9650SE and 9690SA controllers, if the “basic” Verify Task Schedule is selected, the **show verify** command displays a schedule as illustrated below:

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

/cx show verifymode

This command is only supported on 9690SA and 9650SE controllers.

This command shows the current rebuild mode setting of the specified controller. The verify mode has two settings: **Adaptive** and **Low latency**.

Verify mode works in conjunction with the verify task rate (see “/cx show verifyrate” on page 57).

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 *9.5.2 Addendum to the 3ware SAS/SATA RAID Software User Guide*

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

This 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 of the range [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

This command applies to the 7000, 8000, and 9000 models controllers.



Note: In previous versions of the CLI, 1 was incorrectly reported to be the fastest verify rate, and 5 was incorrectly reported to be the slowest—the opposite of the actual settings. In 9.5.2, the scale is reported correctly, as described above, with 5 the fastest verify rate.

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>] [nocache|nowrcache] [nordcache|
rdcachebasic] [autoverify] [noqpolicy] [ignoreECC]
[name=string]
[storsave=<protect|balance|perform>]
[rapidrecovery=all|rebuild|disable]
[v0=n|vol=a:b:c:d]

```

This command allows you to create a new unit on the specified controller. You specify *type*, *disks*, and optional *stripe* size. By default the host operating system will be informed of the new block device, write cache will be enabled, Intelligent read cache will be enabled, a storsave policy of balance will be set, a rapid raid recovery policy of All will be 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 will warn you that you could lose data in the event of a power failure.

Enabling write cache will improve write performance greatly, but you are at risk of losing data if a power failure occurs when data is still in the cache. You may want to obtain a BBU and 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 (9650SE and higher only), raid10, raid50, single, and spare.

Example: `type=raid5`

When a new unit is created, it is automatically assigned a unique serial number. In addition, users can assign the unit a name.



Note: The unit's serial number cannot be changed.

The following table shows supported types and controller models.

Table 6: Supported RAID Types

Model	R0	R1	R5	R6	R10	R50	Single	Spare	JBOD
7K/8K	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes
9000 ^a	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
9650SE and 9690SA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes (SATA only)

a. Models 9500S, 9550SX, and 9590SE

disk=*p*:*p* consists of a list of ports (disks) to be used in the construction of the specified unit type. One or more ports can be specified. Multiple ports can be specified 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 0, 1, 2 through 5 (inclusive), 9 and 12.

If you have a 9690SA controller, the syntax is the same even though you are technically addressing vports.

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

Table 7: Supported Stripe Sizes (KB)

Model	R0	R1	R5	R6	R10	Spare	R50	Single	JBOD
7K/8K	64	N/A	64	N/A	64	N/A	N/A	N/A	N/A
	128				128				
	256				256				
	512				512				
	1024				1024				
9000 ^a	16	N/A	16	N/A	16	N/A	16	N/A	N/A
	64		64		64		64		
	256		256		256		256		
9650SE and 9690SA	16	N/A	16		16	N/A	16	N/A	N/A
	64		64	64	64		64		
	256		256	256	256		256		

a. Models 9500S, 9550SX, and 9590SE

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. (This attribute can only be used when `type=raid50`.) **Group=13-16** is only applicable to 9690SA.

Recall that a RAID 50 is a multi-tier 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.

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

Note that the indicated group number that is supported depends on the number of ports on the controller. **group=16** is the maximum and it is available on the 9690SA.

noscan attribute instructs CLI not to notify the operating system of the creation of the new unit. By default CLI will inform the operating system. One application of this feature is to prevent the operating system from creating block special devices such as `/dev/sdb` and `/dev/sdc` as some implementations might create naming fragmentation and a moving target.

nocache or **nowrcache** attribute instructs CLI to disable the write cache on the newly created unit. Enabling write cache increases write performance at the cost of potential data loss in case of sudden power loss (unless a BBU or UPS is installed). By default the write cache is enabled. To avoid the possibility of data loss in the event of a sudden power loss, it is recommended to set `nocache` or `nowrcache` unless there is a BBU (battery backup unit) or UPS (uninterruptible power supply) installed.

nordcache attribute instructs CLI to disable the read cache on the newly created unit. Enabling the read cache increases performance. The **rdcachebasic** attribute instructs 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. This command is supported on 9650SE and later controllers. For more information, see “`/cx/ux set rdcache=basic|intelligent|off`” on page 94.

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 92. This feature is not supported on model 7000/8000. For 9650SE and 9690SA controllers that support basic verify, autoverify will be set to ON by default for a new unit. For other 9000-series controllers that do not support basic verify, autoverify is set to OFF by default for a new unit.

noqpolicy attribute instructs CLI to disable the qpolicy (drive queuing for SATA drives only) on the newly created unit. The default is for the qpolicy to be on (in other words, noqpolicy is not specified). For a spare unit, drive queuing is not meaningful, so the noqpolicy cannot be set. During unit creation, specifying **noqpolicy** for a spare returns an error. (If the spare unit becomes a true unit, it will adopt the qpolicy of the “new” unit.) For more about drive queuing, see “/cx/ux show qpolicy” on page 86 and “/cx/ux set qpolicy=on|off” on page 96.

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 96. The following table illustrates the supported Model-Unit Types. This table only applies to setting this feature at unit creation time. IgnoreECC only applies to redundant units. For the 7/8000 series, this setting is only applicable during rebuild; it is not applicable during creation.

Table 8: Supported Model-Unit Types for ignoreECC

Model	R-0	R-1	R-5	R-6	R-10	R-50	Single	Spare	JBOD
7K/8K	No	No	No	N/A	No	No	No	No	No
9000 ^a	No	Yes	Yes	N/A	Yes	Yes	No	No	No
9650SE and 9690SA	No	Yes	Yes	Yes	Yes	Yes	No	No	No

a. Models 9500S, 9550SX, and 9590SE

name=string attribute allows you to name the new unit. (This feature is for 9000 series and above controllers.) The string can be up to 21 characters and cannot contain spaces. In order to use reserved characters (<, >, !, &, etc.) put double quotes (" ") around the name string. The name can be changed after the unit has been created. For more information, see “/cx/ux set name=string” on page 96 and “/cx/ux show name” on page 85.

storsave=protect|balance|perform attribute allows user to set the storsave policy of the new unit. This feature is only for 9000 series SX/SE/SA controllers. For more information, see “/cx/ux set storsave=protect|balance|perform [quiet]” on page 97.

rapidrecovery=*all/rebuild/disable* attribute specifies the Rapid RAID Recovery setting for the unit being created. Rapid Raid Recovery can speed up the rebuild process, and it can speed up initialize and verify tasks that may 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 none of the tasks will be sped up.



Notes: Once the **rapidrecovery** policy has been disabled for a unit, it cannot be changed again. Disabling this policy is required if you want to move a unit to a controller that has firmware earlier than 9.5.1.

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

This attribute is only for redundant units created on controller models 9650SE and 9690SA, with the 9.5.1 firmware or later.

Rapid RAID Recovery is not supported over migration.

v0=*n* or **vol=*a:b:c:d*** may 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 will use 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.

The value(s) should be positive integer(s) 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 will be left “uncarved.”

Both **v0=*n*** or **vol=*a:b:c:d*** work in conjunction with auto-carving, if that feature is enabled. When auto-carving is used, **v0=*n*** and **vol=*a:b:c:d*** are used to specify the size of the first few volumes, after which the auto-carve size is used for additional volumes. (For more about auto-carving, see “/cx set autocarve=*on|off*” on page 77 and “/cx set carvesize=*[1024..32768]*” on page 78.)

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 size(s):

```
//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 auto-carving 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 auto carved 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]

This command instructs the controller to rescan all ports, vports, and phys and reconstitute all units. The controller will update its list of disks, and attempts to read every DCB (Disk Configuration Block) in order to re-assemble its view and awareness of logical units. Any newly found unit(s) or drive(s) will be listed.

noscan is used to not inform the operating system 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. Hot swap bays are required unless you first power-down the system to 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

This command only applies to the Windows operating system. It commits all changes if a faster shutdown method is needed when running certain database applications. Linux and FreeBSD file systems do not require this command since they have their own ways of notifying the controller to do clean up for shut down.

/cx flush

This command forces the controller to write all cached data to disk for the specified controller.

/cx update fw=*filename_with_path* [force]

This command is only for 9000 series controllers.

This command allows the downloading of the specified firmware image to the corresponding controller.

Note: Before issuing this command, you must have already obtained the firmware image and placed it on your system. You can obtain the firmware image from the 3ware website: <http://www.3ware.com/downloads>.



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.

A reboot is required for the new firmware image to take effect.



Note: The prom image number will vary for different controllers. Prom0006 is for the 9650SE and prom0008 is for the 9690SA.

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.

force attribute is optional. If you include it, the compatibility checks are bypassed.

/cx add rebuild=ddd:hh:duration

This command adds a new task slot to the Rebuild Task Schedule on the day *ddd* (where *ddd* is Sun, Mon, Tue, Wed, Thu, Fri, and 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 will fail if no (empty) task slot is available.

Example:

```
//localhost> /cl 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 **/cx add rebuild**.

To set up the rebuild schedule you want to use, follow this process:

- 1 Use the **/cx show rebuild** command to display the current schedule for rebuild tasks. (For details, see page 50.)
- 2 If any of the scheduled tasks do not match your desired schedule, use the **/cx del rebuild** command to remove them. (For details, see page 69.)
- 3 Use the **/cx add rebuild** command to create the rebuild schedule slots you want (described above.)
- 4 Use the **/cx set rebuild=enable** command to enable the schedule (this enables all rebuild schedule slots). (For details, see page 70.)



Warning: If all time slots are removed from the rebuild task schedule, be sure to also disable the schedule. Otherwise the rebuild task will never occur.

`/cx add verify=ddd:hh:duration`

This command adds a new task slot to the Verify Task Schedule on the day *ddd* (where *ddd* is Sun, Mon, Tue, Wed, Thu, Fri, and 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 will fail if no (empty) task slot is available.



Note: This Verify Task Schedule is used when `/cx set verify=advanced`, for 9650SE and 9690SA controllers running firmware 9.5.1 or later, and for earlier controllers when `/cx set verify=enabled`.

If you have a 9650SE or a 9690SA running firmware 9.5.1 or later, and would 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 auto-verify policy is set for your RAID units. For more information, see “`/cx set verify=basic [pref=ddd:hh]`” on page 74.

Example:

```
//localhost> /cl 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 the verify schedule you want to use, follow this process:

- 1 Use the `/cx show verify` command to display the current schedule for verify tasks. (For details, see page 55.)
- 2 If any of the scheduled tasks do not match your desired schedule, use the `/cx del verify` command to remove them. (For details, see page 69.)
- 3 Use the `/cx add verify` command to create the verify schedule slots you want (described above.)
- 4 Use the `/cx set verify=enable` command or the `/cx set verify=advanced` to enable the schedule (this enables all rebuild schedule slots). (For details, see page 72.)
- 5 Use the `/cx/ux set autoverify=on` command to turn on autoverify for each unit you want to follow the schedule. (For details, see page 92.)



Note: If you do not enable autoverify for units or start a verification manually, no verifies will run during your verify task schedule, even if the verify schedule is enabled with the `/cx set verify=enable` command or the `/cx set verify=advanced`.



Warning: If all time slots are removed from the verify task schedule, be sure to also disable the schedule. Otherwise verify tasks will never occur.

`/cx add selftest=ddd:hh`

This 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 will fail if no (empty) task slot is available.

In order to run at the specified times, selftests must be enabled, using the command “`/cx set selftest=enable|disable [task=UDMA|SMART]`” on page 76.

Note: Adding self tests to the schedule is different from adding slots to the rebuild and verify schedules. Adding a self-test directly schedules the test, as well as defining a time slot during which the task can occur.

Example:

```
//localhost> /cl 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 be executed 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 you want to use, follow this process:

- 1 Use the `/cx show selftest` command to display the current schedule for selftest tasks. (For details, see page 66.)
- 2 If any of the scheduled tasks do not match your desired schedule, use the `/cx del selftest` command to remove them. (For details, see page 69.)
- 3 Use the `/cx add selftest` command to create the selftest schedule slots you want (described above.)

- 4 Use the `/cx set selftest=enable` command to enable the schedule (this enables all selftest schedule slots). (For details, see page 76.)

`/cx del rebuild=slot_id`

This 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.



Warning: If all time slots are removed, be sure to also disable the schedule. Otherwise rebuilds will never occur.

`/cx del verify=slot_id`

This 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.



Warning: If all time slots are removed, be sure to also disable the schedule. Otherwise the verification tasks will never occur.

`/cx del selftest=slot_id`

This command removes (or unregisters) the selftest background task slot *slot_id* from the Self Test Task Schedule.

Example:

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

Will remove selftest background task in slot 3.



Warning: If all time slots are removed, be sure to also disable the schedule. Otherwise the selftest background task will never occur.

`/cx set dpmstat=on/off`

This command applies only to 9000 series SX/SE/SA controllers.

This 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 display a statistics summary by using the command “`/cx show dpmstat [type=inst|ra|ext]`” on page 39.

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 112.

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

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 115.

For more information, see “Drive Performance Monitoring” on page 253 of the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

Example:

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

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

This command enables or disables the Rebuild Task Schedule defined for controller `/cx` and sets the priority of rebuild versus I/O operations. When enabled, rebuild tasks will only be run during the time slots scheduled for rebuilds. If a rebuild is taking place when the schedule is enabled, it will be paused 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

Enabling and disabling rebuild schedules is only for 9000 series controllers, however the rebuild rate (**1..5**) applies to all controllers.



Note: In previous versions of the CLI, 1 was incorrectly reported to be the fastest rebuild rate, and 5 was incorrectly reported to be the slowest—the opposite of the actual settings. In 9.5.2, the scale is reported correctly, as described above, with 5 the fastest rebuild rate.

7000- and 8000-series controllers have only one setting for Task Rate; it applies to both rebuild and verify rates. This rate is not persistent following a reboot for 7000- and 8000-series controllers.

`/cx set rebuildmode=<adaptive|lowlatency>`

This command is only supported on 9690SA and 9650SE controllers.

This command sets the rebuild mode. The rebuild mode has two settings: **Adaptive** and **Low Latency**.

Rebuild mode works in conjunction with the rebuild task rate (see “`/cx set rebuildrate=<1...5>`” on page 72).

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 may be negatively affected, especially for applications such as video server applications and audio applications. The **Low Latency** setting will minimize 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 *9.5.2 Addendum to the 3ware SAS/SATA RAID Software User Guide*.



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 may never complete. Thus, this setting should be used with care.

Example:

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

Related commands:

```
/cx show rebuildmode
/cx set rebuildrate=<1...5>
/cx show rebuildrate
```

/cx set rebuildrate=<1..5>

This 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 of the range [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

This command applies to the 7000, 8000, and 9000 models controllers.



Note: In previous versions of the CLI, 1 was incorrectly reported to be the fastest rebuild rate, and 5 was incorrectly reported to be the slowest—the opposite of the actual settings. In 9.5.2, the scale is reported correctly, as described above, with 5 the fastest rebuild rate.

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

Enabling and disabling verify schedules is only for 9000 series controllers.

This 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 enabled, verify tasks will only be run during the time slots identified in the verify task schedule. If a verify is taking place when the schedule is enabled, it will be paused 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 implies fastest verify, and 1 implies 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



Note: In previous versions of the CLI, 1 was incorrectly reported to be the fastest verify rate, and 5 was incorrectly reported to be the slowest—the opposite of the actual settings. In 9.5.2, the scale is reported correctly, as described above, with 5 the fastest verify rate.

For 9550SX(U) and earlier controllers, and for SE/SA controllers running firmware 9.5 and 9.5.0.1, disabling verify with this command turns off the verify schedule. In this case, if a verify is manually started, it should begin right away.

For 9650SE and 9690SA controllers running firmware 9.5.1 or later, 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 73.



Note: If you want verifications to occur automatically, when enabling the verify schedule you must also remember to enable the autoverify setting for the units to be verified. For more information see “/cx/ux set autoverify=on|off” on page 92.

You can view the verify schedule to be enabled or disabled with the command “/cx show verify” on page 55. You can add verify task slots to the schedule using the command “/cx add verify=ddd:hh:duration” on page 67. You can remove verify task slots from the schedule with the “/cx del verify=slot_id” on page 69.

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

This command only applies to 9650SE and the 9690SA RAID controllers running 9.5.1 or later.

This command is effectively the same as the **set verify** command. Setting verify to *advanced* enables the advanced Verify Task Schedule, which can include a series of up to 7 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 implies fastest I/O, and 5 implies fastest verify.



Note: In previous versions of the CLI, 1 was incorrectly reported to be the fastest verify rate, and 5 was incorrectly reported to be the slowest—the opposite of the actual settings. In 9.5.2, the scale is reported correctly, as described above, with 5 the fastest verify rate.

For information on the verify schedule, see “/cx add verify=ddd:hh:duration” on page 67

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

This command only applies to 9650SE and the 9690SA RAID controllers running 9.5.1 or later.

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 auto-verify policy for RAID units, to insure that a verification of the unit occurs on a regular basis.



Note: When **verify=basic**, if you start a manual verify, it will start immediately. When **verify=advanced**, if you start a manual verify, it will follow the advanced Verify Task Schedule. For more information, see “/cx/ux start verify” on page 90.

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>

This command is only supported on 9690SA and 9650SE controllers.

This command sets the verify mode. The verify mode has two settings: **Adaptive** and **Low Latency**.

Verify mode works in conjunction with the verify task rate (see “/cx set verifyrate=<1..5>” on page 75).

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 may be negatively affected, especially for applications such as video server applications and audio applications. The **Low Latency** setting will minimize 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 *9.5.2 Addendum to the 3ware SAS/SATA RAID Software User Guide*.



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 may never complete. Thus, this setting should be used 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>

This 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 of the range [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

This command applies to the 7000, 8000, and 9000 models controllers.



Note: In previous versions of the CLI, 1 was incorrectly reported to be the fastest verify rate, and 5 was incorrectly reported to be the slowest—the opposite of the actual settings. In 9.5.2, the scale is reported correctly, as described above, with 5 the fastest verify rate.

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 [task=UDMA|SMART]

This command enables or disables all selftest tasks or a particular selftest_task (UDMA or SMART).

The selftest schedule is always enabled.

For 3ware RAID controllers older than the 9690SA, two self-tests can be set: one to check whether UDMA Mode can be upgraded (applies to PATA drives only) , and another to check whether SMART thresholds have been exceeded. For the 9690SA, you can only check the SMART thresholds for drives.

7000/8000 series have the same internal schedule, but it is not viewable or changeable.

Example:

```
//localhost> /c0 selftest=enable task=UDMA
enables UDMA selftest on controller c0.
```

/cx set exportjbod=on|off

The JBOD Export Policy is only supported on 9000-series controllers. Previous models did not have such a policy enforcement feature.

This command allows you to set the JBOD Export Policy to **on** or **off**. By default, exportjbod is **off**.

If the JBOD export policy is **off**, CLI will not be able to create JBODs. During reboot, firmware will not export JBOD units to the operating system.

A JBOD is an unconfigured disk attached to your 3ware RAID controller. LSI recommends that you use Single Disk as a replacement for JBOD, to take advantage of features such as RAID level migration.

Note: SAS drives cannot be JBODs.

`/cx set ondegrade=cacheoff|follow`

This command is only for 9500S controllers.

This command allows you to set a controller-based write cache policy. If the policy is set to **cacheoff** and a unit degrades, the firmware will disable the write-cache on the degraded unit, regardless of what the unit-based write cache policy is. If the policy is set to **follow** and a unit degrades, firmware will follow whatever cache policy has been set for that unit. (For details about the unit-based policy, see “/cx/ux set cache=on|off [quiet]” on page 94.)

`/cx set spinup=nn`

This command is only for 9000 series controllers.

This 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 2, the controller will spin up two disks at a time, pause, and then spin up another 2 disks. The amount of time to pause can be specified with the Spinup Stagger Time Policy (`/cx set stagger`).

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

`/cx set stagger=nn`

This command is only for 9000 series controllers.

This 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 to 60 seconds. This policy, in conjunction with Disk Spinup Policy, specifies how the controller should spin up disks at boot time. The default is 6 seconds.

`/cx set autocarve=on|off`

This feature only applies to 9000 series SX/SE/SA model controllers.

This command allows you to set the auto-carve policy to **on** or **off**. By default, autocarve is **off**.

When the auto-carve 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 feature is useful for operating systems limited to 2 TB file systems.

For example, using the 2 TB default carve size, a 3 TB unit will be configured into one 2 TB volume and one 1 TB volume. A 5 TB unit will be configured into two 2 TB volumes and one 1 TB volume.

When auto-carve 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 will not be available.

Example:

```
//localhost> /c0 set autocarve=on
Setting Auto-Carving Policy on /c0 to on ... Done.
```

/cx set carve size=[1024..32768]

This feature only applies to 9000 series SX/SE/SA model controllers.

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

Note that for some operating systems are limited to 2 TB. (For details, see “Support for Over 2 Terabytes” on page 10.)

Example:

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

/cx set autorebuild=on|off

This feature only applies to 9000 series SX/SE/SA model controllers.

This command turns the Auto-Rebuild policy on or off. By default, autorebuild is on.

If the policy is on the firmware will select 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 Auto-Rebuild 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 see it as a failed drive) and then reconnect it, the controller will automatically try 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

This command is only for 9000 series controllers.

This command is associated with the staggered spin-up feature when hot-swapping drives. When staggered spin-up is enabled (see command **/cx set spinup** and **/cx set stagger**), during a reset or power on, the controller will spin 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 or displayed in 3DM 2 or 3BM. This feature may be added in a future release.

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 example below shows that autodetect has been set to *off* to initiate staggered spin-up during hot-swapping, where port 3 was empty and ports 5 and 6 had drives inserted.

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. For the 9690SA controller, it would spinup all directly attached SAS and SATA drives, but not any drives attached to 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 might use this command as follows:

- 1 Issue the command (set autodetect=off) to disable automatic detection of the ports for staggered spin-up.
- 2 If the ports are not empty, pull the drives out of the specified ports.
- 3 Insert (or replace) the drives at the ports specified.
- 4 Issue the command (set autodetect=on) to enable auto detect of the ports with the newly inserted drives.

The preceding steps would 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.

/cx start mediascan

This command applies only to 7000/8000 controllers. For 9000 series controllers, use the verify command.

This command provides media scrubbing for validating the functionality of a disk, including bad block detection, remapping, and so forth. The command starts a media scan operation on the specified controller /cx.

/cx stop mediascan

This command applies only to 7000/8000 controllers.

This command stops a media scan operation on the specified controller /cx. (Media scans are started using **/cx start mediascan**.)

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). For example, you use logical disk object commands for such tasks as seeing the rebuild, verify, or initialize status of a unit, starting, stopping, and resuming rebuilds and verifies, and setting policies for the unit.

Syntax

```

/cx/ux show
/cx/ux show attribute [attribute ...] where attributes are:
  autoverify (9000 series)|
  initializestatus|cache|wrcache|rdcache|name(9000
  series)|qpolicy(9000 series SX/SE/SA only)|
  rebuildstatus|serial(9000 series)|status|verifystatus|
  storsave(9000 series SX/SE/SA only)
  |rapidrecovery (9000 series SE/SA)|
  |volumes(9000 series)|ignoreECC (9000 series)|
  identify (9000 series SX/SE/SA only)
/cx/ux show all
/cx/ux start rebuild disk=<p:-p...> [ignoreECC]
/cx/ux start verify
/cx/ux pause rebuild          (7000/8000 only)
/cx/ux resume rebuild        (7000/8000 only)
/cx/ux stop verify
/cx/ux flush
/cx/ux del [noscan] [quiet]
/cx/ux set autoverify=on|off
/cx/ux set cache=on|off [quiet]
/cx/ux set wrcache=on|off [quiet]
/cx/ux set rdcache=basic|intelligent|off
/cx/ux set identify=on|off    (9000 series SX/SE/SA only)
/cx/ux set ignoreECC=on|off
/cx/ux set qpolicy=on|off    (9000 series SX/SE/SA only)
/cx/ux set name=string        (9000 series)
/cx/ux set rapidrecovery=all|rebuild|disable [quiet](9000
  series SE/SA only)
/cx/ux set storsave=protect|balance|perform [quiet](9000
  series SX/SE/SA only)
/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]
  (9000 series) RaidType = {raid0, raid1, raid5,
  raid6(9650SE and later only), raid10, raid50, single}
/cx/ux remove [noscan] [quiet]

```

/cx/ux show

This command shows summary information about the specified unit **/cx/ux**. If the unit consists of sub-units, as in the case of RAID-10 and RAID-50, then each sub-unit is further presented. If the Auto-Carving policy was on at the time the unit was created and the unit is over the carve size, multiple volumes were created and are displayed at the end of the summary information. Similarly, if the unit was created using the 3ware BIOS utility 3BM and a size was entered in the Boot Volume Size field, multiple volumes were created and will be displayed. Note that a volume created using the Boot Volume Size feature does not have to be used as a boot volume.

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

Example for 9690SA controllers:

```
//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

Example for 9650SE and earlier controllers:

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

Unit	UnitType	Status	%RCmpl	%V/I/M	Port	Stripe	Size(GB)
u0	RAID-50	OK	-	-	-	64K	596.05
u0-0	RAID-5	OK	-	-	-	64K	-
u0-0-0	DISK	OK	-	-	p0	-	149.10
u0-0-1	DISK	OK	-	-	p2	-	149.10
u0-0-2	DISK	OK	-	-	p3	-	149.10
u0-1	RAID-5	OK	-	-	-	64K	-
u0-1-0	DISK	OK	-	-	p4	-	149.10
u0-1-1	DISK	OK	-	-	p5	-	149.10
u0-1-2	DISK	OK	-	-	p6	-	149.10

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

Unit	UnitType	Status	%RCmpl	%V/I/M	Port	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/ux show` command is to see which sub-unit of a degraded unit has caused the unit to degrade and which disk within that sub-unit is the source of degradation. Another application is to see the source and destination units during a migration.

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

Unlike other unit types, RAID-6 may potentially have 2 or more parity drives and can tolerate two or more failures within a unit. As a result, an added notation is used to describe **%RCmpl** and **%V/I/M**, and these are (A) and (P). (A) denotes that the percentage completion of the process is for the current active process, and (P) denotes that the percentage completion of the process is for the current 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

Here, the RAID-6 unit `u0` is in the Rebuild-Verify state, with percentage Rebuild completion of 50% and is the current active process. The process of either Verifying, Initializing, or Migrating is at 70% and it is a paused process.

For the unit display:

```
//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 above 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. Like 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 ...]

This command shows the current setting of the specified attributes. One or many attributes can be requested. Specifying an invalid attribute will terminate the loop. Possible attributes are: initializestatus, name (9000 series), autoverify (9000 series), cache, ignoreECC (9000 series), identify (9000 series SX/SE/SA only), qpolicy (9000 series SX/SE/SA only), rapidrecovery (9000 series SE/SA only), rebuildstatus, serial (9000 series), status, storsave (9000 series SX/SE/SA only), verifystatus, and volumes (9000 series).

/cx/ux show autoverify

This feature only applies to 9000 series controllers.

This command shows the current autoverify setting of the specified unit.

Example:

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

/cx/ux show cache

This command shows the current write cache state of the specified unit. (It provides the same information as the command */cx/ux show wrcache*.)

Example:

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

/cx/ux show wrcache

This command shows the current write cache state of the specified unit. (It provides the same information as the command */cx/ux show cache*.)

Example:

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

/cx/ux show rdcache

This 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 feature is supported on 9650SE and later controllers. This feature is supported with all RAID array types. For more information, see “/cx/ux set rdcache=basic|intelligent|off” on page 94

Example:

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

/cx/ux show identify

This feature only applies to 9000 series SX/SE/SA model controllers. This feature requires a supported enclosure.

This command is related to the **/cx/ux set identify** 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/ux show ignoreECC

This feature only applies to 9000 series controllers.

This 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/ux show initializestatus

This command reports 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/ux show name

This feature only applies to 9000 series controllers.

This command reports the name (if any) of the specified unit.

Example:

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

/cx/ux show qpolicy

This feature only applies to 9000 series SX/SE/SA model controllers.

This command reports the queue policy of the firmware for SATA drives. Qpolicy is not applicable to SAS drives. If the queue policy is on, the firmware utilizes the drive's queuing policy. If any drives do not support a queuing policy, this policy will have no effect on those drives.

For a spare unit, drive queuing is not meaningful or applicable. When a spare becomes part of a true unit during a rebuild, it will adopt the queue policy of the "new" parent unit. Thus, this command does not show the queue policy for the spare unit type.

Note that currently only NCQ will be enabled, not tag-queuing.

Note that queuing information is not available for SAS drives.

Example:

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

/cx/ux show rapidrecovery

This command only applies to 9000 series controllers, models SE and SA, and only for redundant units. Firmware 9.5.1 or later is required.

This 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, please see the description about the rapidrecovery attribute for the **/cx add** command on page 58.

Example:

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

/cx/ux show rebuildstatus

This command reports 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 will return the following:

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

/cx/ux show serial

This feature only applies to 9000 series controllers.

This command reports the unique serial number of the specified unit.

Example:

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

/cx/ux show status

This command reports 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 SAS/SATA RAID Software User Guide, Version 9.5.1.*)

Example:

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

/cx/ux show storsave

This feature only applies to 9000 series SX/SE/SA model controllers.

This command reports the storsave policy on the unit.

For more information see, “/cx/ux set storsave=protect|balance|perform [quiet]” on page 97.

Example:

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

/cx/ux show verifystatus

This command reports the verifystatus (if any) of the specified unit.

Example:

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

/cx/ux show volumes

This feature only applies to 9000 series controllers.

This command reports the number of volumes in the specified unit. The number of volumes will normally be “1” unless auto-carving is enabled and/or a boot LUN was specified.

Example:

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

/cx/ux show all

This command shows the current setting of all above attributes.

If the auto-carve policy was on at the time the unit was created and the unit is over the carve size, multiple volumes were created and are displayed at the end of the summary information. Similarly, if the unit was created using the 3ware BIOS utility 3BM and a size was entered in the Boot Volume Size field, multiple volumes were created and will be displayed. Note that a volume created using the Boot Volume Size feature does not have to be used as a boot volume.

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
/c0/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]

This command allows you to remove (previously called “export”) a unit. Removing a unit instructs the firmware to remove the specified unit from its pool of managed units, but retains the DCB (Disk Configuration Block) metadata. A removed unit can be moved to a different controller.

noscan is used to not inform the operating system of this change. The default is to inform the operating system.

quiet is used for non-interactive mode. No confirmation is given and the command is executed immediately. This 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. Hot swap bays are required to do this while the system is online. Otherwise you must power down the system to prevent system hangs and damage.

/cx/ux del [noscan] [quiet]

This 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 destroys the DCB (Disk Configuration Block) metadata. After deleting a unit, ports (or disks) associated with the unit will be part of the free pool of managed disks.



Warning: This is a destructive command and should be used with care. All data on the specified unit will be lost after executing this command.

noscan is used to not inform the operating system of this change. The default is to inform the operating system.

quiet is used for non-interactive mode. No confirmation is given and the command is executed immediately. This 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]`

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

During rebuild, bad sectors on the source disk will 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 will change 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(s) before starting the rebuild. Refer to the command “`/cx/px remove [noscan] [quiet]`” on page 114 for details. Also refer to the command “`/cx rescan [noscan]`” on page 64 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 sub-array is degraded.

When you issue this command, the specified rebuild will begin if schedules are disabled; otherwise it will pause 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’, this command starts a background verification process on the specified unit `/cx/ux`. The following table shows the relationship between the controller model and logical unit type.

N/A (Not Applicable) refers to cases where the RAID type is not supported on that controller model.

Table 9: Supported RAID (Logical Unit) Types for Verification

Model	R0	R1	R5	R6	R10	R50	Single	Spare	JBOD
7K/8K	No	Yes	Yes	N/A	Yes	N/A	N/A	No	No

Table 9: Supported RAID (Logical Unit) Types for Verification

Model	R0	R1	R5	R6	R10	R50	Single	Spare	JBOD
9000 ^a	Yes	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes
9650SE and 9690SA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

a. Models 9500S, 9550SX, and 9590SE

For 9550SX and earlier controllers and for 9650SE and 9690SA running pre-9.5.1, when you issue this command the specified verify will begin if the verify schedule is disabled; otherwise it will pause until the next scheduled verify. If after starting a verify, you enable the Verify Task Schedule, this on-demand task will be paused until the next scheduled timeslot.

For 9650SE and 9690SA controllers running firmware 9.5.1 or later, if `verify=basic`, the verify will begin immediately. If `verify=advanced`, the verify will pause until the next scheduled verify. For more information, see “`/cx set verify=advanced|basic|1..5`” on page 73.

Table 10: Manual Verify Behavior (`/cx/ux start verify`)

	9650SE and 9690SA with 9.5.1 or later	9650SE and 9690SA with firmware 9.5 or 9.5.0.1	9550SX and earlier
Basic Verify Schedule (<code>verify=basic</code>)	Runs immediately	N/A	N/A
Advanced Verify Schedule (<code>verify=advanced</code>)	Follows Advanced Verify Schedule	N/A	N/A
Verify Schedule is Disabled (<code>verify=disable</code>)	Runs immediately (Same as Basic)	Runs immediately	Runs immediately
Verify Schedule is Enabled (<code>verify=enable</code>)	Follows Advanced Verify Schedule	Follows Verify Schedule	Follows Verify Schedule

Verify will pause if a rebuild, migration, or initialization is currently in progress.

/cx/ux pause rebuild

This command allows you to pause the rebuild operation on the specified unit **/cx/ux**.

This feature is only supported on the 7000/8000 series controllers. 9000 series controllers have an on-board scheduler where rebuild operations can be scheduled to take place at specified start and stop times. The **/cx/ux pause rebuild** command is provided to enable 7000/8000 users to achieve similar functionality with use of Linux-provided schedulers such as cron(8) or at(1), or user-supplied programs.

/cx/ux resume rebuild

This command allows you to resume the rebuild operation on the specified unit **/cx/ux**.

This feature is intended only for 7000/8000 series controllers. 9000 series controllers have an on-board scheduler where rebuild operations can be scheduled to take place at specified start and stop times. The **/cx/ux resume rebuild** function is provided to enable 7000/8000 users to achieve similar functionality with use of Linux-provided schedulers such as cron(8) or at(1), or user supplied programs.

/cx/ux stop verify

This command stops a background verification process on the specified unit **/cx/ux**. Table 9 on page 90 shows the supported matrix as a function of the controller model and logical unit type.

/cx/ux flush

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

/cx/ux set autoverify=on|off

This feature only applies to 9000 series controllers.

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

By default, autoverify is **on** for 9650SE and 9690SA controllers running firmware 9.5.1 or later, and **off** all earlier controller models.

For 9650SE and 9690SA controllers running firmware 9.5.1 or later, auto-verify works in conjunction with the basic verify schedule. When autoverify is **on** and the basic verify schedule is used (verify=basic), a verify will automatically run at the basic verify time (Friday at midnight, by default). If the system is not on at that time, verification will start the next time the system is powered on. When the autoverify is **on** and the advanced verify schedule is used (verify=advanced), autoverify will run during the times specified with the advanced schedule. You can use the **show verify** command to display the existing schedule windows. For more information about using basic or advanced verify, see “/cx set verify=advanced|basic|1..5” on page 73.

For all 9000 series controllers running pre-9.5.1 firmware, auto-verify allows the controller to run the verify function once every 24 hours. If verify schedule windows are set up and enabled, then the controller will only start an automatic verify task during the scheduled time slots. If the verify takes longer than the schedule window, the verify process will be paused and restarted during the next verify schedule window.

Table 11: Autoverify Behavior (when enabled)

	9650SE and 9690SA with 9.5.1 or later	9650SE and 9690SA with firmware 9.5 or 9.5.0.1	9550SX and earlier
Basic Verify Schedule (verify=basic)	Runs at weekly day and time	N/A	N/A
Advanced Verify Schedule (verify=advanced)	Follows Advanced Verify Schedule	N/A	N/A
Verify Schedule is Disabled (verify=disable)	Runs at weekly day and time (Same as Basic)	Runs at any time, as determined by firmware	Runs at any time, as determined by firmware
Verify Schedule is Enabled (verify=enable)	Follows Advanced Verify Schedule	Follows verify schedule	Follows verify schedule

For more about setting up verify schedules, see “Setting Up a Verify Schedule” on page 67.

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

This command is the same as “/cx/ux set wrcache=on|off [quiet]”. Please see below for details.

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

This command allows you to turn **on** or **off** the write cache for a specified unit /**cx/ux**. This feature 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 will be stored in 3ware controller cache and 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 could be lost if a power failure occurs. With a Battery Backup Unit (BBU) installed, the data stored on the 3ware controller can be restored.

The following table shows the supported RAID types for write caching as a function of controller model and logical unit type. N/A (Not Applicable) refers to cases where the given logical unit type is not supported on a particular controller model.

Table 12: Supported RAID Types for Write Caching

Model	R0	R1	R5	R6	R10	R50	Single	Spare	JBOD
7K/8K	Yes	Yes	Yes	N/A	Yes	N/A	N/A	No	Yes
9000 ^a	Yes	Yes	Yes	N/A	Yes	Yes	Yes	No	Yes
9650SE and 9690SA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

a. Models 9500S, 9550SX, and 9590SE

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

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

This 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.

This command is supported on the 9690SA and 9650SE controllers. This feature is supported in all types of RAID units.

Read Cache Basic Mode is used to store read cache data locally on the controller that has recently been written to media and is likely to be frequently accessed. This improves read access times for applications such as a database that can take advantage of storage caching. The read cache may 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 Prefetch (IRP) feature.

The Intelligent Read Prefetch feature includes a typical read-ahead caching method which is used to proactively retrieve data from media and store it locally on the controller with the anticipation that it may be requested by the host. For example, the host may read blocks 1, 2, and 3. With the read-ahead caching included in IRP, the controller will also retrieve and hold in its cache blocks 4, 5, and 6 in anticipation of getting those command requests from the host. 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 host queue depth 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 at higher queue depths in multiple read only or mixed read/write stream environments. The performance improvements should be seen for most RAID types regardless of the unit's operating unit 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 feature only applies to 9000 series SX/SE/SA model controllers.

This feature requires a supported enclosure. For additional information about enclosure-related commands, see “Enclosure Object and Element Commands” on page 123.

This 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

This feature only applies to 9000 series controllers.

This 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 will fail. When ignoreECC is set to **on**, such errors are ignored, and the rebuild will continue. When you use ignoreECC, a file system check is recommended following the rebuild, to insure data integrity.

By default, ignoreECC is **off**.

See Table 8, “Supported Model-Unit Types for ignoreECC,” on page 61

/cx/ux set name=*string*

This command allows you to name the unit with an arbitrary name. You can use this name in conjunction with the unit serial number to cross-reference with the unit. The system does not check to ensure uniqueness of names, so be careful 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

This feature only applies to 9000 series SX/SE/SA model controllers.

This command sets the queue policy of the firmware. If the queue policy is **on**, the firmware utilizes the drive's queuing policy. If any drives do not support a queuing policy, this policy will have no effect on those drives.

For a spare unit, drive queuing is not meaningful or applicable. When a spare becomes part of a true unit during a rebuild, it adopts the queue policy of the "new" parent unit. Thus, this command does not set the queue policy for the spare unit type.

Note: Queuing is only applicable for SATA drives.

By default, qpolicy is **on**.

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]

This command only applies to 9000 series controllers, models SE and SA, and only for redundant units. Firmware 9.5.1 or later is required.

This command sets the Rapid RAID Recovery policy for the specified unit.

Rapid Raid Recovery can speed up the rebuild process, and it can speed up initialize and verify tasks that may 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 none of the tasks will be sped up.

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

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

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



Note: When upgrading to 9.5.1, redundant units created using firmware versions prior to 9.5.1 are assigned a Rapid Recovery Policy of *disable*, which cannot be changed.

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]

This feature only applies to 9000 series SX/SE/SA model controllers.

This command sets the storsave policy to be either **protect**, **balance**, or **perform** when the unit write cache is enabled. The default setting is **balance** when a BBU is installed, and **perform** 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 should help you to decide which one is suitable to you and your application. You will find further discussion of this setting in the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*, under “About StorSave Profile Levels” on page 124.

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

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

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

- When the unit becomes degraded, the write cache will not be disabled.
- Write journaling is disabled. All data flushing from controller cache will be flushed to disk. If a BBU is present, this essentially disables the BBU for this unit.
- Incoming FUA (Force Unit Access) host requests will be honored.

If you set the storsave policy to **perform**, a confirmation message will warn 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 less performance than perform mode. When storsave is set to the **balance** mode, it means:

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

quiet is used for non-interactive mode. No confirmation is given and the command is executed immediately. This is useful for scripting purposes.

For additional information, see “Setting the StorSave Profile for a Unit” in the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

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]

```

This feature only applies to 9000 series controllers.

This command allows you to change the existing configuration of a unit with **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, a valid number of disks and parameters must be specified.

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 unit of type single. For details, see the note below.) Unspecified parameters are assigned the default values (stripe size of 64K, write cache enabled, autoverify disabled, and ignoreECC disabled). Both source name and serial number will be carried over to the destination unit.

Note: A special case of this command is 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 disk name will be duplicated on the destination units, but the source unit serial number will not be carried over to the new unit. The new destination unit will have 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 would return 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 or TWINSTOR into multiple Single units.



Note: You can only migrate a unit to a RAID level that has the same or more capacity as the existing one. A four-drive RAID 5 unit can migrate to a four-drive RAID 0, but a four-drive RAID 0 unit cannot migrate to a four-drive RAID 5, without adding another drive, due to the need for additional storage capacity for parity bits.

The following table illustrates valid migration paths:

Table 13: Valid Migration Paths

Source	Destination								
	R0	R1	R5	R6	R10	R50	Single	Spare	JBOD
R0	Yes	No	Yes	Yes	Yes	Yes	No	No	No
R1	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No
R5	Yes	No	Yes	Yes	Yes	Yes	No	No	No
R6	Yes	No	Yes	Yes	Yes	Yes	No	No	No
R10	Yes	No	Yes	Yes	Yes	Yes	No	No	No
R50	Yes	No	Yes	Yes	Yes	Yes	No	No	No
Single	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
JBOD	No	No	No	No	No	No	No	No	No
Spare	No	No	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. One or more ports can be specified. Multiple ports can be specified 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. (This attribute can only be used when `type=raid50`.) Recall that a RAID 50 is a multi-tier 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 12. For example **group=3** indicates 3 disks of RAID 5 at the bottom layer of RAID 50.

Note: You can have a maximum of 4 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 will create two RAID 5 arrays. With 12 disks, specifying 3 will create four RAID 5 arrays under the RAID 0 level. With only 6 disks a grouping of 6 is not allowed, as you would basically be 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, 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 as it provides the best of net capacity and performance). For 15 disks, the disks can be grouped into groups of 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.

Note that RAID-10 always has **group=2**, so an attribute specifying it's group is not necessary.

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 KB (kilobytes).

Table 14: Supported Stripe Sizes

Model	R0	R1	R5	R6	R10	Spare	R50	Single	JBOD
7/8000	64	N/A	64	N/A	64	N/A	N/A	N/A	N/A
	128				128				
	256				256				
	512				512				
	1024				1024				
9000 ^a	16	N/A	16	N/A	16	N/A	16	N/A	N/A
	64		64	N/A	64		64		
	256		256	N/A	256		256		
9650SE and 9690SA	16	N/A	16		16	N/A	16	N/A	N/A
	64		64	64	64		64		
	256		256	256	256		256		

a. Models 9500S, 9550SX, and 9590SE

noscan attribute instructs CLI not to notify the operating system of the creation of the new unit. By default CLI will inform the operating system. One application of this feature is to prevent the operating system from creating block special devices such as /dev/sdb and /dev/sdc as some implementations might create naming fragmentation and a moving target.

nocache attribute instructs CLI to disable the write cache on the migrated unit. Enabling write cache increases write performance but at the cost 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, it is recommended not to set nocache

unless there is a BBU (battery backup unit) or UPS (uninterruptible power supply) 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 92.

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. Once the migration is finished, a reboot will be required if you are booted from the unit. For secondary storage, depending on your operating system, you may need to first unmount the unit, then use CLI commands to ‘remove’ and ‘rescan’ the unit so that the operating system can see the new capacity, and then remount the unit. For details see “/cx/ux remove [noscan] [quiet]” on page 89 and “/cx rescan [noscan]” on page 64.

You may also need to resize the file system or add a new partition. For instructions, consult the documentation for your operating system.



Warning: It is important that you allow migration to complete before adding drives to the unit. Making physical changes to the unit during migration may 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 indicates that u3 should be split into Single units. In this case, u3 is a RAID 1 and the Migrate command splits u3 into u3 and ux, each with a RAID type of Single.



Warning: Make sure that no I/O is pending and that the unit is unmounted before splitting 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 migrating units will be displayed. In this example, the report indicates that /c0/u3 is a migrating unit with 39% completion. The report also indicate that Source Unit su0 is of type RAID-1 and Destination Unit du0 is of 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 of raidtype Single to RAID-1 is a special case. Since the single unit would become 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 will show DEGRADED until the “migration/rebuild” is complete.

For example, below is a system with two migrating units, /c0/u0 and /c0/u1. u0 is migrating from a RAID-10 to a RAID-0 array, while 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, attached to a port (or virtual port), such as **/c0/p0**. You use port object commands for such tasks as seeing 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 (9000 series SX/SE/SA only)|
  lspeed (9000 series SX/SE/SA only)|model|
  ncq (9000 series SX/SE/SA only)|serial|smart|status|
  identify (9000 series SX/SE/SA only)|
  driveinfo (9690SA only)
  dpmstat type=instr|ra|lct|histdata|ext
  (9000 series SX/SE/SA, except for type=ext, which is SE/
  SA only)
/cx/px show all

/cx/px remove [noscan][quiet]
/cx/px set identify=on|off (9000 series SX/SE/SA only)
/cx/px set dpmstate=clear [type=<ra|lct|ext>] (9000 series
  SX/SE/SA only, except for type=ext which is 9000 series
  SE/SA only)
```

/cx/px show

This command shows summary information about the specified disk attached to port **/cx/px**.

Example for 9650SE and earlier controllers:

```
//localhost> /c1/p5 show
```

Port	Status	Unit	Size	Blocks	Serial
p5	OK	u0	149.05 GB	312581808	3JS0L9QW

The above output indicates that port 5 of controller 1 is attached to one disk with status OK participating in unit 0.

Example for 9690SA controller:

Note that in this case the summary information is in a slightly different format

```
//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 above 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).

The VPort number provides a handle by which to identify the drive, even though the drive may not be directly attached to the controller.

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 ...]

This command shows the current setting of the given attributes on the specified port or drive. One or many attributes can be requested. Specifying an invalid attribute will terminate the loop. Possible attributes are: capacity, firmware, identify (9000 series SX/SE/SA only), lspeed (9000 series SX/SE/SA only), model, ncq (9000 series SX/SE/SA only), serial, smart (SATA only), and status.

/cx/px show capacity

This command displays the capacity of the drive attached to the specified port in two formats—GB and blocks. Note that of this version, the GB format is computed based on division by 1000 (not 1024).

Example:

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

/cx/px show driveinfo

This command applies to the 9690SA only. It displays the following information about the drive:

Drive Type can be either SAS or SATA.

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

Drive Ports indicates the number of physical ports on the drive. Can be 1 or 2, depending on whether the drive is a dual-ported drive. SAS drives can be either single or double ported, while SATA drives have only one port.

Drive Connections indicates the number of connections from the controller to the drive. Can be either 1 or 2.

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
```

/cx/px show firmware

This command displays the firmware version of the drive attached to the specified port.

Example:

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

/cx/px show identify

This command only applies to 9000 series SX/SE/SA model controllers. This feature requires a supported enclosure.

This 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 115.

Example:

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

/cx/px show lspeed

This command only applies to 9000 series SX/SE/SA model controllers.

This command displays 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
```

/cx/px show model

This command displays the model of the drive attached to the specified port.

Example:

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

/cx/px show ncq

This command only applies to 9000 series SX/SE/SA model controllers.

This command displays the NCQ (Native Command Queuing) 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
```

/cx/px show serial

This command displays the serial number of the drive attached to the specified port.

Example:

```
//localhost> /c0/p5 show serial
/c0/p5 Serial = WD-WMACK140649
```

/cx/px show smart

SMART data is only applicable to SATA drives. It is not available for SAS drives.

This command extracts SMART (Self Monitoring Analysis and Reporting) data from the specified disk. Because the data is extracted live from the disk, this command can be used to get the most recent data about the presence or absence of a disk.

The SMART data is displayed in hexadecimal form.

Example:

```
//localhost> /c0/p5 show smart
/c0/p5 Drive SMART Data:
10 00 01 0B 00 C8 C8 00 00 00 00 00 00 03 07
00 9A 96 BC 14 00 00 00 00 00 04 32 00 64 64 7A
00 00 00 00 00 00 05 33 00 C8 C8 00 00 00 00 00
...
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2C
```



Note: The SMART data is not decoded. If the drive attached to the specified port is not present or if there are cabling problems reaching the drive, CLI will return an error. This can be one way of detecting whether or not a drive is present.

/cx/px show status

This command displays the status of the drive attached to the specified port. (Definitions of the drive statuses are available in the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1.*)

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/px show” on page 106). For example, if a unit is DEGRADED and a drive is the degradation point of that unit, the output of this command would not show DEGRADED as the command

“/cx/px show” would. Note also the difference that this command only shows the status of the drive; it does not contain other information such as unit, type, size, and so forth.

/cx/px show all

This command shows the current setting for all port-related attributes: status, model, serial, firmware, capacity, and smart.

Example for 9690SA:

```
/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 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 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

```

/cx/pX show dpmstat type=inst|ra|lct|histdata|ext

This command only applies to 9000 series SX/SE/SA controllers, except for **type=ext**, which applies only to SE/SA models.

This command allows you to request drive statistics of the specified type for the specified port. These statistics can be helpful when troubleshooting performance problems.

type= specifies which statistics should be displayed. 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). This measurement provides a short duration average.

ra (Running Average). Running average is a measure of long-term averages that smooth out the data, and results in older 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 FUA (Force Unit Access), flush commands, and a drive sectors's read, write, and write commands with FUA.

lct (Long Command Times). This a collection of the commands with the longest read/write response time.

histdata (Histogram Data). The histogram categorizes the read/write execution times and group 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 39. For more information, see “Drive Performance Monitoring” on page 253 of the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*.

Example of running average statistics (RA)

```
//localhost> /c0/p3 show dpmstat type=ra
```

Port	Status	Unit	Queue Depth	IOPs	Xfer Rate(MB/s)	Resp Time(ms)
p3	OK	u0	0	435	25.249	2

Example of long command times statistics (LCT)

```
//localhost> /c0/p3 show dpmstat type=lct
```

Port	Status	Unit	Resp Time(ms)	----- CDB / ATA Task File (hex) -----
p3	OK	u0		


```

2007-02-09 13:47:57 383.216 00 80 60 40 92 9f 8a 40 1a 00 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 00
2007-02-09 13:47:57 405.478 00 80 60 40 61 11 20 40 26 00 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 00
2007-02-09 13:47:57 419.002 00 80 60 40 5e df d1 40 29 00 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 00
2007-02-09 13:47:57 527.994 00 80 60 40 6e a5 b6 40 03 00 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 00
2007-02-09 13:47:57 609.526 00 80 60 40 27 1c e9 40 2b 00 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 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 displayed.

Example of histogram (histdata)

To display 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 milliseconds or shorter, and there are 204 commands with response times between 10 and 20 milliseconds (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 [noscan] [quiet]`

This command allows you to remove (or export) a port (or drive) `/cx/px`. Exporting a port instructs the firmware to remove the specified port from its pool of managed ports, but does not retain the DCB (Disk Configuration Block) metadata on the attached disk. You can import (or re-introduce) the port by rescanning the controller.

`noscan` is used to not inform the operating system of this change. The default is to inform the operating system. This feature is applicable for 7/8000 series only.

`quiet` is for non-interactive mode.



Warning: Use caution when using this command as this operation will degrade any redundant units. This command will fail if you attempt to remove a drive from a non-redundant unit. After the drive is removed in 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

This command applies only to 9000 series SX/SE/SA controllers. This feature 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 129.



Note: This feature requires an enclosure with appropriate enclosure support. For additional information about enclosure-related commands, see “Enclosure Object and Element Commands” on page 123.

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]

This command only applies to 9000 series SX/SE/SA controllers, except for **type=ext**, which applies only to SE/SA models.

This command allows you to clear the data buffers of accumulated statistics information. There are two reasons to clear this data:

- Once dpmstat is enabled, statistics information continues to accumulate. Eventually it can cause a buffer overflow, causing all statistics information to be rendered as #####.
- You wish to have fresh data, such as when switching between benchmarking writes to benchmarking reads.

This command clears 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 112.

Please note that if **type=ra**, both the Running Average and Histogram data are cleared. If **type=lct**, only the Long Command Times data will be 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
```

Port	Status	Unit	Queue		Xfer	Resp
			Depth	IOPs	Rate(MB/s)	Time(ms)
p3	OK	u0	0	0	0.000	0

Similarly, the display for Histogram data would also be all zeros.

Phy Object Commands

These commands are for 9690SA controllers only.

Phy Object Commands are sent to an instance of a controller phy such as */c0/phy0*.

This command sets the link speed control of the phy. The possible values are auto, 1.5, and 3.0 for SATA, and auto and 3.0 for SAS. The units are in Gigabits per second (Gbps).

Syntax

```
/cx/phyx show
/cx/phyx set link=auto|1.5|3.0
```

/cx/phyx show

This command is only for 9690SA controllers.

This command presents a summary report on the specified phy. 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 may be set with the */cx/phyx set link* command. The default is *auto*.

Example:

```
//localhost> /c3/phy0 show
```

Phy	SAS Address	Device		--- Link Speed (Gbps) ---		
		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

This command is only for 9690SA controllers.

This command sets the link speed for the specified phy. This will control the speed between the controller and the hard drive or enclosure to which it is connected. The possible values for SATA are: auto, 1.5, or 3.0. The possible values for SAS are: auto or 3.0. Speed is in Gigabytes 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.
```

BBU Object Commands

BBU (Battery Backup Unit) 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 9000 series controllers on which a BBU is actually installed. (The BBU is not supported on 9590SE-4ME.)

Syntax

```
/cx/bbu show (9000 series only)
/cx/bbu show attribute [attribute ...] where attributes are:
    batinst|bootloader|cap|fw|lasttest|pcb|ready|serial|
    status|temp|volt
/cx/bbu show all (9000 series only)

/cx/bbu test [quiet] (9000 series only)
    Warning: May take up to 24 hours to complete. Write cache
    will be disabled during the test.
/cx/bbu enable (9000 series only)
/cx/bbu disable [quiet] (9000 series only)
```

/cx/bbu show

This 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-Jul-2004
```

The command output indicates that the battery capacity was last measured on 01-Jul-2004. The battery is estimated to last 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 will be displayed after the command `//localhost> /c0/bbu show`.

Error: (CLI:053) Battery Backup Unit is not present.

`/cx/bbu show attribute [attribute ...]`

This command shows the current setting of the given attribute(s) on the BBU board. One or many attributes can be specified. Specifying an invalid attribute will terminate the loop. Possible attributes are: batinst, bootloader, cap, fw, lasttest, pcb, ready, status, serial, temp, volt.

`/cx/bbu show batinst`

This command shows the date when the current battery was installed.

`/cx/bbu show bootloader`

This command shows the BBU's boot loader version.

`/cx/bbu show cap`

This command shows the battery capacity in hours.

A value of '0 hours' will be displayed if the battery capacity test has never been run.



Note: The estimated BBU capacity hours displayed is based on the measurement taken during the last test. If you have not run the BBU test command for some time, this number can be misleading. 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 122.

`/cx/bbu show fw`

This command shows the BBU firmware version number.

`/cx/bbu show lasttest`

This command shows the date the battery capacity was last measured. If the battery capacity test has never been run, then 'xx-xxx-xxxx' will be displayed.



Note: The estimated BBU capacity hours displayed is based on the measurement taken during the last test. If you have not run the BBU test command for some time, this number can be misleading. For information about running a test, see “/cx/bbu test [quiet]” on page 122.

`/cx/bbu show pcb`

This command shows the PCB revision number on the BBU.

/cx/bbu show serial

This command shows the BBU serial number.

/cx/bbu show status

This command shows the status of the BBU. Possible values are:

Testing. A battery test is currently in progress. This test may take up to 24 hours to complete. During the test, the BBU is **not** capable of backup operation and the write cache of the RAID controller is also disabled. If the test is completed with no error and the BBU status changes to WeakBat or OK, the write cache will be re-enabled. If a Fault, Failed or Error occurs during the test, the write cache remains in the disabled state until the problem is fixed.

Charging. The BBU is currently charging the battery. Charging is started automatically by the BBU whenever necessary. During charging, the BBU is not capable of backup operation and the write cache is disabled. Once the test is completed with no error and the BBU status changes to OK, the write cache will be re-enabled. If a FAULT or ERROR occurs during the test, the write cache remains in the disabled state until the problem is fixed.

Fault. A battery fault is detected. The BBU is not capable of backup operation and the write cache is disabled. Replace the battery and/or the BBU board as soon as possible so that the write cache will be enabled again.

Error. A BBU error is detected. The BBU is not capable of backup operation and the write cache is disabled. Replace the battery and/or the Battery Backup Unit as soon as possible so that the write cache will be enabled again.

Failed. The battery failed a test. In this state, the BBU is not capable of backup operation and the write cache is disabled. We recommend you replace the battery and/or the Battery Backup Unit as soon as possible so that the write cache will be enabled again.

WeakBat. The BBU is functioning normally and is online and capable of backing up the write cache. However, the battery is weak and should be replaced.

OK. The BBU is ready, online and capable of backing up the write cache.

- (dash) A battery is not present or a Battery Backup Unit is not installed

`/cx/bbu show temp`

This 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 that it may be time to replace the battery. (Contact LSI to obtain a replacement battery.)

`/cx/bbu show volt`

This 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 that it is time to replace the battery. (Contact LSI to obtain a replacement battery.)

`/cx/bbu show all`

This 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  = OK
/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
//localhost>
```

`/cx/bbu test [quiet]`

This command starts the battery capacity test. The test may 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. Once the test is completed with no error and the BBU status returns to OK, the write cache will be re-enabled.



Note: Once started, the test can not be terminated before it completes. Write cache cannot be enabled until the test completes.

AEN (Asynchronous Event Notification) messages are also generated by controllers to notify the user 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 displays 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`

This command enables BBU detection on the controller. If the BBU is Ready, the controller will utilize BBU functionality in the event of a power failure.

`/cx/bbu disable [quiet]`

This command disables BBU detection on the controller. When disabled, the controller ignores the existence of the BBU and will show 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, such as `/c0/e0/slot0`. Enclosure object elements include slot, fan, and temperature sensor elements.



Note: The command descriptions of this section show the syntax of enclosure commands for the 9690SA controller, 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 15: Enclosure protocol, supported elements, and syntax

Controller		9650SE		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
	Temp 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|pwr|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

This command is used with the 9690SA controller. For the 9650SE and CCU enclosure, simply drop the prepended controller name in the command and use /ex.

This 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 ...]

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use */ex*.

This command shows the current setting of the given attribute(s). One or many attributes can be requested. An invalid attribute will terminate the loop. Possible attributes are: controllers, slots, fans, temp, pwrs (power supply), and alms (alarms).

/cx/ex show controllers

This command is used with the 9690SA controller. 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 may not already be known.

This command lists the controller associated with enclosure */cx/ex*.

Example:

```
//localhost> /e0 show controllers
e0 connects to controller /c0
```

/cx/ex/ show diag=helptext

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use */ex*.

This command allows you to view the enclosure diagnostic log. What is reported by this log will vary depending upon the manufacturer of the enclosure. The enclosure diagnostic log may be requested by 3ware Customer Support to help troubleshoot problems on your controller.

/cx/ex show slots

This command is used with the 9690SA controller. For the 9650SE and CCU enclosure, simply drop the prepended controller name in the command and use /ex.

This command reports the slots in enclosure /cx/ex 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/ex show fans

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command lists the fans in enclosure /cx/ex and shows their status.

The Status column lists the status of each fan. The State column indicates if the fan is **On** or **Off**. Speed is shown by two columns showing the Step (level) and 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
```

Fan	Status	State	---Speed---		Identify
			Step	RPM	
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

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command lists the temperature sensors in enclosure /cx/ex and the current temperature.

Note: 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 shows 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

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command reports 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

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

Note that in this command, “alarms” may be abbreviated to “alms” as in this syntax usage: **/cx/ex show alms**.

This command reports 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 if the alarm unit is ON or OFF, and the Audibility column indicate 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

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command shows the current settings of all attributes for enclosure **/cx/ex**

/cx/ex/slotx show

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command shows information about the specified **/slotx** on the specified enclosure **/ex**. The slot name is followed by its status. If a slot has been inserted with a drive and no fault has been detected, the status is OK. If the slot is empty the status will indicate NO-DEVICE. The port that is correlated to the slot is indicated in the next column. If no device is found in the slot, that

a dash (-) is shown in the Port column. The final column shows the Identify setting for the specified slot.

Example:

```
//localhost> /c0/e0/slot1 show
Slot      Status      Port      Identify
-----
slot1     OK          /c0/p1    Yes
```

/cx/ex/slotx show identify

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This 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 will blink. If the enclosure does not support Slot Identify, this command will return **N/A**.

Example:

```
//localhost> /c0/e0/slot1 show identify
/c0/e0/slot1 Identify status = on
```

/cx/ex/slotx set identify=on|off

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

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** will cause the LED associated with that slot to blink.

Note: This command is equivalent to “/cx/px set identify=on|off” on page 115.

Example:

```
//localhost> /c0/e0/slot1 set identify=on
Setting Slot Identify /c0/e0/slot0 to [on] ... Done.
```

/cx/ex/fanx show

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command shows the information about the specified enclosure fan **/fanx** in the specified enclosure **cx/ex**. The fan name is followed by its status. If a fan is on and no fault has been detected, the status will indicate OK.

Example:

```
//localhost> /c0/e0/fan0 show
```

Fan	Status	State	---Speed---		Identify
			Step	RPM	
fan0	OK	ON	1	2700	Off

/cx/ex/fanx show identify

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This 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 will blink. If the enclosure does not support Fan Identify, this command will return **N/A**.

Example:

```
//localhost> /c0/e0/fan1 show identify
/c0/e0/fan1 Identify status = on
```

/cx/ex/fanx set identify=on|off

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

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>

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command sets the speed level of the specified enclosure fan. The speed level is a number in the range of <0..7>, where:

- 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

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This command shows the information about the specified power supply element /**pwrsx** in the specified enclosure **cx/ex**. 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, 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 would indicate OK.

Example:

```
//localhost> /c0/e0/pwrs0 show
```

PowerSupply	Status	State	Voltage	Current	Identify
pwrs0	OK	on	OK	OK	Off

/cx/ex/pwrsx show identify

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use /ex.

This 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 will blink. If the enclosure does not support Power Supply Identify, this command will return N/A.

Example:

```
//localhost> /c0/e0/pwrs1 show identify
/c0/e0/pwrs1 Identify status = on
```

`/cx/ex/pwrsx set identify=on|off`

This command is used with the 9690SA controller. 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`

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use `/ex`.

This command shows the information about the specified temperature sensor element `/tempx` in the specified enclosure `cx/ex`. 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 the *3ware SAS/SATA RAID Software User Guide, Version 9.5.1*

Example:

```
//localhost> /c0/e0/temp0 show
TempSensor      Status          Temperature      Identify
-----
temp0           OK              42C(107F)       Off
```

`/cx/ex/tempx show identify`

This command is used with the 9690SA controller. For the 9650SE and CCU enclosure, simply drop the prepended controller name in the command and use `/ex`.

This 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 will blink. If the enclosure does not support Temperature Sensor Identify, this command will return N/A.

Example:

```
//localhost> /c0/e0/temp1 show identify
/c0/e0/temp1 Identify status = on
```

`/cx/ex/tempx set identify=on|off`

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use `/ex`.

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`

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use `/ex`.

This 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:

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, this indication remains.

Example:

```
//localhost> /c0/e0/alm0 show
Alarm      Status          State      Audibility
-----
alm0       ACTIVATED      OFF       UNMUTE
```

`/cx/ex/almx set alarm=mute|unmute|off`

This command is used with the 9690SA controller. For the 9650SE, simply drop the prepended controller name in the command and use `/ex`.

This command controls the audibility and state of the enclosure alarm. It provides the ability to silence the alarm after it has activated. 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 will be audible. To silence the alarm, you may either set the state of the alarm to OFF, or you may mute the alarm.

The default values are UNMUTE and OFF.



Note: Some enclosures support alarms but not the mute/unmute function. For these enclosures, using this command to set the alarm to **mute** will return 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 will appear to complete and will 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.
```

Help Commands

The Help commands provides brief on-line help.

You can get overview help by typing `Help` at the top-level prompt. This displays a brief definition of commands. (For an example, see the discussion of the command “help” on page 136.)

You can also get help with specific commands, by entering `help` before an object name, or by typing a question mark (?) at the point in a command where you are uncertain what the attributes are.

Help with specific commands

If you enter the help command at the top level, you are considered to be in the Shell Object, and the help command will provide help on the Shell commands focus, show, flush, rescan, and commit. Using the help command on objects (such as `/cx`, `/cx/ux`, `/cx/px`, `/cx/bbu`, `/ex`, `/ex/slotx`, `/ex/fanx`, and `/ex/tempx`), displays all possible sub-commands associated with the object.

For example: help on the controller object `/cx`, will display all the sub-commands associated with the controller `/cx`, like this:

```
//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[pause[lines=n]]|
    ctlbus(9KSX/SE/SA)|memory|model|monitor|numdrives|
    numports|numunits|unitstatus|ondegrade(9500S only)|
    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 (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 9690SA only)[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 (9650SE and 9690SA)}
/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 ondegrade=cacheoff|follow (9500S only)
/cx set spinup=mn (9000 series)
/cx set stagger=mn (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=UDMA|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 start mediascan (7000/8000 only)
/cx stop mediascan (7000/8000 only)
/cx rescan [noscan] NOTE: Does not import non-JBOD on 7/8000
models.
//localhost>

```

Help with attributes

As you work with specific objects or commands, you can also use **?** to get help.

For example: If you enter the command **/c0 show** and then need help on what specific attribute syntax is possible, you can use **?** to get help as following:

```

//localhost> /c0 show ?

/cx show
/cx show attribute [attribute ...] where attribute is:
achip|allunitstatus|autocarve(9000 series)|
autorebuild(9550SX only)|bios|carvesize(9000series)|
driver|drivestatus|exportjbod|firmware|memory|model|
monitor|numdrives|numports|numunits|ctlbus(9000 series
SX/SE/SA only)|serial|ondegrade (9500S only)|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

This help command provide a table of contents, providing help with the overall navigation of the CLI commands. Typical output looks like the following.

```

//localhost> help

```


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AMCC/3ware CLI (version 2.x)

Commands	Description
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/bbu	BBU specific commands. (9000 only)
/cx/ex	Enclosure Specific commands. (9690SA only)

Certain commands are qualified with constraints of controller type/model support. Please consult the tw_cli documentation for explanation of the controller-qualifiers.

The controller-qualifiers of the Enclosure commands (/ex) also apply to Enclosure Element specific commands (e.g., /ex/elementx).

Type help <command> to get more details about a particular command. For more detail information see tw_cli's documentation.

help show

This 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 26 for more information.

help flush

This command provides specific flush-related help, illustrating various ways to use the flush command. See the section “Shell Object Commands” on page 26 for more information.

help rescan

This command provides specific rescan related help, illustrating various ways to use the rescan command. See the section “Shell Object Commands” on page 26 for more information.

help update

This command provides specific update-related help. See “Shell Object Commands” on page 26 for more information.

help commit

This command provides specific commit related help, illustrating various ways to use the commit command. See the section “Shell Object Commands” on page 26 for more information.

help focus

This command provides specific focus related help, illustrating various ways to use the focus command. See the section “Shell Object Commands” on page 26 for more information.

help /cx

This command provides specific controller **/cx** related help, illustrating various commands associated with the controller **/cx**. See the section “Controller Object Commands” on page 33 for more information.

help /cx/phyx

This command provides specific **/cx/phyx** related help, illustrating various ways to use the **/cx/phyx** command. See “Phy Object Commands” on page 117.

help /cx/ux

This command provides specific unit **/cx/ux** related help, illustrating various commands to use on a unit **/cx/ux**. See the section “Unit Object Commands” on page 81 for more information.

help /cx/px

This command provides specific **/cx/px** related help, illustrating various ways to use the **/cx/px** command. See the section “Port Object Commands” on page 106 for more information.

help /cx/bbu

This command provides specific **/cx/bbu** related help, illustrating various ways to use the **/cx/bbu** command. See the section “BBU Object Commands” on page 118 for more information.

help /cx/ex

This 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 123 for more information.

help /cx/ex/slotx

This 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 123 for more information.

help /cx/ex/fanx

This 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 123 for more information.

help /cx/ex/tempx

This 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 123 for more information.

help /cx/ex/pwrsx

This 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 123 for more information.

help /cx/ex/almx

This 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 123 for more information.

Command Logging

Both CLI and 3DM 2 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. (If you install 3DM 2, you are given the choice whether to enable command logging or not, during installation.)

You may be asked to supply this log file to tech support for troubleshooting.

Location of the Log File

The log file name is **tw_mgmt.log**.

For Windows Vista and Server 2008

The log file is stored in

`\ProgramData\AMCC`

Note that *ProgramData* is a hidden folder by default. To display it in Windows Explorer, enter `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

`\Documents and Settings\All Users\Application Data\AMCC`

For Linux, FreeBSD, Mac OS, and OpenSolaris

The log file is in the 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: Use the same shell you are using to run CLI, to set the environment variable. If you set it in a different shell window and then terminate that shell, the change will revert.

- **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 as described above is not persistent across reboot, because the the shell terminates when you power down, and defaults are reset on power on. To set an environment variable that will persist, set a global variable in a login config file (such as `.rc` or `.cshrc`) that will set the variable to the desired state when the system powers on. 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 on **My Computer**, and choose **Properties**.
- 2 In the **Properties** dialog box, click on 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 may 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 prints either a 0 or a 1, depending on whether the command was successful or not.

For example, if you had a 3ware controller with an ID of 0, you could type this command:

```
tw_cli /c0 show
(c0 information displayed here)
echo $?
0
```

If you type:

```
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 displayed 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.