

Xyratex Command Line Interface for RAID (XCR) User Guide

Part No. 0084353-06A

Issue 2.5

January 29, 2009

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Preface

What is in this guide

This user guide gives you an overview of how to use the Xyratex Command Line Interface for RAID (XCR) to configure a RAID system.

Who should use this guide

This user guide is for those requiring a command line interface for storage management. It assumes a working knowledge of storage appliance products. For a graphical storage management program, use StorView instead – see ["Related Documentation" beginning on page ix](#).

About this guide

This user guide provides the following information:

- [Chapter 1, "Introduction", on page 1](#) describes the program's capabilities, system requirements and installation.
- [Chapter 2, "Getting Started", on page 3](#) contains fundamental information about how to use the program.
- [Chapter 3, "How To ...", on page 9](#) contains a number of step-by-step procedures for accomplishing common tasks.
- [Chapter 4, "Command List", on page 17](#) lists every command, parameter and argument available.
- [Chapter 5, "Command Summary", on page 65](#) provides a quick reference for the syntax of each command.
- [Chapter 6, "Event Codes", on page 75](#) lists all of the events and associated code numbers that may appear in the event log.
- The Glossary, on [page 83](#), defines some of the terms used throughout this user guide.

Related Documentation

The following documentation is essential for the understanding and use of this software:

- StorView Storage Management Software Installation (part number: 80223).
- StorView Storage Management Software RAID Module User Guide (part number: 80224).

Revision History

Version	Date	Description of Change
1.0	December 5, 2006	Initial Release.
2.0	September 3, 2007	General updates and additional commands.
2.1	February 20, 2008	Addition of APM commands.
2.2	June 20, 2008	General updates and additional commands; removal of “-u” parameter from Event commands; addition of error codes, as well as new features for performance tuning, and an update to the operating system support. Added notation regarding deleting arrays while certain operations are occurring.
2.3	August 22, 2008	Minor updates.
2.4	January 5, 2009	Addition of alternative commands using names rather than indexes. Support for F6500E controllers.
2.5	January 29, 2009	Addition of save/restore configuration and fail drive commands. Licensing for mapping commands.

Chapter 1

Introduction

1.1 Introduction

The Xyratex Command Line Interface for RAID (XCR) is a tool for sending commands to a 5xxx series RAID controller. Data can be sent in-band (in other words, over the same medium as the data: Fibre Channel, SAS, SCSI, and so on) or out-of-band via ethernet.

It is run from the Windows Command Prompt (WXCR.exe) or Linux terminal (LXCR) and accepts a wide range of arguments and parameters, allowing:

- Creation and management of Arrays, Logical Drives and Hot Spares.
- Mapping of Logical Drives to host systems.
- Reporting of information for physical components such as drives and controllers.
- Reporting of information for logical components such as Arrays, Logical Drives, Hot Spares, Mappings and Jobs.
- Statistical reporting.
- Dumping of event logs and other controller information.

Automatic control or monitoring of the RAID system can also be achieved through the use of a batch file or external scripting language.

1.2 System Requirements

Use of this software requires the following:

1.2.1 Hardware

XCR requires an enclosure with a 5xxx or 6xxx series RAID controller.

1.2.2 Operating System

The following operating systems are supported:

- Microsoft Windows Server 2003 with Service Pack 2 (Web, Standard, Enterprise, Enterprise 64-bit and Standard 64-bit).
- Microsoft Windows Server 2008 (32-bit, 64-bit and IA64).
- Red Hat Enterprise Linux (RHEL) ES/AS 4 Update 4.
- Red Hat Enterprise Linux (RHEL) ES/AS 5.
- SUSE Linux Enterprise Server (SLES) 9 Service Pack 3.
- SUSE Linux Enterprise Server (SLES) 10 Service Pack 1.

1.2.3 Software

In order to use XCR out-of-band, embedded StorView must be installed. Embedded StorView is not required if XCR is used in-band.

1.3 Installation

Xyratex Command Line Interface for RAID (XCR) does not require installation – the executable binary file (WXCR.exe for Windows, LXCR for Linux) can be copied to any directory on the system and run like any other command line program.

You may want to include the program's directory in the system path so that it can be run from any other directory without typing the full path to the executable.

Chapter 2

Getting Started

2.1 Command Format

Each command consists of the LXCR command (on Linux) or the WXCR.exe command (on Windows) followed by one or more arguments, each of which may or may not have a parameter.

Arguments are single letters preceded by a single dash (–). Parameters are single words or numerical values, usually in decimal, but hexadecimal can be used if the –X option is used (see 2.2, "Arguments," on page 4). The order of arguments and parameters is critical and must not be altered. Both arguments and parameters are case-sensitive.

If multi-word phrases are used for parameters (for example, when specifying names of Arrays, Logical Drives, etc.) they must be included in double-quotes so they can be identified as a single entity.

See Chapter 4, on page 17 for a list of operations that can be performed. Parameters in angled brackets (<>) vary depending on the situation and must be supplied by the user. Those without angled brackets must be typed literally.

Arguments inside square brackets ([]) are optional.

An example:

```
LXCR / WXCR.exe -F -c -z arrayspare -u <driveWWN> -l 255
```

- Here the arguments are –F, –c, –z, –u and –l.
- "arrayspare" is a literal parameter of the –z argument.
- <driveWWN> is a parameter of the –u argument and must be replaced with the appropriate value (in this case, the WWN of a drive).
- "255" is a literal parameter of the –l argument.

2.2 Arguments

The command format follows a regular format. The first argument determines the object to which the command applies:

Argument		Object
Short form	Long form	
-C	--controller	Controller
-D	--device	Drive
-E	--enclosure	Enclosure
-F	--configuration	Configuration
-H	--hostport	Host Port
-O	--devport	Drive Port
-S	--sysman	System Manager
-N		Out-of-band usage (see 2.5, "Out-of-Band Use," on page 6)

The second argument describes the type of operation:

Argument		Operation
Short form	Long form	
-a	--add	Add an object
-c	--create	Create an object
-d	--delete	Delete an object
-g	--get	Get or display a value
-n	--number	Get number or quantity
-o	--commit	Commit an object
-s	--set	Set a value

The third argument is `-z` followed by the name of the command.

Subsequent arguments `-u`, `-l` (lower-case "L"), `-m` and `-p` pass additional parameters to the command, based on the type of data required. There may be more than one of each argument type, and the order must be maintained.

When a text string is used as a parameter, it must be enclosed in quotes if it contains a space. For example, to delete a logical drive called "LD One":

```
LXCR -F -d -z logicaldrives -m "LD One"
```

Also, when objects (such as logical drives) are named, the names must be unique in order for the command line program to be able to distinguish between them.

The `-X` argument can be used at the end of the line to specify that all parameters following a `-l` (lower-case "L") must be in hexadecimal. Omitting the `-X` means that all `-l` parameters will be assumed to be in decimal.

Note The output values from a command will follow the input parameters, so if `-X` is used, output will be in hexadecimal, otherwise it will default to decimal.

Version number and usage information can also be shown via the command line:

Argument		Operation
Short form	Long form	
<code>-v</code>	<code>--version</code>	Show version information and exit
<code>-h</code>	<code>--help</code>	Show usage information and exit

2.3 Indexes

Many commands require a particular object to be specified in the command syntax. Where multiple objects exist, they are referred to by an index number. This begins at zero (unless otherwise stated) and increments for each additional object in the system. For example, four arrays have been created, they will have indexes of 0, 1, 2 and 3.

If an object is removed, the indexes are reassigned so that they remain contiguous. In the example above, if the array with index 1 is deleted, then the array with index 2 will be assigned index 1, and the array with index 3 will be assigned index 2.

Index numbers are in decimal unless otherwise stated. Most indexes are based on the total number of objects in the system, but there are occasions when the scope of the indexes will be different. For example, when using the Get Drive WWN in Array command (see [4.4.6 on page 32](#)) command, the drives are indexed according to the array; whereas using the Get Drive WWN command (see [4.4.5 on page 32](#)) command, they are indexed according to the entire system. It is important to know the scope of the index required by the command, and to use the appropriate command to determine the index, otherwise the wrong object may be specified.

2.4 Multiple RAID Systems

To find the number of RAID systems present, use the command in [4.14.13, "Get Number of RAID Systems," on page 57](#):

```
LXCR / WXCR.exe -F -n -z raidsystems
```

To display the device names of each RAID system, use the command in [4.14.15, "Get RAID System Devices"](#):

```
LXCR / WXCR.exe -S -g -z whoami
```

Any command can be directed to a specific RAID system by adding the `-p <RaidSystemID>`, `-p <RaidSystemWWN>` or `-p <DeviceName>` option at the end of the command line.

For example:

To list all arrays on RAID system 0:

```
LXCR / WXCR.exe -F -g -z rankconfigstruct -p 0
```

To list all arrays on RAID system 1:

```
LXCR / WXCR.exe -F -g -z rankconfigstruct -p 1
```

To list all arrays on the RAID system with WWN 20000011C60E7F56:

```
LXCR / WXCR.exe -F -g -z rankconfigstruct -p 20000011C60E7F56
```

To list all arrays on the RAID system with device name `\\.\PHYSICALDRIVE1`:

```
LXCR / WXCR.exe -F -g -z rankconfigstruct -p \\.\PHYSICALDRIVE1
```

If the `-p` option is omitted, the RAID system with index 0 is assumed. So, for example, to create a logical drive of 10GB on array 3 on RAID system 0:

```
LXCR / WXCR.exe -F -c -z logicaldrives -l 3 -l 10 -l 512 -p 0
```

... is the same as:

```
LXCR / WXCR.exe -F -c -z logicaldrives -l 3 -l 10 -l 512
```

2.5 Out-of-Band Use

XCR can be used out-of-band via ethernet. This requires an embedded StorView installation for XCR to interact with.

The following additional parameters must be used in each out-of-band command:

```
-N -p <UserName> -p <Password> -p <IPAddress>
```

Where:

- `-N` – Specifies out-of-band usage.
- `<UserName>` – A valid username for the StorView installation.
- `<Password>` – A valid password for the StorView installation.
- `<IPAddress>` – The IP address of the hardware on which StorView is installed.

For example, to get all array information out-of-band on a system with an IP address of 10.128.107.32, username “admin” and password “1234”, the following command would be used:

```
LXCR / WXCR.exe -F -g -z rankconfigstruct -N -p admin -p 1234 -p 10.128.107.32
```

There are two special case commands for out-of-band usage:

To discover the number of out-of-band systems:

```
LXCR / WXCR.exe -F -n -z raidsystems -N
```

To show a list of all RAID systems with their IP and MAC addresses.

```
LXCR / WXCR.exe -F -g -z raidsystems -N
```

Note that these commands only need the `-N` parameter. The username, password and IP address parameters are not required.

2.6 Advanced Power Management (APM)

APM can be used to reduce the power consumption of disk drives in a RAID environment by spinning drives down when not in use. Two categories of APM are defined in XCR:

- 1 APM Level 1 – covers drives that are currently hot spares, unused or failed.
- 2 APM Level 2 – covers drives that are currently part of an array.

Normally the APM policy will be set using the commands described in [4.2.7, “Set APM Level 1 Options \(Non-Array Drives\),” on page 19](#) and [4.2.8, “Set APM Level 2 Options \(Array Drives\),” on page 21](#). However, XCR also offers commands to perform manual APM functions.

A regular functional test of drives can also be set: drives which have been spun down can be tested to make sure they are still working correctly.

2.7 Simultaneous Access

It is possible that multiple users might attempt to make configuration changes simultaneously. In such a case, the first user to complete their configuration changes will block any other changes that are already in progress from completing. A status message will be sent to the user informing them that the change has not taken place.

Of course, once the first user’s change has completed, changes from other users will be accepted. This atomic method of dealing with requests is purely to prevent corruption of the system configuration.

Chapter 3

How To ...

3.1 Introduction

Here you can find step-by-step instructions describing how to perform a variety of common tasks. This is a good place to explore the basic functions of the program.

All input and return values are in the default decimal. Hex can be specified if preferred by using the `-X` option (see [2.2, "Arguments," on page 4](#)).

For a more detailed description of any of the software's functions and capabilities, see ["Command List" beginning on page 17](#).

3.2 How to Create an Array

- 1 Determine that enough free drives are available:

```
LXCR / WXCR.exe -D -g -z unused
```

- 2 List information for all drives:

```
LXCR / WXCR.exe -D -g -z alldriveinfostruct
```

- 3 In the information for each drive is line marked "RankNo." This is the array to which the drive is currently assigned, but the special value "255" indicates that the drive is available for use. Note the "Entry" number (the drive's index) for each unused drive you wish to include in the array.

- 4 For each drive index from the previous step, use the following command to find the WWN of the drive:

```
LXCR / WXCR.exe -D -g -z name -l <DriveID>
```

- 5 Create the array with the following command:

```
LXCR / WXCR.exe -F -c -z array -l <NumDrives> -u <DriveWWN> -u <DriveWWN>... -l  
<ChunkSize> -l <RaidLevel> -l <BackoffPercent> -l <EnableCache> -l  
<ReadAheadCacheSize> -l <WriteBackCacheSize> -l <EnableMirrorCache> -l  
<EnableBatteryCache> -l <EnableCriticalRAID> -l <EnforceWriteBack>
```

Where the parameters are:

- <NumDrives> – The number of drives to be included in the array. See the <RaidLevel> parameter for limitations on the number of drives.
- <DriveWWN> – The WWN of a drive to be used in the creation of the array (from step 4). There will be multiple “-u <DriveWWN>” parameters - one each for the number of drives specified in the <NumDrives> parameter.
- <ChunkSize> – The chunk size of the array in kilobytes: “64”, “128”, or “256”.
- <RaidLevel> – The RAID level of the array: “0”, “5”, “6”, “10”, and “50”.
 - RAID 0 – Striped. Not fault tolerant. Requires 2-16 drives.
 - RAID 5 – Striped with parity. Requires 3-16 drives.
 - RAID 6 – Striped with two parity drives. Requires 4-16 drives.
 - RAID 10 – A RAID 0 array of RAID 1 arrays. Requires 4, 8, 12 or 16 drives.
 - RAID 50 – A RAID 0 array of RAID 5 arrays. Requires 6, 8, 10, 12, 14 or 16 drives.
- <BackoffPercent> – The percentage of the array that will not be available for use. Normally set to “1.”
- <EnableCache> – “0” disables cache settings; “1” enables the default cache settings. See [4.3.2, "Create Array," on page 23](#) for more detail on these parameters.
- <ReadAheadCacheSize> – See [4.3.2, "Create Array," on page 23](#) for more details. A value of “0” selects automatic read ahead cache sizing.
- <WriteBackCacheSize> – See [4.3.2, "Create Array," on page 23](#) for more details. A value of “0” disables the write back cache.
- <EnableMirrorCache> – “0” disables the mirror cache; “1” enables it.
- <EnableMirrorCache> – “0” disables the mirror cache, “1” enables it.
- <EnableBatteryCache> – To enable the Write Back cache when the battery is missing, low or failed, set this to “1”. Otherwise, set to “0.”
- <EnableCriticalRAID> – To enable the Write Back cache when an array becomes critical, set this to “1”. Otherwise, set to “0”. Not applicable to RAID 0 arrays.
- <EnforceWriteBack> – When set to “1,” this prohibits the firmware from allowing the transition to a “write through” policy.

Example:

We want to create a RAID 5 array containing 3 drives.

- 1 First we need to see if there are enough free drives:

```
LXCR / WPCR.exe -D -g -z unused
```

- 2 This returns “12”, so there are 12 drives available – plenty for our purposes.

- 3 Next we must determine exactly which drives are free:

```
LXCR / WPCR.exe -D -g -z alldriveinfostruct
```

We pick the drives with indexes 0, 1 and 2 because they all have a “RankNo” value of “255” (available for use).

- 4 Then we find the WWNs of the drives:

```
LXCR / WPCR.exe -D -g -z name -l 0
LXCR / WPCR.exe -D -g -z name -l 1
LXCR / WPCR.exe -D -g -z name -l 2
```

These commands give us WWNs of 5931333437393030, 5931323836353435 and 5931333131353136 for our three drives.

- 5 Finally we can create our array:

```
LXCR / WPCR.exe -F -c -z array -l 3 -u 5931333437393030 -u 5931323836353435 -u
5931333131353136 -l 128 -l 5 -l 1 -l 1 -l 1 -l 0 -l 0 -l 0 -l 0 -l 0 -l 0
```

Note that we have chosen a chunk size of 128K, a Backoff Percentage of 1%, enabled the default cache settings, specified an automatic read ahead cache size, no write back cache, no mirror cache, no battery cache, no enabling of write back when an array is critical, and no enforced write back.

3.3 How to Create a Logical Drive

Logical drives are created from arrays. If an array with sufficient free space is not already available, one will have to be created using the instructions in [3.2, “How to Create an Array,” on page 9](#).

- 1 List the arrays on the system:

```
LXCR / WPCR.exe -F -g -z rankconfigstruct
```

- 2 Select an array and note its index (the value given after the text “Array”).

- 3 Use the following command to create the logical drive:

```
LXCR / WPCR.exe -F -c -z logicaldrives -l <ArrayID> -l <Size> -l <HostBlockSize>
[-m <LogicalDriveName>]
```

Where the parameters are:

- <ArrayID> – The index of the array created previously.
- <Size> – The intended size of the array in GB.
- <HostBlockSize> – The block size that is read/written to the logical drive from the host. One of the following:
 - “0” – Default (usually 512 bytes).
 - “512” – 512 bytes.
 - “4096” – 4096 bytes (4KB).
- <LogicalDriveName> (optional argument) – The name to assign to the newly created logical drive (maximum of 32 characters).

3.4 How to Use Snapshots

Two logical drives are required for snapshotting – one containing the data to be backed up, another to contain the snapshot (backed-up) data. See [3.3, "How to Create a Logical Drive," on page 11](#) for more information. For the purpose of this How To, the logical drives are referred to as:

- LDdata – the logical drive to be backed up.
- LDsnap – the logical drive to hold the snapshot data.

3.4.1 Unlocking the snapshot features

- 1 In order to use the snapshot features, a valid license key must be applied (this can be obtained from your storage vendor).
- 2 Use the following command to unlock the snapshot features:

```
LXCR / WXCR.exe -S -s -z snaplicense -m <LicenseKey>
```

Where the parameters are:

- <LicenseKey> – The key for the snapshot license (provided by your storage vendor).

3.4.2 Configuring logical drives for snapshot

- 1 Use the following command to list logical drives and note the indexes of the LDdata and LDsnap logical drives:

```
LXCR / WXCR.exe -F -g -z hostconfigstruct
```

- 2 Convert the LDsnap logical drive into an internal logical drive using the following command:

```
LXCR / WXCR.exe -F -s -z hostlun -l <LogicalDriveID> -l 128
```

Where the parameters are:

- <LogicalDriveID> – The index of LDsnap.

- 3 Create an ODA on LDsnap:

```
LXCR / WXCR.exe -F -c -z oda -l <IntLogicalDriveID> -l <StripeSize>
```

Where the parameters are:

- <IntLogicalDrive> – The index of LDsnap.
- <StripeSize> – The minimum block size for a snapshot write in KB (64, 128, 256, 512, or 1024).

The index number of the ODA will be returned.

- 4 Assign the ODA on LDsnap to LDdata:

```
LXCR / WXCR.exe -F -s -z assignoda -l <OdaID> -l <LogicalDriveID>
```

Where the parameters are:

- <OdaID> – The index of the ODA (given in the previous step).
- <LogicalDriveID> – The index of LDdata.

3.4.3 Taking a snapshot

Once logical drives are set up properly, a snapshot can be taken with the following command:

```
LXCR / WXCR.exe -F -c -z snapshot -l <LogicalDriveID>
```

Where the parameters are:

- <LogicalDriveID> – The index of LDdata.

3.4.4 Restoring data from a snapshot (snap back)

If one or more snapshots have been taken, data can be restored to the state at the point of snapshot by using the following command:

```
LXCR / WXCR.exe -F -s -z snapback -l <IntLogicalDriveID> -l <SnapshotID> -l <SnapbackFlag>
```

Where the parameters are:

- <IntLogicalDriveID> – The index of LDsnap.

- <SnapshotID> – The index of the snapshot to snap back to (see 4.13.13, "Get Snapshot Data," on page 50).
- <SnapbackFlag> – One of the following values:
 - "0" – Snap back to the point where the snapshot volume was originally created, ignoring all subsequent snapshots written to the volume.
 - "1" – Snap back to the most recent snapshot.

Note that all snapshots up to the snapshot required will be deleted by this operation.

3.4.5 Mapping a snapshot to a host

- 1 If firmware version 2.1 is being used, you must assign a virtual LUN to the snapshot before mapping it to a host. If firmware version 2.2 and above is in use, this step can be skipped.

```
LXCR / WXCR.exe -F -s -z snapshot -l <IntLogicalDriveID> -l <SnapshotID>
```

Where the parameters are:

- <IntLogicalDriveID> – The index of LDsnap.
- <SnapshotID> – The index of the snapshot to assign (see 4.13.13, "Get Snapshot Data," on page 50).

- 2 Type the following command and make a note of the virtual LUN number for the snapshot you wish to map:

```
LXCR / WXCR.exe -F -g -z snapshotdata
```

- 3 To map the snapshot volume to a host, use the following command:

```
WXCR / LXCR -F -c -z mapsnapshot -u<HostWWN> -u<PortWWN> -l <VirtualLunNumber> -l <LunNo> -l <PortFlag> -l<ReadOnly>
```

Parameters:

- <HostWWN> – The WWN of the host to map (see 4.7.1, "Get Host WWN," on page 36).
- <PortWWN> – The WWN of the port (see 4.8.1, "Get Host Port WWN," on page 37).
- <VirtualLunNumber> – The virtual lun number of the snapshot determined in the previous step.
- <LunNo> – The LUN number to assign to this mapping.
- <PortFlag> – The sum of the following values determines which ports will have access:
 - 1 – c0p0 (Logical Drive is available on c0p0)
 - 2 – c0p1 (Logical Drive is available on c0p1)

- 4 – c1p0 (Logical Drive is available on c1p0)
- 8 – c1p1 (Logical Drive is available on c1p1)

So, for example, to allow access through c0p1 and c1p1 only, use the value “10” (2 plus 8). To allow access through all ports use “15.”

- <ReadOnly> – 0: Read/Write access, 1: Read Only.

3.4.6 De-configuring snapshot logical drives

To return logical drives to their original purpose and remove all snapshot capability, the configuration process is performed in reverse:

- 1 List the ODAs defined in the system:

```
LXCR / WXCR.exe -F -g -z odastatstruct
```

- 2 Note the index of the ODA (under “OdaNumber”) and the logical drive index (under “SnapshotLd”).
- 3 Unassign the ODA on LDsnap from LDdata with the following command:

```
LXCR / WXCR.exe -F -s -z unassignoda -l <OdaID> -l <LogicalDriveID>
```

Where the parameters are:

- <OdaID> – The index of the ODA found above.
- <LogicalDrive> – The index of the logical drive found above.

- 4 Release the ODA from LDsnap with the following command:

```
LXCR / WXCR.exe -F -d -z oda -l <OdaID>
```

Where the parameters are:

- <OdaID> – The zero-based index of the ODA (see [4.13.6, “Get All ODA Information,” on page 49](#)).

- 5 Convert LDsnap from an internal logical drive to a normal logical drive using the command in [4.10.9, “Set Logical Drive Availability,” on page 41](#).

3.5 How to Search the Event Log

- 1 Determine the WWN of the configuration with the following command:

```
LXCR / WXCR.exe -F -g -z whoami
```

- 2 Find the code number for the event you are interested in (they are listed [on page 75](#)).
- 3 Use the following command to list all events of the specified type:

```
LXCR / WXCR.exe -F -n -z specificevent -u <ConfigWWN> -l <EventCode>
```

Where the parameters are:

- <ConfigWWN> is the configuration WWN from step 1
- <EventCode> is the event code number from step 2.

Chapter 4

Command List

4.1 Introduction

The following section lists all supported commands, arguments and parameters.

It is ordered alphabetically and organized by object, so all array commands, for example, are in the same place.

4.2 APM Commands

4.2.1 Get All Drive APM Statuses

Returns the APM status of all drives, in the same manner as [4.2.5, "Get Drive APM Status," on page 18](#). A summary is also provided, showing:

- The group to which the drive belongs – “Failed”, “Unused” or “Spare.”
- The total number of drives currently spinning up/down.
- The total number of drives that are spun up.
- The total number of drives that are spun down.

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -D -g -z apmstatusall
```

4.2.2 Get APM Level 1 Information (Non-Array Drives)

Returns the APM Level 1 information (for hot spares, unused drives and failed drives) set using the command described in [4.2.7, "Set APM Level 1 Options \(Non-Array Drives\)," on page 19](#).

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -S -g -z apmlevel1
```

4.2.3 Get APM Level 2 Information (Array Drives)

Returns the APM Level 2 information (for drives currently in arrays) set using the command described in [4.2.8, "Set APM Level 2 Options \(Array Drives\)," on page 21](#).

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -S -g -z apmlevel2
```

4.2.4 Get Array APM Status

Returns APM Level 1 information for the specified array:

- The array index.
- The array APM status, which is one of:
 - Spun Up.
 - Spun Down.
 - Spinning (currently changing from spun up to spun down or spun down to spun up).
 - Testing (currently undergoing functional test).
- The time remaining to the next functional test.
- The amount of idle time that must elapse before the array is spun down.

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -F -g -z apmstatus -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see [4.3.5, "Get All Array Information," on page 26](#)).

4.2.5 Get Drive APM Status

Returns the APM status of the specified drive, including the following information:

- The enclosure number to which the drive belongs.
- The slot number in which the drive is located.
- The drive WWN.
- The group to which the drive belongs – “Failed”, “Unused” or “Spare.”

- The drive status, which is one of:
 - Spun Up.
 - Spun Down.
 - Spinning (currently changing from spun up to spun down or spun down to spun up).
 - Testing (currently undergoing functional test).

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -D -g -z apmstatus -l <SlotNumber> -l <EnclosureID>
```

Parameters:

- <SlotNumber> – The number of the physical slot in which the drive is located (this can be found from [4.4.2, "Get All Drive Information," on page 30](#)). The valid range is 0 to 47.
- <EnclosureID> – The index of the enclosure (see [4.5.2, "Get Number of Enclosures," on page 34](#)). Note that enclosure indexes begin at 1, not 0.

4.2.6 Get Drive Functional Test Status

Returns the completion status of the functional test started on the specified drive using [4.2.12, "Start Drive Functional Test," on page 22](#). A returned value of "0" means the test is completed; "1" means it has not yet finished.

```
LXCR / WXCR.exe -D -g -z apmtest -l <SlotNumber> -l <EnclosureID>
```

Parameters:

- <SlotNumber> – The number of the physical slot in which the drive is located (this can be found from [4.4.2, "Get All Drive Information," on page 30](#)). The valid range is 0 to 47.
- <EnclosureID> – The index of the enclosure (see [4.5.2, "Get Number of Enclosures," on page 34](#)). Note that enclosure indexes begin at 1, not 0.

4.2.7 Set APM Level 1 Options (Non-Array Drives)

Selects the settings for APM Level 1 drives (hot spares, unused and failed drives).

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -S -s -z apmlevell -l <SpinDownHotSpare> -l <SpinDownUnused>
-l <SpinDownFailed> -l <SelfTestType> -l <CycleTime> -l <Date> -l <Day> -l <Hour>
-l <Minute>
```

Parameters:

- <SpinDownHotSpare> – Spins down hot spare drives when not in use.

- 0 – Disabled.
- 1 – Enabled.
- <SpinDownUnused> – Spins down unused drives.
 - 0 – Disabled.
 - 1 – Enabled.
- <SpinDownFailed> – Spins down failed drives.
 - 0 – Disabled.
 - 1 – Enabled.
- <SelfTestType> – Specifies the type of testing to perform:
 - 0 – Disabled.
 - 1 – A self test is performed.
- <CycleTime> – Specifies how regularly drive testing will be performed:
 - 0 – Disabled (no testing).
 - 1 – Daily (according to the <Hour> and <Minute> parameters).
 - 2 – Weekly (according to the <Day>, <Hour> and <Minute> parameters).
 - 3 – Monthly (according to the <Date>, <Hour> and <Minute> parameters).
- <Date> – The date on which testing will occur (assuming that <CycleTime> is set to “Monthly”). Valid values are 0 – 28.
- <Day> – The day on which testing will occur (assuming that <CycleTime> is set to “Weekly”):
 - 0 – Disabled.
 - 1 – Sunday.
 - 2 – Monday.
 - 3 – Tuesday.
 - 4 – Wednesday.
 - 5 – Thursday.
 - 6 – Friday.
 - 7 – Saturday.

- <Hour> – The hour at which testing will occur, based on a 24-hour clock (valid values are 0 – 23).
- <Minute> – The minute at which testing will occur.

4.2.8 Set APM Level 2 Options (Array Drives)

Selects the settings for APM Level 2 drives (those which are part of an array).

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -S -s -z apmlevel1 -l <ArrayID> -l <SelfTestType> -l <SpinSelection>
-l <Date> -l <Hour> -l <IdleHours> -l <IdleMinutes>
```

Parameters:

- <ArrayID> – The index of the array to check (see [4.3.5, "Get All Array Information," on page 26](#)).
- <SelfTestType> – Specifies whether regular drive testing will take place.
 - 0 – Disabled: no testing will occur.
 - 1 – Performs a self test of idle arrays at the time specified by the <Date> and <Hour> parameters.
- <SpinSelection> – Specifies the conditions under which drives in the array will be spun down:
 - 0 – Enables manual spin down of array drives.
 - 1 – Spins down an idle array after a period of time specified by the <IdleHours> and <IdleMinutes> parameters.
- <Date> – The date on which testing will occur. Valid values are 0 – 28 (0 being disabled). This option is only relevant if <SelfTestType> is set to "1".
- <Hour> – The hour at which testing will occur, based on a 24-hour clock (valid values are 0 – 23). This option is only relevant if <SelfTestType> is set to "1".
- <IdleHours> – Specifies the number of hours to wait after the array goes idle before spinning the array drives down. Valid values are 0 – 23. This option is only relevant if <SpinSelection> is set to "2".
- <IdleMinutes> – Specifies the number of minutes to wait after the array goes idle before spinning the array drives down. Valid values are 0 – 59. This option is only relevant if <SpinSelection> is set to "2".

4.2.9 Spin Array Up/Down

Spins all the drives in the specified array up or down. To spin up/down a hot spare, unused or failed drive, see [4.2.9, "Spin Array Up/Down," on page 21](#).

At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -F -s -z apmspin -l <ArrayID> -l <State>
```

Parameters:

- <ArrayID> – The index of the array (see 4.3.5, "Get All Array Information," on page 26).
- <State> – One of the following:
 - 0 – Spins the drive down.
 - 1 – Spins the drive up.

4.2.10 Spin Drives Up/Down

Spins the specified drive up or down. Only hot spare, unused or failed drives can be spun up/down with this command. To spin up/down drives that belong to an array, see 4.3, "Array Commands," on page 23.

```
LXCR / WXCR.exe -D -s -z apmspin -l <SlotNumber> -l <EnclosureID> -l <State>
```

Parameters:

- <SlotNumber> – The number of the physical slot in which the drive is located (this can be found from 4.4.2, "Get All Drive Information," on page 30). The valid range is 0 to 47 and the slot must contain a hot spare, unused or failed drive.
- <EnclosureID> – The index of the enclosure (see 4.5.2, "Get Number of Enclosures," on page 34). Note that enclosure indexes begin at 1, not 0.
- <State> – One of the following:
 - 0 – Spins the drive down.
 - 1 – Spins the drive up.

4.2.11 Start Array Functional Test

Manually starts a functional test on the drives in the specified array. To set up a regular automatic test, see 4.2.8, "Set APM Level 2 Options (Array Drives)," on page 21.

```
LXCR / WXCR.exe -F -s -z apmtest -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array on which to start the test (see 4.3.5, "Get All Array Information," on page 26).

4.2.12 Start Drive Functional Test

Overrides the current power mode status and performs the following tests on the specified drive:

- 1 Read/write circuitry test.
- 2 Read/write head test.

3 Servo seek test.

4 Read/verify disk media.

This command can only be used with hot spare and unused drives. At least one array must be configured in order to perform this function.

```
LXCR / WXCR.exe -D -s -z apmtest -l <SlotNumber> -l <EnclosureID>
```

Parameters:

- <SlotNumber> – The number of the physical slot in which the drive is located (this can be found from [4.4.2, "Get All Drive Information," on page 30](#)). The valid range is 0 to 47 and the slot must contain a hot spare, unused or failed drive.
- <EnclosureID> – The index of the enclosure (see [4.5.2, "Get Number of Enclosures," on page 34](#)). Note that enclosure indexes begin at 1, not 0.

4.3 Array Commands

4.3.1 Check Array Parity

Checks the parity of one or more RAID 5 or RAID 50 arrays.

```
LXCR / WXCR.exe -F -s -z paritycheck -l <CheckAll> -l <ArrayID> -l <Mode>
```

Parameters:

- <CheckAll> – “0” to check only the array specified in the <ArrayID> parameter, or “1” to check all RAID 5 and RAID 50 arrays.
- <ArrayID> – The index of the array to check (see [4.3.5, "Get All Array Information," on page 26](#)). This must be a RAID 5 or RAID 50 array.
- <Mode> – One of the following:
 - 1 – Parity Check Only.
 - 2 – Parity Rewrite Only.
 - 3 – Parity Check and Rewrite.

4.3.2 Create Array

Creates a new array and starts to initialize it in the background.

```
LXCR / WXCR.exe -F -c -z array -l <NumDrives> -u <DriveWWN> -u <DriveWWN>...
-l <ChunkSize> -l <RaidLevel> -l <BackoffPercent> -l <EnableCache>
-l <ReadAheadCacheSize> -l <WriteBackCacheSize> -l <EnableMirrorCache>
-l <EnableBatteryCache> -l <EnableCriticalRAID> -l <EnforceWriteBack>
```

Parameters:

- <NumDrives> – The number of drives to be included in the array. See the <RaidLevel> parameter for limitations on the number of drives.
- <DriveWWN> – The WWN of a drive to be used in the creation of the array (see 4.4.5, "Get Drive WWN," on page 32). There will be multiple "-u <DriveWWN>" parameters – one each for the number of drives specified in the <NumDrives> parameter.
- <ChunkSize> – The chunk size of the array in kilobytes. Options are 64, 128 or 256.
- <RaidLevel> – The RAID level of the array: 0, 5, 10 or 50.
 - RAID 0 – Data is striped across drives. This can improve performance over using a single drive. There is NO data redundancy with RAID 0 – if a drive fails, data will be lost. RAID 0 is not fault tolerant. Requires 2-16 drives.
 - RAID 5 – Data is striped across all drives except for one, to which redundant parity data is written. Also, the drive on which parity data is written gets rotated at the end of each stripe. This prevents the abnormally high load that would result from using a single, dedicated parity drive. In the event that a single drive fails, data is not lost and can be rebuilt onto a replacement drive from the data stored on the remaining drives, plus the parity drive. Requires 3-16 drives.
 - RAID 10 – A RAID 0 array of two elements, but these elements are not drives, instead they are RAID 1 arrays. This means a drive in each half of the array can fail without data loss. Requires a multiple of four drives (4, 8, 12 or 16).
 - RAID 50 – A RAID 0 array of two elements, but these elements are not drives, instead they are RAID 5 arrays. This means a drive in each half of the array can fail without data loss. Requires a multiple of two drives, but at least six (6, 8, 10, 12, 14 or 16).
- <BackoffPercent> – The percentage of the array that will not be available for use. Normally this will be the minimum value of "1" (in other words 99% of the array will be usable). However, for testing purposes this may be set to any value up to 90%.
- <EnableCache> – "0" disables all cache settings; "1" enables the following cache options to be set individually:
 - <EnableMirrorCache>
 - <EnableBatteryCache>
 - <EnableCriticalRAID>
 - <EnforceWriteBack>
- <ReadAheadCacheSize> – The size of the Read Ahead cache:

Hex	Decimal	Setting
0x00	0	Automatic
0x01	1	256KB
0x02	2	512KB
0x03	3	1MB
0x04	4	2MB
0x0F	15	Disabled

- <WriteBackCacheSize> – The size of the Write Ahead cache:

Hex	Decimal	Setting
0x00	0	Disabled
0x01	1	1MB
0x02	2	2MB
0x03	3	4MB
0x04	4	8MB
0x05	5	16MB
0x06	6	32MB
0x07	7	64MB
0x08	8	128MB
0x09	9	256MB
0x0A	10	Maximum MB

- <EnableMirrorCache> – “0” disables the mirror cache, “1” enables it.
- <EnableBatteryCache> – To enable the Write Back cache when the battery is missing, low or failed, set this to “1.” Otherwise, set to “0.”
- <EnableCriticalRAID> – To enable the Write Back cache when an array becomes critical, set this to “1”. Otherwise, set to “0”. Not applicable to RAID 0 arrays.
- <EnforceWriteBack> – When set to “1”, this prohibits the firmware from allowing the transition to a “write through” policy. This setting does not override the other cache policies related to battery failure, reduced redundancy or partner controller failure.

The progress of the array initialization can be monitored (see [4.3.12, "Get Initialization Status," on page 28](#) and [4.3.11, "Get Initialization Percent Complete," on page 27](#)). Alternatively, initialization can be aborted and the array trusted (see [4.3.17, "Trust Array," on page 29](#)).

4.3.3 Delete Array

Removes the specified array from the system. All of its component drives will be made available for other purposes.

Warning Deleting an array will cause all of its logical to be deleted, along with all data stored on them! Use with caution!

Important You cannot delete any array in the storage system while any of the following background operations are occurring: Expansion, Rebuild, Initialization, or Parity Check.

```
LXCR / WXCR.exe -F -d -z array -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array to delete (see [4.3.5, "Get All Array Information," on page 26](#)).

4.3.4 Expand Array

Increases the size of an array by adding one or more drives to it.

```
LXCR / WXCR.exe -F -s -z expandarray -l <ArrayID> -l <NumDrives> -u <DriveWWN>
```

Parameters:

- <ArrayID> – The index of the array to be expanded (see 4.3.5, "Get All Array Information," on page 26).
- <NumDrives> – The number of unused drives by which the array will be expanded.
- <DriveWWN> – The WWN of a drive that will be used to expand the array (see 4.4.5, "Get Drive WWN," on page 32). There can be multiple "-u <DriveWWN>" parameters – one each for the number of drives specified in the <NumDrives> parameter.

4.3.5 Get All Array Information

Returns detailed information about all the arrays present in the system.

```
LXCR / WXCR.exe -F -g -z rankconfigstruct
```

Information includes (among other things):

- The array index.
- RAID level.
- Whether the array is trusted.
- How many drives compose the array.
- The chunk size in KB.
- The array capacity in GB.
- Whether the array has cache enabled.
- Whether the array is fault tolerant.
- The fault status.
- The array name.

4.3.6 Get Array Chunk Block Count

Returns the number of blocks (usually 512 bytes in size, but this may differ) in each chunk.

```
LXCR / WXCR.exe -F -g -z chunkblkcnt -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see 4.3.5, "Get All Array Information," on page 26).

4.3.7 Get Array RAID Level

Returns the RAID level of the specified array.

```
LXCR / WXCR.exe -F -g -z arraylevel -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see [4.3.5, "Get All Array Information," on page 26](#)).

4.3.8 Get Array Size

Returns the size of the specified array in GB.

```
LXCR / WXCR.exe -F -g -z arraysizesize -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see [4.3.5, "Get All Array Information," on page 26](#)).

4.3.9 Get Expansion Percent Complete

Returns the percentage completion of an array expansion operation (if one is in progress).

```
LXCR / WXCR.exe -C -g -z expandarraypercent
```

4.3.10 Get Expansion Status

Returns a value describing whether an array is currently being expanded.

```
LXCR / WXCR.exe -C -g -z expandarraystate
```

Return values:

- "0" – An array is not being expanded.
- "1" – An array is being expanded.

4.3.11 Get Initialization Percent Complete

Returns the percentage completion of an array initialization.

```
LXCR / WXCR.exe -F -g -z percentcomplete -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see [4.3.5, "Get All Array Information," on page 26](#)).

Note that arrays that have completed initialization will return a value of 0. See [4.3.12, "Get Initialization Status," on page 28](#) for information on whether the array is currently initializing.

4.3.12 Get Initialization Status

Returns a value representing the progress of array initialization.

```
LXCR / WXCR.exe -F -g -z initstate -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see 4.3.5, "Get All Array Information," on page 26).

Return values:

- "0" – Initialization is not in progress.
- "1" – Initialization is in progress.

See also Get Initialization Percentage Complete (see 4.3.11, "Get Initialization Percent Complete," on page 27).

4.3.13 Get Number of Arrays

Returns the number of arrays defined in the system.

```
LXCR / WXCR.exe -F -n -z array
```

4.3.14 Get Parity Status

Returns the ID of the array currently undergoing a parity check, and the value 1 if array parity checking is in progress, or 0 if it is not.

```
LXCR / WXCR.exe -C -g -z paritycheck
```

4.3.15 Set Array Cache Settings

Changes cache settings for the specified array.

```
LXCR / WXCR.exe -F -s -z arraycachesettings -l <ArrayID> -l <ReadAheadCacheSize>
-l <WriteBackCacheSize> -l <EnableMirrorCache> -l <EnableBatteryCache>
-l <EnableCriticalRAID> -l <EnforceWriteBack>
```

Parameters:

- <ArrayID> – The index of the array to check (see 4.3.5, "Get All Array Information," on page 26).
- <ReadAheadCacheSize> – The size of the Read Ahead cache:

Hex	Decimal	Setting
0x00	0	Automatic
0x01	1	256KB
0x02	2	512KB
0x03	3	1MB
0x04	4	2MB
0x0F	15	Disabled

- <WriteBackCacheSize> – The size of the Write Back cache:

Hex	Decimal	Setting
0x00	0	Disabled
0x01	1	1MB
0x02	2	2MB
0x03	3	4MB
0x04	4	8MB
0x05	5	16MB
0x06	6	32MB
0x07	7	64MB
0x08	8	128MB
0x09	9	256MB
0x0A	10	Maximum MB

- <EnableMirrorCache> – “0” disables the mirror cache, “1” enables it.
- <EnableBatteryCache> – To enable the Write Back cache when the battery is missing, low or failed, set this to “1”. Otherwise, set to “0”.
- <EnableCriticalRAID> – To enable the Write Back cache when an array becomes critical, set this to “1”. Otherwise, set to “0”. Not applicable to RAID 0 arrays.
- <EnforceWriteBack> – When set to “1”, this prohibits the firmware from allowing the transition to a “write through” policy. This setting does not override the other cache policies related to battery failure, reduced redundancy or partner controller failure.

4.3.16 Set Array Name

Changes the name of an existing array.

```
LXCR / WXCR.exe -F -s -z array -l <ArrayID> -m <ArrayName>
```

Parameters:

- <ArrayID> – The index of the array (see [4.3.5, "Get All Array Information," on page 26](#)).
- <ArrayName> – The new name for the array.

4.3.17 Trust Array

Terminates the initialization of an array and trusts the array to have correct parity data.

```
LXCR / WXCR.exe -F -s -z trust -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array to trust (see [4.3.5, "Get All Array Information," on page 26](#)).

4.4 Drive Commands

4.4.1 Fail Drive

Simulates the failure of a specified drive for the purposes of testing array rebuilds.

```
LXCR / WXCR.exe -D -s -z faildrive -u <DriveWWN>
```

...Or...

```
LXCR / WXCR.exe -D -s -z faildrive -l <ArrayID> -l <DriveID>
```

Parameters:

- <DriveWWN> – The WWN of a drive to be used in the creation of the array (see [4.4.5, "Get Drive WWN," on page 32](#)).
- <ArrayID> – The index of the array that contains the drive to be “failed” (see [4.3.5, "Get All Array Information," on page 26](#)).
- <DriveID> – The index of the drive in the array (*not* the index of the drive in the system obtained from [4.4.2, "Get All Drive Information," on page 30](#)). Indexing starts at 0 and continues up to the number of drives in the array minus one.

4.4.2 Get All Drive Information

Returns detailed information about all the drives in the system.

```
LXCR / WXCR.exe -D -g -z alldriveinfostruct [-l <DriveStatus>]
```

Parameters:

- <DriveStatus> – An optional parameter that filters which drives are shown according to their status:

Table 4–1 Drive Status Codes

Status Code		Status
Hex	Decimal	
0x55	85	Drive in use – array rebuild
0x56	86	Drive in use – array expansion
0x69	105	Drive firmware update

Information returned by this command includes (among other things):

- EnclosureNo – The index of the enclosure which contains the drive (enclosure indexes start at “1”, not “0”).
- SlotNo – The number of the slot where the drive is installed.

- RankNo – the index of the array to which this drive belongs. However there are several values with special meanings:
 - “f3” – The drive is currently being used to rebuild an array.
 - “f5” – The drive is a global hot spare.
 - “ff” – The drive is not currently in use and may be used as the member of a new array or as a hot spare.
- DriveNo – The drive index.
- Capacity – The size of the drive in blocks.
- BlockSize – The block size in bytes (usually 512).
- SerialNumber.

4.4.3 Get Drive State

Returns the state of a drive.

```
LXCR / WXCR.exe -D -g -z state -u <DeviceWWN>
```

Parameters:

- <DeviceWWN> – The WWN of the drive (see [4.4.5, "Get Drive WWN," on page 32](#)).

The value returned is the index of the array to which the drive belongs. However, there are also some values with special meanings:

- “f3” – The drive is being used to rebuild an array.
- “f5” – The drive is a hot spare.
- “ff” – The drive is currently unused.

4.4.4 Get Drive Status

Returns the status of a drive.

```
LXCR / WXCR.exe -D -g -z status -u <DriveWWN>
```

Parameters:

- <DriveWWN> – The WWN of the drive (see [4.4.5, "Get Drive WWN," on page 32](#)).

The status returned will be one of the following:

- “0” – The drive is valid and has not previously failed.
- “85” – The drive is being used in an array rebuild.

- “86” – The drive is being used to expand an array.

If the drive is invalid or has been removed, it will return an “invalid” status.

4.4.5 Get Drive WWN

Returns the WWN of a drive given its index.

```
LXCR / WXCR.exe -D -g -z name -l <DriveID>
```

Parameters:

- <DriveID> – The index of the drive (see [4.4.2, "Get All Drive Information," on page 30](#)).

4.4.6 Get Drive WWN in Array

Returns the WWN of one of the drives in an array.

```
LXCR / WXCR.exe -F -g -z arraydevice -l <ArrayID> -l <DriveID>
```

Parameters:

- <ArrayID> – The index of the array (see [4.3.5, "Get All Array Information," on page 26](#)).
- <DriveID> – The index of the drive in the array (*not* the index of the drive in the system obtained from [4.4.2, "Get All Drive Information," on page 30](#)). Indexing starts at 0 and continues up to the number of drives in the array minus one.

4.4.7 Get Drive WWN in Enclosure

Returns the WWN of a drive in a given enclosure.

```
LXCR / WXCR.exe -E -g -z device -l <EnclosureID> -l <DriveID>
```

Parameters:

- <EnclosureID> – The index of the enclosure (see [4.5.2, "Get Number of Enclosures," on page 34](#)). Note that enclosure indexes begin at 1, not 0.
- <DriveID> – The index of the drive in the enclosure (*not* the index of the drive in the system obtained from [4.4.2, "Get All Drive Information," on page 30](#)). Indexing starts at 0 and continues up to the number of drives in the enclosure minus one.

4.4.8 Get Drive WWN in Slot

Returns the WWN of a drive in the specified enclosure slot.

```
LXCR / WXCR.exe -E -g -z deviceinslot -l <EnclosureID> -l <SlotNumber>
```

Parameters:

- <EnclosureID> – The index of the enclosure (see 4.5.2, "Get Number of Enclosures," on page 34). Note that enclosure indexes begin at 1, not 0.
- <SlotNumber> – The number of the physical slot in which the drive is located (this can be found from 4.4.2, "Get All Drive Information," on page 30).

4.4.9 Get Drive's Enclosure Index

Returns the index of the enclosure in which the specified drive is located. Note that enclosure indexes begin at 1, not 0.

```
LXCR / WPCR.exe -D -g -z encnum -l <DriveID>
```

Parameters:

- <DriveID> – The index of the drive (which can be determined from 4.4.2, "Get All Drive Information," on page 30).

4.4.10 Get Number of Drives

Returns the number of drives in the system.

```
LXCR / WPCR.exe -D -n
```

4.4.11 Get Number of Drives in Array

Returns the number of drives present in the specified array.

```
LXCR / WPCR.exe -F -n -z devicesinarray -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see 4.3.5, "Get All Array Information," on page 26).

4.4.12 Get Number of Drives in Enclosure

Returns the number of drives present in a given enclosure.

```
LXCR / WPCR.exe -E -n -z device -l <EnclosureID>
```

Parameters:

- <EnclosureID> – The index of the enclosure (see 4.5.2, "Get Number of Enclosures," on page 34). Note that enclosure indexes begin at 1, not 0.

4.4.13 Get Number of Unused Drives

Returns the number of drives not already used in arrays or as hot spares.

```
LXCR / WPCR.exe -D -g -z unused
```

4.4.14 Locate Drive

Flashes the LED on a drive for the specified amount of time so it can be physically identified in the enclosure.

```
LXCR / WXCR.exe -D -s -z locate -l <DriveID> -l <Time>
```

Parameters:

- <DriveID> – The index of the drive (see [4.4.2, "Get All Drive Information," on page 30](#)).
- <Time> – The time in seconds that the drive LED will flash (maximum 60 seconds).

4.4.15 Upload Drive Firmware

Updates the firmware of all drives in the system.

```
LXCR / WXCR.exe -C -s -z drivefirmware -m <FirmwareFile>
```

Parameters:

- <FirmwareFile> – The file containing the drive firmware image. This can be a full path name on the host, for example: "c:\files\drivefirmwarefile003.0."

4.5 Enclosure Commands

4.5.1 Get Enclosure Product Type

Returns the model number of the enclosure (for example: "F5412E").

```
LXCR / WXCR.exe -C -g -z prodtype
```

4.5.2 Get Number of Enclosures

Returns the number of enclosures in the system.

```
LXCR / WXCR.exe -E -n
```

4.5.3 Locate Enclosure

Flashes the LED on an enclosure for the specified amount of time so it can be physically identified.

```
LXCR / WXCR.exe -E -s -z locate -l <EnclosureID> -l <Time>
```

Parameters:

- <EnclosureID> – The index of the enclosure (see [4.5.2, "Get Number of Enclosures," on page 34](#)). Note that enclosure indexes begin at 1, not 0.
- <Time> – The time in seconds that the drive LED will flash (maximum 60 seconds).

4.6 Event Commands

4.6.1 Clear All Events

Removes all events from the event log.

```
LXCR / WXCR.exe -F -s -z clearevent
```

4.6.2 Display All Events

Returns a list of all events on the controller.

```
LXCR / WXCR.exe -F -g -z encevents
```

The event information includes:

- The event number.
- The time and date on which the event occurred (according to the controller).
- The RAID system ID.
- The severity of the event.
- The source of the event.
- Some text describing the nature of the event.

For more details, [see "Event Codes" beginning on page 75.](#)

4.6.3 Get Number of Records

Returns the number of entries in the controller event log.

```
LXCR / WXCR.exe -F -n -z encevents
```

4.6.4 Get Specific Events

Shows a list of events of the specified type.

```
LXCR / WXCR.exe -F -n -z specificevent -l <EventCode>
```

Parameters:

- <EventCode> – A value identifying the type of event to show. For a list of events, [see "Event Codes" beginning on page 75.](#)

4.7 Host Commands

4.7.1 Get Host WWN

Returns the WWN of a host given its index.

```
LXCR / WXCR.exe -F -g -z host -l <HostID>
```

Parameters:

- <HostID> – The index of the host (see [4.7.2, "Get Number of Hosts," on page 36](#)). The range of permissible values will be 0 to the number of hosts minus one).

4.7.2 Get Number of Hosts

Returns the number of hosts in the system.

```
LXCR / WXCR.exe -F -n -z host
```

A dual-ported HBA will count as two separate hosts.

4.7.3 Set Host Data Rate

Determines the speed of data sent from the host.

```
LXCR / WXCR.exe -C -s -z datarate -l <DataRate>
```

Parameters:

- <DataRate> – The host data rate.

For Fibre Channel:

- "0" – Automatically detected.
- "1" – 1Gb/s.
- "2" – 2Gb/s.
- "3" – 4Gb/s.

For SAS:

- "0" – Automatically detected.
- "1" – 1.5Gb/s.
- "2" – 3.0Gb/s.

4.8 Host Port Commands

4.8.1 Get Host Port WWN

Returns the WWN of a host port given the host port index.

```
LXCR / WXCR.exe -F -g -z hostport -l <HostPortID>
```

Parameters:

- <HostPortID> – The index of the host port.

4.9 Hot Spare Commands

4.9.1 Create Hot Spare

Creates a new hot spare from a specified drive. The hot spare can be dedicated to a specific array or made globally available.

```
LXCR / WXCR.exe -F -c -z arrayspare -u <DriveWWN> -l <ArrayID>
```

Parameters:

- <DriveWWN> – The WWN of the drive to use as the hot spare (see [4.4.5, "Get Drive WWN," on page 32](#)).
- <ArrayID> – The index of the array to which this hot spare will be assigned (see [4.3.5, "Get All Array Information," on page 26](#)), or the special value "255" ("0xFF" in hex) to create a global hot spare.

4.9.2 Delete Hot Spare

Removes an existing hot spare from the system and makes it available for other purposes.

Warning If no hot spares are assigned to protect an array, it will not be automatically rebuilt following a drive failure.

```
LXCR / WXCR.exe -F -d -z arrayspare -l <HotSpareID>
```

Parameters:

- <HotSpareID> – The index of the hot spare to delete (see [4.9.7, "Get Number of Hot Spares," on page 38](#)).

4.9.3 Get Hot Spare Type

Returns the type of a specified hot spare: "Global" or "Dedicated."

```
LXCR / WXCR.exe -F -g -z hotsparetype -l <SpareID>
```

Parameters:

- <SpareID> – The index of the hot spare (see 4.9.7, "Get Number of Hot Spares," on page 38).

4.9.4 Get Hot Spare WWN

Returns the WWN of a hot spare given its index.

```
LXCR / WXCR.exe -F -g -z hotsparewwn -l <HotSpareID>
```

Parameters:

- <HotSpareID> – The index of the hot spare to delete (see 4.9.7, "Get Number of Hot Spares," on page 38).

4.9.5 Get Hot Spare WWN in Array

Returns the WWN of the specified hot spare in the specified array.

```
LXCR / WXCR.exe -F -g -z arrayspare -l <ArrayID> -l <SpareID>
```

Parameters:

- <ArrayID> – The index of the array to which this hot spare will be assigned (see 4.3.5, "Get All Array Information," on page 26).
- <SpareID> – The index of the hot spare assigned to the array (not the index of all hot spares in the system). Indexing starts at 0 and continues up to the number of hot spares assigned to the array minus one. See 4.9.8, "Get Number of Hot Spares in Array," on page 38.

4.9.6 Get Number of Global Hot Spares

Returns the number of global hot spares in the system (those not dedicated to a specific array).

```
LXCR / WXCR.exe -F -n -z globalhotspare
```

4.9.7 Get Number of Hot Spares

Returns the total number of hot spares in the system - both global spares and spares assigned to specific arrays.

```
LXCR / WXCR.exe -F -n -z totalhotsparecnt
```

4.9.8 Get Number of Hot Spares in Array

Returns the number of hot spares specifically assigned to an array (not global hot spares).

```
LXCR / WXCR.exe -F -n -z arrayspare -l <ArrayID>
```

Parameters:

- <ArrayID> – The index of the array (see 4.3.5, "Get All Array Information," on page 26).

4.10 Logical Drive Commands

4.10.1 Compare Logical Drive Name

Compares the name of a logical drive to a text string and determines whether they match. If they don't, the string is assigned as the new logical drive name.

```
LXCR / WXCR.exe -F -g -z isldnamematch -l <LogicalDriveID> -m <LogicalDriveName>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive (see [4.10.5, "Get All Logical Drive Information," on page 40](#)).
- <LogicalDriveName> – A text string to compare to the logical drive name.

4.10.2 Create Logical Drive

Creates a logical drive from an existing array. There are two versions of this command:

```
LXCR / WXCR.exe -F -c -z logicaldrives -l <ArrayID> -l <Size> -l <HostBlockSize> [-m <LogicalDriveName>]
```

...Or...

```
LXCR / WXCR.exe -F -c -z logicaldrives -m <ArrayName> -l <Size> -l <HostBlockSize> [-m <LogicalDriveName>]
```

Parameters:

- <ArrayID> – The index of the array from which to create this logical drive (see [4.3.5, "Get All Array Information," on page 26](#)).
- <Size> – The capacity of the logical drive in GB. The maximum permissible size of any logical drive is 65535GB (64TB).
- <HostBlockSize> – The block size that is read/written to the logical drive from the host. One of the following:
 - "0" – Default (usually 512 bytes).
 - "512" – 512 bytes.
 - "4096" – 4096 bytes (4KB).
- <LogicalDriveName> (optional argument) – The name to assign to the newly created logical drive (maximum of 32 characters).
- <ArrayName> – The name of the array from which to create this logical drive (see [4.3.5, "Get All Array Information," on page 26](#)).

4.10.3 Delete Logical Drive

Warning Use of this command will cause all data on the logical drive to be lost! Use with caution!

Deletes an existing logical drive. There are two versions of this command:

```
LXCR / WXCR.exe -F -d -z logicaldrives -l <LogicalDriveID>
```

...Or...

```
LXCR / WXCR.exe -F -d -z logicaldrives -m <LogicalDriveName>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive to delete (see 4.10.5, "Get All Logical Drive Information," on page 40). This is a zero-based index with valid values of 0 to 511.
- <LogicalDriveName> – The name of the logical drive to delete.

4.10.4 Expand Logical Drive

Expands an existing logical drive.

```
LXCR / WXCR.exe -F -s -z expandld -l <ArrayID> -l <IncreaseInGB> -l <LogicalDriveID>
```

Parameters:

- <ArrayID> – The index of the array to be used to expand the logical drive.
- <IncreaseInGB> – The increase in the size of the logical drive, in GB.
- <LogicalDriveID> – The index of the logical drive that you want to expand.

4.10.5 Get All Logical Drive Information

Returns detailed information on each logical drive in the system.

```
LXCR / WXCR.exe -F -g -z hostconfigstruct
```

Information includes (among other things):

- Lun No – The LUN assigned to the logical drive.
- Name – A friendly name for the logical drive.
- 0x83 Identifier – The logical drive descriptor obtained from a page 0x83 SCSI Inquiry command.
- CapacityInGB – The size of the logical drive in GB.
- Port – Controller port access (see 4.10.9, "Set Logical Drive Availability," on page 41). This is the sum of the following values:

- 1 – c0p0 (Logical Drive is available on c0p0).
- 2 – c0p1 (Logical Drive is available on c0p1).
- 4 – c1p0 (Logical Drive is available on c1p0).
- 8 – c1p1 (Logical Drive is available on c1p1).

A value of “15” therefore means that all ports are mapped. The special value “128” indicates that this is an internal logical drive, unavailable for normal use (but which can be used for snapshots).

- WLUNReferenceNo – A value used in some commands to specify the logical drive.
- Name – The name assigned to the logical drive.

4.10.6 Get Logical Drive Reference Number

Returns the reference number of a logical drive, given its index.

```
LXCR / WXCR.exe -F -g -z ldid -l <LogicalDriveID>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive (see [4.10.5, "Get All Logical Drive Information," on page 40](#)). This is a zero-based index.

4.10.7 Get Logical Drive Size

Returns the size of a given logical drive in GB.

```
LXCR / WXCR.exe -F -g -z ldsiz -l <LogicalDriveID>
```

Parameters:

- <LogicalDriveID> – The zero-based index of the logical drive (see [4.10.5, "Get All Logical Drive Information," on page 40](#)).

4.10.8 Get Number of Logical Drives

Returns the number of logical drives defined in the system.

```
LXCR / WXCR.exe -F -n -z logicaldrives
```

4.10.9 Set Logical Drive Availability

Determines which controller ports will have access to the specified logical drive.

```
LXCR / WXCR.exe -F -s -z hostlun -l <LogicalDriveID> -l <PortFlag>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive to map to the host (see 4.10.5, "Get All Logical Drive Information," on page 40). This is a zero-based index.
- <PortFlag> – The sum of the following values determines which ports will have access:
 - 1 – c0p0 (Logical Drive is available on c0p0).
 - 2 – c0p1 (Logical Drive is available on c0p1).
 - 4 – c1p0 (Logical Drive is available on c1p0).
 - 8 – c1p1 (Logical Drive is available on c1p1).

So, for example, to allow access through c0p1 and c1p1 only, use the value "10" (2 plus 8). To allow access through all ports use "15" (or "0xF" if using hex).

Note This command can also be used to convert a logical drive to an internal logical drive for snapshot purposes. See 4.13.3, "Convert to Internal Logical Drive for Snapshot Use," on page 47 for details.

4.10.10 Set Logical Drive Name

Changes the name of an existing logical drive.

```
LXCR / WXCR.exe -F -s -z logicaldrives -l <LogicalDriveID> -m <LogicalDriveName>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive (see 4.10.5, "Get All Logical Drive Information," on page 40).
- <LogicalDriveName> – The new name for the logical drive.

4.11 Mapping Commands

Note In order for mapping commands to work a valid license must be applied. This can be done via StorView, or by using the command described in 4.14.28, "Set License Key," on page 61.

4.11.1 Create LUN Mapping

Creates a mapping between a host and a logical drive, and assigns it to a LUN. There are two versions of this command:

```
LXCR / WXCR.exe -F -c -z lun -u <HostWWN> -u <PortWWN> -l <LogicalDriveID> -l <LunNo> -l <PortFlag> -l <ReadOnly>
```

...Or...

```
LXCR / WXCR.exe -F -c -z lun -u <HostWWN> -u <PortWWN> -m <LogicalDriveName> -l <LunNo> -l <PortFlag> -l <ReadOnly>
```

Parameters:

- <HostWWN> – The WWN of the host to map (see 4.7.1, "Get Host WWN," on page 36).
- <PortWWN> – The WWN of the port (see 4.8.1, "Get Host Port WWN," on page 37).
- <LogicalDriveID> – The index of the logical drive to map to the host (see 4.10.5, "Get All Logical Drive Information," on page 40). This is a zero-based index.
- <LunNo> – The LUN number to assign to this mapping.
- <PortFlag> – The sum of the following values determines which ports will have access:
 - 1 – c0p0 (Logical Drive is available on c0p0).
 - 2 – c0p1 (Logical Drive is available on c0p1).
 - 4 – c1p0 (Logical Drive is available on c1p0).
 - 8 – c1p1 (Logical Drive is available on c1p1).

So, for example, to allow access through c0p1 and c1p1 only, use the value "10" (2 plus 8). To allow access through all ports use "15" (or "0xF" if using hex).

- <ReadOnly> – Determines whether the LUN mapping is read/only:
 - "0" – Read/Write access.
 - "1" – Read Only.
- <LogicalDriveName> – The name of the logical drive to map to the host (see 4.10.5, "Get All Logical Drive Information," on page 40).

4.11.2 Delete LUN Mapping

Deletes a previously created LUN mapping. There are two versions of this command:

```
LXCR / WXCR.exe -F -d -z lun -u <HostWWN> -l <RemoveAllMappings> -l <LunNo>
```

...Or...

```
LXCR / WXCR.exe -F -d -z lun -u <HostWWN> -l <RemoveAllMappings> -m <LunName>
```

Parameters:

- <HostWWN> – The WWN of the host which has been mapped (see 4.7.1, "Get Host WWN," on page 36).
- <RemoveAllMappings> – One of the following:
 - "0" – Delete only the mapping with the LUN specified in <LunNo>.
 - "1" – Delete *all* mappings, regardless of the LUN stated in <LunNo>.

- <LunNo> – The LUN number of the mapping to delete (this is the same parameter that was used to create the mapping in 4.11.1, "Create LUN Mapping").
- <LunName> – The name of the LUN mapping.

4.11.3 Get All LUN Mapping Information

Returns details of the mapping configuration, including which logical drives are mapped to which LUN numbers.

```
LXCR / WXCR.exe -F -g -z lunmappingstruct
```

For each mapping, the following Information is included:

- The host WWN.
- The host port WWN.
- Which LUN the logical drive is presented as.

4.11.4 Map LUN to Port

Determines whether the given LUN is mapped to the given port. If it is not, the mapping is created.

```
LXCR / WXCR.exe -F -g -z isldmappedtoport -l <LunNo> -l <PortFlag>
```

Parameters:

- <LunNo> – The Logical Unit Number to check.
- <PortFlag> – A value indicating the port to check/map:
 - 1 – c0p0.
 - 2 – c0p1.
 - 4 – c1p0.
 - 8 – c1p1.
 - 15 – All ports.

4.12 Region Commands

4.12.1 Get All Region Information

Returns detailed information for all regions in the system.

```
LXCR / WXCR.exe -F -g -z regionmap
```

4.12.2 Get Number of Regions

Returns the sum of all regions present in all arrays.

```
LXCR / WXCR.exe -F -n -z regionmap
```

4.12.3 Get Region Capacity

Returns the capacity of a region in GB.

```
LXCR / WXCR.exe -F -g -z regioncap -l <RegionID>
```

Parameters:

- <RegionID> – The index of the region (see [4.12.1, "Get All Region Information," on page 44](#)).

4.12.4 Get Region Status

Returns the status of a given region.

```
LXCR / WXCR.exe -F -g -z regionstatus -l <RegionID>
```

Parameters:

- <RegionID> – The index of the region (see [4.12.1, "Get All Region Information," on page 44](#)).

If the return value is "65535" (hex: "ffff") the region is unused and free for use.

4.12.5 Get Region's Array Index

Returns the index of the array to which the specified region belongs.

```
LXCR / WXCR.exe -F -g -z regionarrayno -l <RegionID>
```

Parameters:

- <RegionID> – The index of the region (see [4.12.1, "Get All Region Information," on page 44](#)).

4.13 Snapshot Commands

Note In order for snapshot commands to work a valid license must be applied. This can be done via StorView, or by using the command described in [4.14.28, "Set License Key," on page 61](#).

4.13.1 Assign ODA

Assigns an ODA to a logical drive. This enables snapshots to be taken of the logical drive and stored on the ODA. There are two versions of this command:

```
LXCR / WXCR.exe -F -s -z assignoda -l <OdaID> -l <LogicalDriveID>
```

...Or...

```
LXCR / WXCR.exe -F -s -z assignoda -m <OdaLogicalDriveName> -m <LogicalDriveName>
```

Parameters:

- <OdaID> – The index of the ODA to assign. This is a zero-based index, unrelated to the index of the internal logical drive. It can be determined using the command in [4.13.6, "Get All ODA Information," on page 49](#).
- <LogicalDriveID> – The index of the logical drive to assign the ODA to (in other words, the logical drive on which snapshots will be performed). This is not the internal logical drive on which the ODA has been created.
- <OdaLogicalDriveName> – The name of the internal logical drive on which the ODA resides.

- <LogicalDriveName> – The name of the logical drive to assign the ODA to (in other words, the logical drive on which snapshots will be performed). This is not the internal logical drive on which the ODA has been created.

4.13.2 Assign Virtual LUN to Snapshot

Note On firmware versions 2.2 and later it is not necessary to run this command – assigning of virtual LUNs to snapshots is done automatically.

```
LXCR / WXCR.exe -F -s -z snapshot -l <IntLogicalDriveID> -l <SnapshotID>
```

Where the parameters are:

- <IntLogicalDriveID> – The index of LDsnap.
- <SnapshotID> – The index of the snapshot to assign (see 4.13.13, "Get Snapshot Data," on page 50).

4.13.3 Convert to Internal Logical Drive for Snapshot Use

Converts an existing logical drive into an internal logical drive for snapshot purposes. The logical drive will no longer be available for any other purpose. There are two versions of this command:

```
LXCR / WXCR.exe -F -s -z hostlun -l <LogicalDriveID> -l <InternalLDType>
```

...or...

```
LXCR / WXCR.exe -F -s -z hostlun -m <LogicalDriveName> -l <InternalLDType>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive to convert to an internal logical drive. This is a zero-based index which can be found using the command in 4.10.5, "Get All Logical Drive Information," on page 40.
- <InternalLDType> – Always "128" (or "0x80" in hex). This specifies that an internal logical drive is required for snapshot purposes.
- <LogicalDriveName> – The name of the logical drive to convert to an internal logical drive (see 4.10.5, "Get All Logical Drive Information," on page 40).

Note With different values for <PortFlag>, this command can also be used to determine which controller ports will have access to a logical drive. See 4.10.9, "Set Logical Drive Availability," on page 41 for details.

4.13.4 Create ODA

Creates an ODA on an internal logical drive (for snapshot purposes). The array containing the internal logical drive must be trusted or initialized before creating the ODA. There are two versions of this command:

```
LXCR / WXCR.exe -F -c -z oda -l <IntLogicalDriveID> -l <StripeSize>
```

...Or...

```
LXCR / WXCR.exe -F -c -z oda -m <IntLogicalDriveName> -l <StripeSize>
```

Parameters:

- <IntLogicalDriveID> – The index of a logical drive that has already been converted to internal use only (see 4.13.3, "Convert to Internal Logical Drive for Snapshot Use," on page 47). This is a zero-based index which can be found using the command in 4.10.5, "Get All Logical Drive Information," on page 40.
- <StripeSize> – The minimum data block size (in KB) written when a snapshot is taken. Acceptable values are: "64", "128", "256", "512" and "1024".
- <IntLogicalDriveName> – The name of a logical drive that has already been converted to internal use only (see 4.13.3, "Convert to Internal Logical Drive for Snapshot Use," on page 47). The name of the logical drive can be found using the command in 4.10.5, "Get All Logical Drive Information," on page 40.

The array containing the logical drive must be trusted or initialized before an ODA can be created on it.

A small stripe size is better for applications using lots of writes to random addresses. A large stripe size is preferable if lots of sequential writes occur.

The stripe size dictates the maximum size of the snapshot:

Table 4–2 Maximum Snapshot Sizes

Stripe Size	Maximum Snapshot Size
64KB	512GB
128KB	1024GB
256KB	2048GB
512KB	4096GB
1024KB	8192GB

4.13.5 Delete Snapshot

Deletes all snapshots from a logical drive.

```
LXCR / WXCR.exe -F -d -z snapshot -l <SnapshotNo> -l <SnappedLogicalDriveID>
-l <Flags>
```

Parameters:

- <SnapshotNo> – Set to "0". Currently, use of the Delete Snapshot command deletes all snapshots.
- <SnappedLogicalDriveID> – The zero-based index of the logical drive containing the snapshots (see 4.10.5, "Get All Logical Drive Information," on page 40).

- <Flags> – Set to “0”.

4.13.6 Get All ODA Information

Returns information about each ODA in the system.

```
LXCR / WXCR.exe -F -g -z odastatstruct
```

For each ODA, information includes (among other things):

- OdaNumber – The zero-based index of the ODA.
- SnapshotLd – The index of the logical drive from which snapshots are taken.
- Snapshots – The number of snapshots created on the ODA.

4.13.7 Get Internal Logical Drives

Returns information about internal logical drives.

```
LXCR / WXCR.exe -F -g -z internalld
```

The following information is shown:

- The total number of internal logical drives.
- The index of each logical drive that has been marked as internal.
- The capacity (in gigabytes) of the internal logical drive.

4.13.8 Get Logical Drive Index for Internal Logical Drive

Returns the index of the logical drive that contains the specified internal logical drive.

```
LXCR / WXCR.exe -F -g -z ldinternallun -l <IntLogicalDriveID>
```

Parameters:

- <IntLogicalDriveID> – The zero-based index of the internal logical drive, as found from the command in [4.13.7, "Get Internal Logical Drives," on page 49](#).

4.13.9 Get Number of Snapshots from Logical Drive

Returns the number of snapshots taken from the specified logical drive.

```
LXCR / WXCR.exe -F -n -z snapshotdata -l <LogicalDriveID>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive from which snapshots have been taken. This is a zero-based index which can be found using the [4.10.5, "Get All Logical Drive Information," on page 40](#).

4.13.10 Get ODA Assigned to Logical Drive

Returns the index of the ODA which this logical drive will use when a snapshot is taken (see [4.13.19, "Take Snapshot," on page 53](#)). An ODA must first have been assigned (see [4.13.1, "Assign ODA," on page 46](#)). If no ODA has been assigned, "65535" (hex: "ffff") will be returned.

```
LXCR / WXCR.exe -F -g -z ldassignflag -l <LogicalDriveID>
```

Parameters:

- <LogicalDriveID> – The index of the logical drive to which the ODA is assigned.

4.13.11 Get ODA Summary

Returns a broad summary of ODAs.

```
LXCR / WXCR.exe -F -g -z odainfostruct
```

The following information is given:

- NumberOfOverwriteDataAreas – The number of ODAs currently defined in the system.
- MaximumOverwriteDataAreas – The maximum number of ODAs allowed throughout the system.
- MaximumSnapshotsPerHostLun – The maximum number of snapshots allowed per host LUN.
- MaximumVirtualLunsPerHostLun – The maximum number of virtual LUNs allowed per host LUN.

4.13.12 Get Snap Back in Progress

Returns the progress of a snap back operation.

```
LXCR / WXCR.exe -F -g -z snapbackinprogress -l <SnappedLogicalDriveID>
```

Parameters:

- <SnappedLogicalDrive> – The zero-based index of the logical drive (see [4.10.5, "Get All Logical Drive Information," on page 40](#)).

4.13.13 Get Snapshot Data

Shows information about snapshots.

```
LXCR / WXCR.exe -F -g -z snapshotdata
```

For each logical drive, the following is shown:

- The index of the logical drive.
- The number of snapshots created for the logical drive.

And for each snapshot on the logical drive:

- The index number of the snapshot.
- The index number of the ODA.
- The virtual LUN number.

For firmware versions 2.2 and above, additional information is shown, including the following:

- ODA stripe size.
- Snapshot day, date and time.

4.13.14 Get Snapshot License Information

Note This is a legacy command, provided for backwards compatibility. Use [4.14.12, "Get License Information," on page 57](#) instead.

Displays the following information about the snapshot license:

- Current license key.
- Evaluation days remaining.
- Licensed number of ODAs.
- Licensed number of snapshots.
- Licensed number of controllers.

```
LXCR / WXCR.exe -S -g -z snaplicense
```

4.13.15 Map Snapshot Volume

Maps a snapshot volume to a host.

```
WXCR / LXCR -F -c -z mapsnapshot -u<HostWWN> -u<PortWWN> -l <VirtualLunNumber>
-l <LunNo> -l <PortFlag> -l<ReadOnly>
```

Parameters:

- <HostWWN> – The WWN of the host to map (see [4.7.1, "Get Host WWN," on page 36](#)).
- <PortWWN> – The WWN of the port (see [4.8.1, "Get Host Port WWN," on page 37](#)).
- <VirtualLunNumber> – The virtual lun number of the snapshot. This can be obtained using the command in [4.13.13, "Get Snapshot Data," on page 50](#).
- <LunNo> – The LUN number to assign to this mapping.
- <PortFlag> – The sum of the following values determines which ports will have access:
 - 1 – c0p0 (Logical Drive is available on c0p0).

- 2 – c0p1 (Logical Drive is available on c0p1).
- 4 – c1p0 (Logical Drive is available on c1p0).
- 8 – c1p1 (Logical Drive is available on c1p1).

So, for example, to allow access through c0p1 and c1p1 only, use the value “10” (2 plus 8). To allow access through all ports use “15” (or “0xF” in hex).

- <ReadOnly> – Determines whether the volume has read only access:
 - “0” – Read/Write access.
 - “1” – Read Only.

4.13.16 Release ODA

Removes the ODA previously created (see 4.13.4, “Create ODA,” on page 47). There are two versions of this command:

```
LXCR / WXCR.exe -F -d -z oda -l <OdaID>
```

...or...

```
LXCR / WXCR.exe -F -d -z oda -m <LogicalDriveName>
```

Parameters:

- <OdaID> – The zero-based index of the ODA to be released, which can be found using the command in 4.13.6, “Get All ODA Information,” on page 49.
- <LogicalDriveName> – The name of the internal logical drive associated with the ODA to be released.

4.13.17 Set Snapshot License Key

Note This is a legacy command, provided for backwards compatibility. Use 4.14.28, “Set License Key,” on page 61 instead.

Unlocks the snapshot and mapping features.

```
LXCR / WXCR.exe -S -s -z snaplicense -m <LicenseKey>
```

Parameters:

- <LicenseKey> – is the key for the snapshot or mapping license (provided by your storage vendor).

4.13.18 Snap Back

Causes data on a logical drive to be returned to the state which existed when the specified snapshot was taken. All snapshots back to this snapshot are deleted.

```
LXCR / WXCR.exe -F -s -z snapback -l <IntLogicalDriveID> -l <SnapshotID>
-l <SnapbackFlag>
```

Parameters:

- <IntLogicalDriveID> – The zero-based index of the logical drive containing the snapshots (see [4.10.5, "Get All Logical Drive Information," on page 40](#)).
- <SnapshotID> – The index of the snapshot to snap back to (see [4.13.13, "Get Snapshot Data," on page 50](#)).
- <SnapbackFlag> – One of the following values:
 - "0" – Snap back to the point where the snapshot volume was originally created, ignoring all subsequent snapshots written to the volume.
 - "1" – Snap back to the most recent snapshot.

4.13.19 Take Snapshot

Performs a snapshot on the specified logical drive. This logical drive must previously have been assigned an ODA (see [4.13.1, "Assign ODA," on page 46](#)).

```
LXCR / WXCR.exe -F -c -z snapshot -l <LogicalDriveID> [-l <AutoDelete>]
```

Parameters:

- <LogicalDriveID> – The logical drive on which to perform a snapshot. This is a zero-based index which can be found using the command in [4.10.5, "Get All Logical Drive Information," on page 40](#). This is the logical drive to which an ODA is assigned, not the logical drive containing the ODA.
- <AutoDelete> (optional argument) – Determines whether the snapshot will be deleted immediately after it is taken.
 - "0" – Do not automatically delete snapshot (default).
 - "1" – Automatically delete snapshot after creation.

4.13.20 Unassign ODA

Removes the association between an ODA and a logical drive that was previously established with the command in [4.13.1, "Assign ODA," on page 46](#). There are two versions of this command:

```
LXCR / WXCR.exe -F -s -z unassignoda -l <OdaID> -l <LogicalDriveID>
```

...or...

```
LXCR / WXCR.exe -F -s -z unassignoda -m <OdaLDName> -m <LogicalDriveName>
```

Parameters:

- <OdaID> – The zero-based index of the ODA to unassign (see 4.13.6, "Get All ODA Information," on page 49).
- <OdaLDName> – The name of the internal logical drive associated with the ODA to be unassigned (see 4.10.5, "Get All Logical Drive Information," on page 40).
- <LogicalDriveID> – The index of the logical drive to which the ODA has been assigned. This is a zero-based index which can be found using the command in 4.10.5, "Get All Logical Drive Information," on page 40. The existing associations between logical drives and ODAs can be found using the command in 4.13.10, "Get ODA Assigned to Logical Drive," on page 50.
- <LogicalDriveName> – The name of the logical drive to which the ODA has been assigned (see 4.10.5, "Get All Logical Drive Information," on page 40). The existing associations between logical drives and ODAs can be found using the command in 4.13.10, "Get ODA Assigned to Logical Drive," on page 50.

4.14 System Commands

4.14.1 Clear Configuration

Warning **Warning: This command removes all defined arrays, logical drives, hot spares and mappings from the system! Use with caution!**

```
LXCR / WXCR.exe -F -s -z clearconfig
```

4.14.2 Display Diagnostic Dump

Dumps diagnostic information to the screen.

```
LXCR / WXCR.exe -C -g -z diagdump
```

4.14.3 Get Advanced Performance Settings

Shows performance information.

```
LXCR / WXCR.exe -S -g -z advanceperformance
```

The following information is shown:

- TQM Response Type (see 4.14.30, "Set Target Queue Management (TQM) Settings," on page 62).
- TQM Response Time.
- Cache Flushing Command.
- Target Command Thread Balance.
- Sequential Write Stream Support.

4.14.4 Get All Configuration Information

Displays all configuration information for the system, including data on arrays, logical drives, ODAs, hosts, LUN mapping, hot spares and configuration parameters.

```
LXCR / WXCR.exe -F -g -z allinfo
```

4.14.5 Get All Controller Information

Displays all controller information, including WWNs, firmware information, processor information, temperatures, voltages and battery details.

```
LXCR / WXCR.exe -C -g -z allinfo
```

4.14.6 Get Configuration In Progress State

Shows whether a configuration change is in progress (returns "1") or not (returns "0").

```
LXCR / WXCR.exe -F -g -z configprogress
```

4.14.7 Get Configuration Information

Returns information concerning the system configuration.

```
LXCR / WXCR.exe -F -g -z confighdrstruct
```

Information includes (among other things):

- The configuration name.
- The configuration WWN.
- The controller LUN.
- The total number of defined arrays, logical drives and hot spares.

4.14.8 Get Configuration Progress Information

Shows information about the progress of configuration changes.

```
LXCR / WXCR.exe -F -g -z configprogressinfo
```

- Start New Configuration in Progress – A configuration update has started but not yet completed. New updates will fail until the first has finished.
- Save New Configuration in Progress – A configuration save has started but not yet completed. New configuration saves will fail until the first has finished.
- Configuration Unavailable – Updates to the configuration cannot be made at the current time.
- Array Expansion In Progress – Updates to the configuration cannot be made at the current time, because an array is currently being expanded (see [4.3.4, "Expand Array," on page 25](#)).

For each controller, the following is also shown:

- All drive information update counter – Incremented each time drive information statistics are updated.
- All host information update – Incremented each time host information statistics are updated.
- All event log update counter – Incremented each time event log information statistics are updated.
- All ODA info update counter – Incremented each time ODA information statistics are updated.
- All snapshot update counter – Incremented each time snapshot information statistics are updated.

4.14.9 Get Configuration WWN

Returns the WWN of the configuration.

```
LXCR / WXCR.exe -F -g -z whoami
```

4.14.10 Get Controller Information

Returns information about the controllers in the system.

```
LXCR / WXCR.exe -C -g -z cntinfofailstruct
```

System-wide information includes:

- Whether the system is performing any rebuild, initialization, expand or verify command.
- Information for each controller includes:
 - Name – The controller name.
 - Config WWN – The WWN of the configuration (not the same as the controller).
 - Actual WWN – The actual WWN of the controller.
 - F/W Version – The controller firmware revision number.
 - F/W Date – The datestamp of the controller firmware.
 - Cont Version – The controller version.
 - Proc Speed – The speed of the controller processor in MHz.
 - Proc RAM – The amount of controller RAM in MB.

4.14.11 Get IP Settings

Note This command currently only works out-of-band (see 2.5, "Out-of-Band Use," on page 6).

Returns information about the IP settings.

```
LXCR / WXCR.exe -C -g -z prefsconfig -N -p <UserName> -p <Password> -p <IPAddress>
```

Parameters:

- -N – Specifies out-of-band usage.
- <UserName> – A valid username for the StorView installation.
- <Password> – A valid password for the StorView installation.
- <IPAddress> – The IP address of the hardware on which StorView is installed.

4.14.12 Get License Information

Displays the following information about licenses:

- Current license key.
- Evaluation days remaining.
- Licensed number of ODAs.
- Licensed number of snapshots.
- Licensed number of controllers.
- SAN LUN Mapping License Information.
- License validity period (Unlimited, Expired, or Trial with N days remaining).

```
LXCR / WXCR.exe -S -g -z license
```

4.14.13 Get Number of RAID Systems

Returns the number of RAID systems.

```
LXCR / WXCR.exe -F -n -z raidsystems
```

4.14.14 Get RAID System WWN

Returns the WWN of the specified RAID system.

```
LXCR / WXCR.exe -F -g -z raidsystems -l <RaidSystemID>
```

Parameters:

- <RaidSystemID> – The zero-based index of the RAID system. To determine how many RAID systems are present, see [4.14.13, "Get Number of RAID Systems," on page 57](#).

4.14.15 Get RAID System Devices

Returns the device name, LUN, path ID and WWN of each RAID system.

```
LXCR / WXCR.exe -S -g -z whoami
```

4.14.16 Get RAID System IP Addresses

Note This command currently only works out-of-band (see [2.5, "Out-of-Band Use," on page 6](#)).

Returns a list of all RAID systems with their IP and MAC addresses.

```
LXCR / WXCR.exe -F -g -z raidsystems -N
```

Parameters:

- -N – Specifies out-of-band usage.

4.14.17 Get Rebuild Percent Complete

Returns the percentage completion of any array rebuild occurring in the system.

```
LXCR / WXCR.exe -C -g -z regenpercentcomplete
```

4.14.18 Get Rebuild State

Returns a flag showing whether the system is currently rebuilding an array.

```
LXCR / WXCR.exe -C -g -z regenstate
```

4.14.19 Get SES Information

Returns SES (SCSI Enclosure Services) information for an enclosure, including things such as voltages, temperatures, fan speeds, door locks and alarm states.

```
LXCR / WXCR.exe -E -g -z sesinfo -l <EnclosureIndex>
```

Parameters:

- <EnclosureID> – The index of the enclosure (see [4.5.2, "Get Number of Enclosures," on page 34](#)). Note that enclosure indexes begin at 1, not 0.

4.14.20 Reset Controller

Reboots one or both controllers. The configuration will not be lost.

```
LXCR / WXCR.exe -C -s -z reset -l <Controller>
```

Parameters:

- <Controller> – "0" for controller A, "1" for controller B, or "2" to reset both controllers.

4.14.21 Restore Configuration

Reloads a system configuration previously stored using the command in 4.14.22, "Save Configuration," on page 59.

```
LXCR / WXCR.exe -F -s -z restoreconfig [-m <ConfigFileName>]
```

Parameters:

- <ConfigFileName> – An optional parameter to specify the name of the configuration file to load. If this is omitted, the system will attempt to load the file "raidsystem.cfg" stored in the same directory as the LXCR or WXCR executable. Alternatively, an absolute or relative pathname can be specified to load a file elsewhere on the filesystem.

4.14.22 Save Configuration

Stores the current configuration (including arrays, logical drives and mappings) to a binary file which can later be reloaded using the command in 4.14.21, "Restore Configuration," on page 59. This command will fail if any of the following are in progress:

- Array rebuild
- Array initialization
- Array expansion (4.3.4 on page 25)
- Parity check (4.3.1 on page 23)

```
LXCR / WXCR.exe -F -g -z saveconfig [-m <ConfigFileName>] [-l <Overwrite>]
```

Parameters:

- <ConfigFileName> – An optional parameter to specify the name of the saved configuration file. If this is omitted, the file "raidsystem.cfg" will be used, and the file stored in the same directory as the LXCR or WXCR executable. Alternatively, an absolute or relative pathname can be specified.
- <Overwrite> – One of the following values:
 - "0" – Will not attempt to overwrite an existing file of the same name. The system configuration will *not* be saved.
 - "1" – Will overwrite any existing configuration file with the same name.

4.14.23 Set Advanced Performance Settings

Sets advanced performance parameters.

```
LXCR / WXCR.exe -S -s -z advanceperformance -l <EnableCacheFlushing>  
-l <EnableSimultaneousMultiStripe> -l <EnableTargetCmdThreadBalance>  
-l <EnableSeqWriteSupport>
```

Parameters:

- <EnableCacheFlushing> – If set to "1", this causes the cache to be flushed after a command completes. This results in slower data transfer, but means that data integrity will not be compromised in the event of a power failure. If in doubt, set to "0" (disabled).

- <EnableTargetCmdThreadBalance> – If set to “1”, this reduces the maximum response time when multiple I/Os are issued from multiple sources. However, there is a small performance impact (around 5%) on maximum I/O rate. If in doubt, set to “0” (disabled).
- <EnableSeqWriteSupport> – Scales the streaming write support to the needs of the application. Different values may result in better performance depending on the exact nature of the workload. Valid settings are:
 - “0” – Disabled.
 - “1” – Low.
 - “2” – Medium.
 - “3” – High.

If in doubt, set to “1” (Low).

4.14.24 Set Configuration Name

Applies a new name to the configuration.

```
LXCR / WXCR.exe -F -s -z name -m <ConfigName>
```

Parameters:

- <ConfigName> – A user-defined name for the configuration (no more than 32 characters long and with no spaces).

4.14.25 Set Configuration WWN

Changes the WWN of the configuration to that of one of the controllers. If the configuration WWN is set to a controller which then fails, it will need to be changed to the surviving controller.

```
LXCR / WXCR.exe -C -s -z configwwn -l <ControllerID>
```

Parameters:

- <ControllerID> – “0” for controller A, “1” for controller B.

4.14.26 Set Controller LUN

Maps the host HBA to the controller when no LUNs are mapped.

```
LXCR / WXCR.exe -C -s -z controllerlun -l <Enable> -l <LunNo>
```

Parameters:

- <Enable> – “0” to disable the controller LUN; “1” to enable it.
- <LunNo> – The LUN number to assign to the controller. Valid numbers are 0 to 511.

4.14.27 Set IP Settings

Note This command currently only works out-of-band (see 2.5, "Out-of-Band Use," on page 6).

Changes the IP settings.

```
LXCR / WXCR.exe -C -s -z prefsconfig -m <MulticastPort> -m <NewIPAddress>
-m <HostName> -m <SubnetMask> -m <Gateway> -m <DnsServer> -N -p <UserName>
-p <Password> -p <IPAddress>
```

Parameters:

- <MulticastPort> – The port used for discovering StorView systems on the network ("9191" by default).
- <NewIPAddress> – The IP address to be assigned to the hardware.
- <HostName> – The new host name to be assigned to the hardware.
- <SubnetMask> – The IP address subnet mask.
- <Gateway> – The IP address of the gateway.
- <DnsServer> – The IP address of the DNS server.
- -N – Specifies out-of-band usage.
- <UserName> – A valid username for the StorView installation.
- <Password> – A valid password for the StorView installation.
- <IPAddress> – The IP address of the hardware on which StorView is installed.

4.14.28 Set License Key

Unlocks the snapshot and mapping features.

```
LXCR / WXCR.exe -S -s -z license -m <LicenseKey>
```

Parameters:

- <LicenseKey> – is the key for the snapshot or mapping license (provided by your storage vendor).

4.14.29 Set System Parameters

Allows a number of system parameters to be changed.

```
LXCR / WXCR.exe -S -s -z sysparams -l <LogSESEvents> -l <RebuildPriority>
-l <AutoHotSpare> -l <AutoDriveUpdate> -l <AllowCommandBalancing>
-l <CommandBalanceCount> -l <InitializePriority> -l <AutoRebuild>
-l <BackgroundVerify> -l <SingleControllerMode> -l <DifferentNodeNameOnHostPorts>
```

Parameters:

- <LogSESEvents> – “0”: Off, “1”: On. If set on, SES events – such as power supply failure, fan failure, and temperature errors – will be stored in the event log.
- <RebuildPriority> – 10% - 90%. The percentage of the controller's resources assigned to rebuilding arrays.
- <AutoHotSpare> – “0”: Off, “1”: On. If set on, the physical replacement of a failed drive will automatically start a rebuild using that drive, without having to first assign it as a hot spare.
- <AutoDriveUpdate> – “0”: Off, “1”: On. If set on, the drive firmware for any new drive that is inserted is automatically updated, provided there is already a drive of the same type present and the drive firmware file has previously been stored.
- <AllowCommandBalancing> – “0”: Off, “1”: On. If set on, I/O load will be balanced between LUNs.
- <CommandBalanceCount> – 1 - 64. Default = “2.” Only applies if AllowCommandBalancing is set to “On.”
- <InitializePriority> – 10% - 90%. The percentage of the controller's resources assigned to array initialization.
- <AutoRebuild> – “0”: Off, “1”: On. If set on, the arrays will automatically begin rebuilding on drive failure if a suitable hot spare is available. It is recommended that this setting is kept on (“1”).
- <BackgroundVerify> – “0”: Off, “1”: On. If set on, media will be verified in the background when there is no host activity. If an error is found, the correct data will be rewritten, provided the drive is part of a fault tolerant array.
- <SingleControllerMode> – “0”: Off, “1”: On.
- <DifferentNodeNameOnHostPorts> - “0”: Off, “1”: On.

Additionally, any of these parameters can be set to a value of “256” (“0xFF” in hex) to retain the setting which is currently in effect.

4.14.30 Set Target Queue Management (TQM) Settings

Sets the response type and response time of the RAID controller.

```
LXCR / WXCR.exe -S -s -z configuretqm -l <ResponseType> -l <ResponseTime>
```

Parameters:

- <ResponseType> – Specifies the response to be sent in the event of a queue timeout.
 - “0” – Disabled. No response.
 - “1” – SCSI status Busy response.
 - “2” – SCSI status Task Set Full response.
 - “3” – Automatic response.

- <ResponseTime> – The response time from the controller, in seconds. Accepted values are from 1 to 99.

4.14.31 Shutdown Controller

Shuts down (but does not reboot) one or both controllers. The configuration will not be lost.

```
LXCR / WXCR.exe -C -s -z shutdown -l <Controller> -l <ShutdownMode>
```

Parameters:

- <Controller> – “0” for controller A, “1” for controller B, or “2” to reset both controllers.
- <ShutdownMode> – One of the following:
 - “0” – Normal shutdown: powers off the controller as quickly as possible.
 - “1” – Graceful shutdown: powers off the controller in a controlled manner, including flushing the cache. This will take longer than a normal shutdown.

4.14.32 Synchronize Time

Sets the time on the controller to the operating system's time.

```
LXCR / WXCR.exe -C -s -z synctime
```

4.14.33 Update Controller Firmware

Updates the controller firmware.

```
LXCR / WXCR.exe -C -s -z firmware -m <FirmwareFile>
```

Parameters:

- <FirmwareFile> – The name of the file containing the new controller firmware image.

Chapter 5

Command Summary

5.1 APM Commands

Get All Drive APM Statuses:

```
LXCR / WXCR.exe -D -g -z apmstatusall
```

Get APM Level 1 Information (Non-Array Drives):

```
LXCR / WXCR.exe -S -g -z apmlevel1
```

Get APM Level 2 Information (Array Drives):

```
LXCR / WXCR.exe -S -g -z apmlevel2
```

Get Array APM Status:

```
LXCR / WXCR.exe -F -g -z apmstatus -l <ArrayID>
```

Get Drive APM Status:

```
LXCR / WXCR.exe -D -g -z apmstatus -l <SlotNumber> -l <EnclosureID>
```

Get Drive Functional Test Status:

```
LXCR / WXCR.exe -D -g -z apmtest -l <SlotNumber> -l <EnclosureID>
```

Set APM Level 1 Options (Non-Array Drives):

```
LXCR / WXCR.exe -S -s -z apmlevel1 -l <SpinDownHotSpare> -l <SpinDownUnused> -l  
<SpinDownFailed> -l <SelfTestType> -l <CycleTime> -l <Date> -l <Day> -l <Hour> -l  
<Minute>
```

Set APM Level 2 Options (Array Drives):

```
LXCR / WXCR.exe -S -s -z apmlevel1 -l <ArrayID> -l <SelfTestType> -l <SpinSelection>  
-l <Date> -l <Hour> -l <IdleHours> -l <IdleMinutes>
```

Spin Array Up/Down:

```
LXCR / WXCR.exe -F -s -z apmspin -l <ArrayID> -l <State>
```

Spin Drives Up/Down:

```
LXCR / WXCR.exe -D -s -z apmspin -l <SlotNumber> -l <EnclosureID> -l <State>
```

Start Array Functional Test:

```
LXCR / WXCR.exe -F -s -z apmtest -l <ArrayID>
```

Start Drive Functional Test:

```
LXCR / WXCR.exe -D -s -z apmtest -l <SlotNumber> -l <EnclosureID>
```

5.2 Array Commands

Check Array Parity:

```
LXCR / WXCR.exe -F -s -z paritycheck -l <CheckAll> -l <ArrayID> -l <Mode>
```

Create Array:

```
LXCR / WXCR.exe -F -c -z array -l <NumDrives> -u <DriveWWN> -u <DriveWWN>... -l  
<ChunkSize> -l <RaidLevel> -l <BackoffPercent> -l <EnableCache> -l  
<ReadAheadCacheSize> -l <WriteBackCacheSize> -l <EnableMirrorCache> -l  
<EnableBatteryCache> -l <EnableCriticalRAID> -l <EnforceWriteBack>
```

Delete Array:

```
LXCR / WXCR.exe -F -d -z array -l <ArrayID>
```

Expand Array:

```
LXCR / WXCR.exe -F -s -z expandarray -l <ArrayID> -l <NumDrives> -u <DriveWWN>
```

Get All Array Information:

```
LXCR / WXCR.exe -F -g -z rankconfigstruct
```

Get Array Chunk Block Count:

```
LXCR / WXCR.exe -F -g -z chunkblkcnt -l <ArrayID>
```

Get Array RAID Level:

```
LXCR / WXCR.exe -F -g -z arraylevel -l <ArrayID>
```

Get Array Size:

```
LXCR / WXCR.exe -F -g -z arraysizes -l <ArrayID>
```

Get Expansion Percent Complete:

```
LXCR / WXCR.exe -C -g -z expandarraypercent
```

Get Expansion Status:

```
LXCR / WXCR.exe -C -g -z expandarraystate
```

Get Initialization Percentage Complete:

```
LXCR / WXCR.exe -F -g -z percentcomplete -l <ArrayID>
```

Get Initialization Status:

```
LXCR / WXCR.exe -F -g -z initstate -l <ArrayID>
```

Get Number of Arrays:

```
LXCR / WXCR.exe -F -n -z array
```

Get Parity Status:

```
LXCR / WXCR.exe -C -g -z paritycheck
```

Set Array Name:

```
LXCR / WXCR.exe -F -s -z array -l <ArrayID> -m <ArrayName>
```

Set Array Cache Settings:

```
LXCR / WXCR.exe -F -s -z arraycachesettings -l <ArrayID> -l <ReadAheadCacheSize> -l  
<WriteBackCacheSize> -l <EnableMirrorCache> -l <EnableBatteryCache> -l  
<EnableCriticalRAID> -l <EnforceWriteBack>
```

Trust Array:

```
LXCR / WXCR.exe -F -s -z trust -l <ArrayID>
```

5.3 Drive Commands

Fail Drive:

```
LXCR / WXCR.exe -D -s -z faildrive -u <DriveWWN>  
LXCR / WXCR.exe -D -s -z faildrive -l <ArrayID> -l <DriveID>
```

Get All Drive Information:

```
LXCR / WXCR.exe -D -g -z alldriveinfostruct [-l <DriveStatus>]
```

Get Drive State:

```
LXCR / WXCR.exe -D -g -z state -u <DeviceWWN>
```

Get Drive Status:

```
LXCR / WXCR.exe -D -g -z status -u <DriveWWN>
```

Get Drive WWN:

```
LXCR / WXCR.exe -D -g -z name -l <DriveID>
```

Get Drive WWN in Array:

```
LXCR / WXCR.exe -F -g -z arraydevice -l <ArrayID> -l <DriveID>
```

Get Drive WWN in Enclosure:

```
LXCR / WXCR.exe -E -g -z device -l <EnclosureID> -l <DriveID>
```

Get Drive WWN in Slot:

```
LXCR / WXCR.exe -E -g -z deviceinslot -l <EnclosureID> -l <SlotNumber>
```

Get Drive's Enclosure Index:

```
LXCR / WXCR.exe -D -g -z encnum -l <DriveID>
```

Get Number of Drives:

```
LXCR / WXCR.exe -D -n
```

Get Number of Drives in Array:

```
LXCR / WXCR.exe -F -n -z devicesinarray -l <ArrayID>
```

Get Number of Drives in Enclosure:

```
LXCR / WXCR.exe -E -n -z device -l <EnclosureID>
```

Get Number of Unused Drives:

```
LXCR / WXCR.exe -D -g -z unused
```

Locate Drive:

```
LXCR / WXCR.exe -D -s -z locate -l <DriveID> -l <Time>
```

Upload Drive Firmware:

```
LXCR / WXCR.exe -C -s -z drivefirmware -m <FirmwareFile>
```

5.4 Enclosure Commands

Get Enclosure Product Type:

```
LXCR / WXCR.exe -C -g -z prodtype
```

Get Number of Enclosures:

```
LXCR / WXCR.exe -E -n
```

Locate Enclosure

```
LXCR / WXCR.exe -E -s -z locate -l <EnclosureID> -l <Time>
```

5.5 Event Commands

Clear All Events:

```
LXCR / WXCR.exe -F -s -z clearevent
```

Display All Events:

```
LXCR / WXCR.exe -F -g -z encevents
```

Get Number of Records:

```
LXCR / WXCR.exe -F -n -z encevents
```

Get Specific Events:

```
LXCR / WXCR.exe -F -n -z specificevent -l <EventCode>
```

5.6 Host Commands

Get Host WWN:

```
LXCR / WXCR.exe -F -g -z host -l <HostID>
```

Get Number of Hosts:

```
LXCR / WXCR.exe -F -n -z host
```

Set Host Data Rate:

```
LXCR / WXCR.exe -C -s -z datarate -l <DataRate>
```

5.7 Host Port Commands

Get Host Port WWN:

```
LXCR / WXCR.exe -F -g -z hostport -l <HostPortID>
```

5.8 Hot Spare Commands

Create Global Hot Spare:

```
LXCR / WXCR.exe -F -c -z arrayspare -u <DriveWWN> -l 255
```

Create Hot Spare:

```
LXCR / WXCR.exe -F -c -z arrayspare -u <DriveWWN> -l <ArrayID>
```

Delete Hot Spare:

```
LXCR / WXCR.exe -F -d -z arrayspare -u <HotSpareID>
```

Get Hot Spare Type:

```
LXCR / WXCR.exe -F -g -z hotsparetype -l <SpareID>
```

Get Hot Spare WWN:

```
LXCR / WXCR.exe -F -g -z hotsparewwn -l <HotSpareID>
```

Get Hot Spare WWN in Array:

```
LXCR / WXCR.exe -F -g -z arrayspare -l <ArrayID> -l <SpareID>
```

Get Number of Global Hot Spares:

```
LXCR / WXCR.exe -F -n -z globalhotspare
```

Get Number of Hot Spares:

```
LXCR / WXCR.exe -F -n -z totalhotsparecnt
```

Get Number of Hot Spares in Array:

```
LXCR / WXCR.exe -F -n -z arrayspare -l <ArrayID>
```

5.9 Logical Drive Commands

Compare Logical Drive Name:

```
LXCR / WXCR.exe -F -g -z isldnamematch -l <LogicalDriveID> -m <LogicalDriveName>
```

Create Logical Drive:

```
LXCR / WXCR.exe -F -c -z logicaldrives -l <ArrayID> -l <Size> -l <HostBlockSize> [-m <LogicalDriveName>]
```

```
LXCR / WXCR.exe -F -c -z logicaldrives -m <ArrayName> -l <Size> -l <HostBlockSize> [-m <LogicalDriveName>]
```

Delete Logical Drive:

```
LXCR / WXCR.exe -F -d -z logicaldrives -l <LogicalDriveID>
```

```
LXCR / WXCR.exe -F -d -z logicaldrives -m <LogicalDriveName>
```

Expand Logical Drive:

```
LXCR / WXCR.exe -F -s -z expandld -l <ArrayID> -l <IncreaseInGB> -l <LogicalDriveID>
```

Get All Logical Drive Information:

```
LXCR / WXCR.exe -F -g -z hostconfigstruct
```

Get Logical Drive Reference Number:

```
LXCR / WXCR.exe -F -g -z ldid -l <LogicalDriveID>
```

Get Logical Drive Size:

```
LXCR / WPCR.exe -F -g -z ldsize -l <LogicalDriveID>
```

Get Number of Logical Drives:

```
LXCR / WPCR.exe -F -n -z logicaldrives
```

Set Logical Drive Availability:

```
LXCR / WPCR.exe -F -s -z hostlun -l <LogicalDriveID> -l <PortFlag>
```

Set Logical Drive Name:

```
LXCR / WPCR.exe -F -s -z logicaldrives -l <LogicalDriveID> -m <LogicalDriveName>
```

5.10 Mapping Commands

Create LUN Mapping:

```
LXCR / WPCR.exe -F -c -z lun -u <HostWWN> -u <PortWWN> -l <LogicalDriveID> -l <LunNo>  
-l <PortFlag> -l <ReadOnly>
```

```
LXCR / WPCR.exe -F -c -z lun -u <HostWWN> -u <PortWWN> -m <LogicalDriveName>  
-l <LunNo> -l <PortFlag> -l <ReadOnly>
```

Delete LUN Mapping:

```
LXCR / WPCR.exe -F -d -z lun -u <HostWWN> -l <RemoveAllMappings> -l <LunNo>  
LXCR / WPCR.exe -F -d -z lun -u <HostWWN> -l <RemoveAllMappings> -m <LunName>
```

Get All LUN Mapping Information:

```
LXCR / WPCR.exe -F -g -z lunmappingstruct
```

Map LUN to Port:

```
LXCR / WPCR.exe -F -g -z isldmappedtoport -l <LunNo> -l <PortFlag>
```

5.11 Region Commands

Get All Region Information:

```
LXCR / WPCR.exe -F -g -z regionmap
```

Get Number of Regions:

```
LXCR / WPCR.exe -F -n -z regionmap
```

Get Region Capacity:

```
LXCR / WPCR.exe -F -g -z regioncap -l <RegionID>
```

Get Region Status:

```
LXCR / WPCR.exe -F -g -z regionstatus -l <RegionID>
```

Get Region's Array Index:

```
LXCR / WPCR.exe -F -g -z regionarrayno -l <RegionID>
```

5.12 Snapshot Commands

Assign ODA:

```
LXCR / WPCR.exe -F -s -z assignoda -l <OdaID> -l <LogicalDriveID>
```



```
LXCR / WXCR.exe -F -s -z assignoda -m <OdaLogicalDriveName> -m <LogicalDriveName>
```

Convert to Internal Logical Drive for Snapshot Use:

```
LXCR / WXCR.exe -F -s -z hostlun -l <LogicalDriveID> -l 128
LXCR / WXCR.exe -F -s -z hostlun -m <LogicalDriveName> -l 128
```

Create ODA:

```
LXCR / WXCR.exe -F -c -z oda -l <IntLogicalDriveID> -l <StripeSize>
LXCR / WXCR.exe -F -c -z oda -m <IntLogicalDriveName> -l <StripeSize>
```

Delete Snapshot:

```
LXCR / WXCR.exe -F -d -z snapshot -l 0 -l <SnappedLogicalDriveID> -l <Flags>
```

Get All ODA Information:

```
LXCR / WXCR.exe -F -g -z odastatstruct
```

Get Internal Logical Drives:

```
LXCR / WXCR.exe -F -g -z internalld
```

Get Logical Drive Index for Internal Logical Drive:

```
LXCR / WXCR.exe -F -g -z ldinternallun -l <IntLogicalDriveID>
```

Get Number of Snapshots from Logical Drive:

```
LXCR / WXCR.exe -F -n -z snapshotdata -l <LogicalDriveID>
```

Get ODA Assigned to Logical Drive:

```
LXCR / WXCR.exe -F -g -z ldassignflag -l <LogicalDriveID>
```

Get ODA Summary:

```
LXCR / WXCR.exe -F -g -z odainfostruct
```

Get Snap Back in Progress:

```
LXCR / WXCR.exe -F -g -z snapbackinprogress -l <SnappedLogicalDriveID>
```

Get Snapshot Data:

```
LXCR / WXCR.exe -F -g -z snapshotdata
```

Get Snapshot License Information:

```
LXCR / WXCR.exe -S -g -z snaplicense
```

Map Snapshot Volume:

```
WXCR / LXCR -F -c -z mapsnapshot -u<HostWWN> -u<PortWWN> -l <VirtualLunNumber> -l
<LunNo> -l <PortFlag> -l<ReadOnly>
```

Release ODA:

```
LXCR / WXCR.exe -F -d -z oda -l <OdaID>
LXCR / WXCR.exe -F -d -z oda -m <OdaName>
```

Set Snapshot License Key:

```
LXCR / WXCR.exe -S -s -z snaplicense -m <LicenseKey>
```

Snap Back:

```
LXCR / WXCR.exe -F -s -z snapback -l <IntLogicalDriveID> -l <SnapshotNo> -l
<SnapbackFlag>
```

Take Snapshot:

```
LXCR / WXCR.exe -F -c -z snapshot -l <LogicalDriveID>
```

Unassign ODA:

```
LXCR / WXCR.exe -F -s -z unassignoda -l <OdaID> -l <LogicalDriveID>
```

```
LXCR / WXCR.exe -F -s -z unassignoda -m <OdaLDName> -m <LogicalDriveName>
```

5.13 System Commands

Clear Configuration:

```
LXCR / WXCR.exe -F -s -z clearconfig
```

Display Diagnostic Dump:

```
LXCR / WXCR.exe -C -g -z diagdump
```

Get All Configuration Information:

```
LXCR / WXCR.exe -F -g -z allinfo
```

Get All Controller Information:

```
LXCR / WXCR.exe -C -g -z allinfo
```

Get Configuration In Progress State:

```
LXCR / WXCR.exe -F -g -z configprogress
```

Get Configuration Information:

```
LXCR / WXCR.exe -F -g -z confighdrstruct
```

Get Configuration WWN:

```
LXCR / WXCR.exe -F -g -z whoami
```

Get Controller Information:

```
LXCR / WXCR.exe -C -g -z cntinfofailstruct
```

Get IP Settings

```
LXCR / WXCR.exe -C -g -z prefsconfig -N -p <UserName> -p <Password> -p <IPAddress>
```

Get License Information:

```
LXCR / WXCR.exe -S -g -z license
```

Get Number of RAID Systems:

```
LXCR / WXCR.exe -F -n -z raidsystems
```

Get RAID System Devices:

```
LXCR / WXCR.exe -S -g -z whoami
```

Get RAID System IP Addresses

```
LXCR / WXCR.exe -F -g -z raidsystems -N
```

Get RAID System WWN:

```
LXCR / WXCR.exe -F -g -z raidsystems -l <RaidSystemID>
```

Get Rebuild Percent Complete:

```
LXCR / WXCR.exe -C -g -z regenpercentcomplete
```

Get Rebuild State:

```
LXCR / WXCR.exe -C -g -z regenstate
```

Get SES Information:

```
LXCR / WXCR.exe -E -g -z sesinfo -l <EnclosureIndex>
```

Reset Controller:

```
LXCR / WXCR.exe -C -s -z reset -l <Controller>
```

Restore Configuration:

```
LXCR / WXCR.exe -F -s -z restoreconfig [-m <ConfigFileName>]
```

Save Configuration:

```
LXCR / WXCR.exe -F -g -z saveconfig [-m <ConfigFileName>] [-l <Overwrite>]
```

Set Configuration Name

```
LXCR / WXCR.exe -F -s -z name -m <ConfigName>
```

Set Configuration WWN

```
LXCR / WXCR.exe -C -s -z configwwn -l <ControllerID>
```

Set Controller LUN

```
LXCR / WXCR.exe -C -s -z controllerlun -l <Enable> -l <LunNo>
```

Set IP Settings

```
LXCR / WXCR.exe -C -s -z prefsconfig -m <MulticastPort> -m <NewIPAddress> -m  
<HostName> -m <SubnetMask> -m <Gateway> -m <DnsServer> -N -p <UserName> -p <Password>  
-p <IPAddress>
```

Set License Key:

```
LXCR / WXCR.exe -S -s -z snaplicense -m <LicenseKey>
```

Set System Parameters:

```
LXCR / WXCR.exe -S -s -z sysparams -l <LogSESEvents> -l <RebuildPriority> -l  
<AutoHotSpare> -l <AutoDriveUpdate> -l <AllowCommandBalancing> -l  
<CommandBalanceCount> -l <InitializePriority> -l <AutoRebuild> -l <BackgroundVerify>  
-l <SingleControllerMode> -l <DifferentNodeNameOnHostPorts>
```

Set Target Queue Management (TQM) Settings

```
LXCR / WXCR.exe -S -s -z configuretqm -l <ResponseType> -l <ResponseTime>
```

Shutdown Controller:

```
LXCR / WXCR.exe -C -s -z shutdown -l <Controller> -l <ShutdownMode>
```

Synchronize Time:

```
LXCR / WXCR.exe -C -s -z synctime
```

Update Controller Firmware:

```
LXCR / WXCR.exe -C -s -z firmware -m <FirmwareFile>
```


Chapter 6

Event Codes

6.1 Windows Event Codes

The following is a list of all events that can appear in the event log, plus their associated code numbers.

Code		Description
Hex	Decimal	
0x01	1	Fatal Error
0x02	2	Firmware Incompatible
0x03	3	Temperature Limit
0x04	4	Temperature Warning
0x05	5	Reserved
0x06	6	UPS Failure
0x07	7	Battery Failure
0x08	8	Other Controller Failed or Removed
0x09	9	Other Controller Timeout
0x0A	10	Drive Check Condition Failure
0x0B	11	Drive Remove Failure
0x0C	12	Drive Rebuild Failure
0x0D	13	New Drive Rebuild Failure
0x0E	14	Drive Timeout Failure
0x0F	15	Drive Loop Error, Loop 0
0x10	16	Drive Loop Error, Loop 1

0x11	17	Drives Missing from Loop 0
0x12	18	Drives Missing from Loop 1
0x13	19	Drive Loop Excessive Error Count, Loop 0
0x14	20	Drive Loop Excessive Error Count, Loop 1
0x15	21	Host Loop Error, Loop 0 [FC] Host Error, Loop 0 [SAS]
0x16	22	Host Loop Error, Loop 1[FC] Host Error, Loop 0 [SAS]
0x17	23	Host Loop Hard Address Error, Loop 0
0x18	24	Host Loop Hard Address Error, Loop 1
0x19	25	Voltage Error
0x1A	26	Internal Transfer Error
0x1B	27	Array Critical
0x21	33	Drive Loop LIP
0x22	34	Drive Loop Up
0x23	35	Drive Loop Down
0x24	36	FC Host Loop LIP / SCSI Bus Reset [FC] Bus Reset or Task Management Request (TMR) Received [SAS]
0x25	37	Host Loop Up [FC] Host Port Up (SAS Target Discovery Complete) [SAS]
0x26	38	Host Loop Down [FC] Host Port Down (SAS Target Discovery Started) [SAS]
0x27	39	Drive Bad Status Returned
0x28	40	Drive Timeout
0x29	41	Other Controller Present
0x2A	42	Other Controller Valid
0x2C	44	RAID 5/50 Resynchronization started
0x2D	45	RAID 5/50 Resynchronization Completed
0x2E	46	Power On Reset Check Condition Returned to Host
0x2F	47	Configuration Changed
0x30	48	Rebuild Started
0x31	49	Rebuild Completed
0x32	50	Rebuild Restarted

0x33	51	Stripe Initialization Started
0x34	52	Stripe Initialization Completed
0x35	53	Flush Mirrored Cache Start
0x36	54	Flush Mirrored Cache Completed
0x37	55	Host SCSI Error Status
0x38	56	Host SCSI Invalid Status
0x39	57	Drive SCSI Error Status
0x3A	58	Drive SCSI Invalid Status
0x3B	59	Drive Loop Data Underrun
0x3C	60	Controller Generated Drive LIP
0x3D	61	Controller Generated Host LIP
0x3E	62	Drive Invalid Block Size
0x3F	63	Mapped WWN Logged In
0x40	64	Check Condition Returned to Host
0x41	65	UPS OK
0x42	66	Battery OK
0x43	67	Parity Check Started
0x44	68	Parity Check Complete
0x45	69	Parity Check Aborted
0x46	70	Parity Check Retry
0x50	80	Controller Powered Off
0x51	81	Controller Powered On
0x52	82	Controller Selftest Pass
0x53	83	Controller Selftest Fail
0x54	84	NVRAM Reset
0x55	85	Invalid Controller WWN
0x56	86	Event Log Cleared
0x57	87	Controller Reset
0x58	88	Controller Shutdown
0x59	89	SES Level 1
0x5A	90	SES Level 3 Critical

0x5B	91	SES Level 3 Fault Tolerant
0x5C	92	Controller Failover Started
0x5D	93	Controller Failover Completed
0x5E	94	Controller Failback Started
0x5F	95	Controller Failback Completed
0x60	96	Controller Firmware Upgraded
0x61	97	Drive Inserted
0x62	98	Battery Charging
0x63	99	Flush Cache Started
0x64	100	Flush Cache Completed
0x65	101	Lost Cached Data
0x66	102	Drive Firmware Update Started
0x67	103	Drive Firmware Update Completed
0x68	104	Array Expansion Started
0x69	105	Array Expansion Completed
0x6A	106	Array Expansion Restarted
0x6B	107	SES Power Supply Status
0x6C	108	SES Fan Status
0x6D	109	SES Temperature Status
0x6E	110	SES Alarm Status
0x6F	111	Cache Disabled
0x70	112	Cache Enabled
0x71	113	Data Blocks Reallocated
0x72	114	SDRAM ECC Error Corrected
0x73	115	Rebuild Aborted
0x74	116	Configuration Parameter Change
0x75	117	SATA Device Error
0x76	118	Drive Removed
0x7C	124	SAS Host WWN Logged In
0x7D	125	SAS Host WWN Logged Out
0x7E	126	Disk IO Firmware Upgrade Started

0x7F	127	Disk IO Firmware Upgrade End
0x80	128	Disk IO Firmware Upgrade Error
0x81	129	Snapshot ODA Capacity
0x82	130	Snapshot ODA
0x83	131	Snapshot Virtual LUN
0x84	132	Snapshot Snapshot
0x85	133	Snapshot Error
0x86	134	Snapshot License
0x87	135	Persistent Reservation Event
0x88	136	Snapshot MD Recovery
0x89	137	CEMI Firmware Report Event
0x8A	138	Netburner Reset Request Event
0x8B	139	PMC Firmware Report Event
0x93	147	APM – Drive Spin Up or Down
0x94	148	APM – Drive Group Spin Up or Down
0x95	149	APM – Array Spin Up or Down
0x96	150	APM – Self Test Started
0x97	151	APM – Self Test Completed
0x98	152	Cable Removal/Insertion Event
0x99	153	Expander SPIMEM Update Event (6412)
0x9A	154	Expander Boot ROM Update Event (6412)
0x9B	155	Expander EEPROM Update Event (6412)
0x9C	156	Controller Warning Event
0x9D	157	Backend Controller Reset Information Errors

6.2 Error Codes

When a command fails, an error code will be shown on the command line. Those that begin with a “1” (“1xxx”) are system level failures; those that begin with “2” (“2xxx”) are user-level issues related to invalid syntax or configuration problems.

Description	Error Code
Success	0
LAPI Timeout	1000
LAPI Bad input parameters	1001
LAPI Communication failed	1002
LAPI Command Failed	1003
LAPI Cannot Talk to Lower Controller	1004
LAPI Cannot Talk to Upper Controller	1005
LAPI Cannot Open File for reading or writing	1006
LAPI No Wahoo Handle	1007
LAPI End Of Data	1008
LAPI Read Failed	1009
LAPI Cannot Access RAID System	1010
LAPI Command worked but data cannot be read	1011
LAPI System Halted	1012
LAPI Mapping exists for host to volume	1013
LAPI APM feature not enabled	1014
LAPI Asynchronous feature not enabled	1015
LAPI Advance performance feature not enabled	1016
LAPI Start Configuration in progress	1017
LAPI Save Configuration in progress	1018
LAPI Array Expansion in progress	1019
LAPI Configuration unavailable	1020
XCR_MEMORY_ALLOCATION_ERROR	2001
XCR_INVALID_LUN_INDEX	2002
XCR_INVALID_DRIVE_INDEX	2003
XCR_INVALID_ARRAY_INDEX	2004

XCR_INVALID_HOST_INDEX	2005
XCR_INVALID_LUN_MAP_INDEX	2006
XCR_INVALID_SPARE_INDEX	2007
XCR_INVALID_REGION_INDEX	2008
XCR_INVALID_RAID_LEVEL	2009
XCR_INVALID_STRIPE_SIZE	2010
XCR_INVALID_ODA_INDEX	2011
XCR_INSUFFICIENT_FREE_REGIONS	2012
XCR_INVALID_CONTROLLER_INDEX	2013
XCR_CANNOT_OPEN_FILE	2014
XCR_INVALID_SLOT_INDEX	2015
XCR_INVALID_TIMING_RANGE	2016
XCR_NO_LOOP_ID	2017
XCR_INVALID_SELECTION	2018
XCR_INVALID_DATE_OR_TIME	2019
XCR_APM_REQUEST_NOT_VALID	2020
XCR_INVALID_ENCLOSURE_INDEX	2021
XCR_FAIL_TO_DOWNLOAD_FIRMWARE	2022
XCR_NO_VALID_CONFIGURATION	2023
XCR_INVALID_MODE	2024
XCR_INVALID_OUT_OF_BAND_REQUEST	2025
XCR_SNAPSHOT_REQUEST_NOT_VALID	2026
XCR_INVALID_CONTROLLER_TYPE	2027
XCR_INVALID_BACKOFF_PERCENT	2028
XCR_INVALID_CACHE_SIZE	2029
XCR_INVALID_PORT	2030
XCR_CONFIGURATION_CHANGE_IN_PROGRESS	2031
XCR_INVALID_HOST_BLOCK_SIZE	2032

Glossary

APM Advanced Power Management.

Array An area of storage assigned a RAID level and a chunk size. One or more logical drives can be created from an array.

Chunk Size The amount of data written to a single drive before rotating to the next drive in a striped RAID system. The same as the stripe size.

Configuration The state of the entire system, including all arrays, logical drives, hot spares, mappings, and so on.

Device Another name for a disk drive.

HBA Host Bus Adapter.

Hot Spare A drive set aside for the purpose of rebuilding an array automatically when one of its member drives fails.

Logical Drive A region of storage created from part of an array. Logical drives can be mapped as LUNs and made accessible to the host operating system. Also known as a Volume.

LUN Logical Unit Number – only mapped logical drives are assigned LUNs.

LUN Mapping A relationship between a host and a logical drive that is assigned a LUN.

ODA Overwrite Data Area – an area of storage set aside for storing snapshots.

Rank Another name for an array.

Region An extent of storage space. A logical drive can consist of one or more regions. A region can also be an area of free space. XCR does not deal with regions directly, but commands are provided for showing region-related information.

Snapshot The process of backing up the current state of a logical drive. It can be restored at a later date using a "snap back".

Stripe Size The amount of data written to a single drive before rotating to the next drive in a striped RAID system. The same as the chunk size.

Volume A Logical Drive.

WWN World Wide Name – a 64-bit number that uniquely identifies a system device or node. It is usually written as a 16 digit hex value (for example: 200000E527F80368).

Write Back Data is written to the cache, but written to disk only when a sufficient number of writes have been accumulated. This reduces the number of disk I/Os and hence increases performance. However, there is a danger that a system failure could result in cached writes not being written to disk. See also "Write Through."

Write Through Data is written to cache and also immediately to the drive. This reduces the chance of cached writes not being stored on the drive, but is also generally slower than using "Write Back".