GEM-5 CLI Reference Guide

Abstract

This guide describes how to use the GEM enclosure management firmware that controls Seagate Exos® and Nytro® E-series and AP-series storage enclosures.

Regulatory and compliance information

For the latest regulatory and compliance information see www.seagate.com/support/data-storage-systems/. Scroll down to the Compliance, Safety and Disposal Guide link.

Contents

1 Introduction

GEM is the enclosure management firmware responsible for controlling Seagate Exos® and Nytro® E-series and AP-series storage enclosures. The GEM firmware provides a human readable command-line interface (CLI) for interacting with the enclosure via in-band and out-of-band management paths. This document describes the methods through which this interface can be accessed and the commands available to the end-user.

This chapter includes the following topics:

- Terms and abbreviations
- Notation conventions
- Command-line interface overview

Terms and abbreviations

Term	Definition
ANSI	American National Standards Institute
BMC	Baseboard management controller
CLI	Command line interface
GEM	Generic enclosure management
GOBI	GEM on BMC interface
I2C	Inter-integrated circuit
IP	Internet protocol
IPM	Intelligent platform management interface
IPMI	Intelligent platform management interface
JBOD	Just a bunch of disks
SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SBB	Storage Bridge Bay
SCSI	Small Computer System Interface
SES	SCSI Enclosure Services
UART	Universal asynchronous receiver/transmitter
VPD	Vital Product Data
WWN	World Wide Name

Notation conventions

Component	Description
<value>h	Denotes a hexadecimal (base-16) number, e.g. 23h.
<value>b	Denotes a binary (base-2) number, e.g. 1010b.
<value>	A value without leading zeros and no suffix indicates a decimal number (base-10), e.g. 34.
[parameter]	Square brackets in the command usage denote an optional command parameter or list of parameters. The name of the parameter or parameters is enclosed within the brackets.

<parameter>	Angle brackets in the command usage denote a mandatory command parameter or list of parameters. The name of the parameter or parameters is enclosed within the brackets.
option1|option2	If two identifiers within a command parameter are separated by a '|' character, it describes the values that may be passed within the parameter, e.g. <1|0> stipulates that the parameter may take a value of either 1 or 0. Any other value would be invalid. The '|' symbol can also be used for string values, e.g. <enable|disable>.
parameter...	If used in a command parameter list, ellipses ('...') indicate that more than one value for the parameter can be specified. Each subsequent value is delimited with a ' ' (space) character.
`code`	Text formatting uses a monospace font to show how commands (including parameters and options) and filenames are typed on the command line.

Command-line interface overview

This section discusses the topics listed below:

- Supported interfaces
- Login and users
- Command prompt
- Command completion status
- Command-line syntax
- Command redirection
- Limitations

Supported interfaces

The GEM CLI can be used in several interfaces. These interfaces vary based on the capabilities of the specific storage product. The following sections describe the GEM CLI interfaces and the product families to which they apply.

The interfaces listed below are supported:

- UART serial port
- Telnet
- SSH
- SES CLI

UART serial port

Exos and Nytro E enclosures provide access to an interactive GEM CLI console via a UART serial port. The GEM console may be accessed through common terminal applications such as TeraTerm and PuTTY.

Terminal settings for a serial interface are summarized in the table below.

Parameter	Value
Baud rate	115200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Exos and Nytro AP storage server products do not support the UART serial port GEM CLI interface.

Telnet

Exos and Nytro E enclosures provide ability to connect to an interactive Telnet CLI session via the management Ethernet ports located on the I/O modules. As Telnet is considered an insecure protocol, the enclosure is configured with both the Ethernet port and Telnet disabled by default.

The management Ethernet port and Telnet protocol may be enabled through the UART Serial Port CLI by using the `ipconfig` CLI command.

Exos and Nytro AP products do not support Telnet CLI connectivity as they offer a more secure SSH alternative.

SSH

Exos and Nytro AP products support the ability to connect to an interactive CLI session using the Secure Shell (SSH) protocol. The SSH CLI is hosted by the baseboard management controller (BMC) and can be accessed by connecting an SSH client such as PuTTY to the BMC's hostname or IP address.

To access the SSH GEM CLI the following login details must be used. The table below shows default login credentials for SSH CLI.

Parameter	Value
Username	`gobi`
Password	`gobiuser`

Note that on initial login to the SSH CLI, the user is prompted to change the password from the default value to a user specified one.

Exos E and Nytro E products do not support SSH CLI.

SES CLI

The SES CLI provides a mechanism for issuing CLI commands to GEM in-band using vendor unique SES pages. The interface works by writing the command line to the enclosure and collecting the resultant command output. Full details of the SES CLI protocol may be found in the GEM ANSI SES Specification. The SES CLI is non-interactive and requires a host utility to access.

All Exos and Nytro AP and E series enclosures support SES CLI.

Login and users

This section describes CLI login for Exos and Nytro E enclosures.

Interactive CLI interfaces, such as UART and Telnet, are, by default, protected with a username and password. The user must provide valid login credentials before commands can be issued to the enclosure. The enclosure is manufactured with a default password that must be changed by the user on first login to the enclosure.

The table below provides the default serial and Telnet CLI login credentials.

Parameter	Value
Username	`manage`
Password	`P@ssw0rd`
Access level	General

Once changed, the new password is propagated to both I/O modules within the enclosure and resides with the enclosure chassis itself. Replacing an I/O module does not change the password. After you login, you can change the password by using the `change_password` CLI command. The user may log out of the interactive CLI session by running the `exit` command.

Command prompt

Interactive command sessions, such as those provided over SSH, Telnet, and UART, display a prompt where the user enters the command line. This prompt takes the following format.

`<timestamp> <role><id> GEM`

Where:

Element	Description
timestamp	Either the current up-time of the enclosure or the date
role	• `M` to indicate the controller is operating in the primary role. • `S` indicates the controller is operating in the secondary role. • `I` indicates the operating role has yet to be determined.
id	The ID of the slot in which the I/O module is inserted

For example, the following prompt indicates the system up-time is 0 days, 0 hours, 3 minutes, 57 seconds and 68 milliseconds, the operating role is secondary, and the I/O module is running in slot 0.

`0+00:03:57.068 S0 GEM>`

Command completion status

The CLI commands can be configured by Seagate to complete with either a human readable or a hexadecimal machine-readable status code. In most product configurations, GEM will not print the status on command completion. If, however, command return codes are enabled, the values that are reported are listed in the table below.

The table below provides GEM CLI command completion status codes:

Hexadecimal status code	Human readable status
0h	SUCCESS
1h	INSUFFICIENTRESOURCES
2h	NOT_SUPPORTED
3h	NOT_IMPLEMENTED
4h	INVALID_PARAMETER
5h	IO_TIMEOUT
6h	CANCELLED
7h	UNSUCCESSFUL
8h	NO_MEMORY
9h	DEVICE_REMOVED
ah	REVISION_MISMATCH
bh	INVALID_HANDLE
ch	INVALID_DEVICE_REQUEST
dh	INTERRUPTED
eh	DEVICE_NOT_READY
fh	FILE_NOT_FOUND
10h	UNKNOWN

Command line syntax

Syntax can consist of:

- Numerical parameter values
- String parameter values

All commands in GEM conform to the basic syntax:

`<command name> [parameters]`

The command name stipulates the specific command to be run, with the parameters providing additional instructions to the command. Each command can have set of parameters that it supports, where the parameter values are numbers or strings.

Individual command parameters are delimited with a space character. Optionally, you can delimit parameters by enclosing them in double quotes (e.g. ["parameter1""parameter2"]) and not using a space character between them.

Numerical parameter values

Unless stipulated in the command usage, numerical parameter values can be specified in one of three bases by using the appropriate prefix as shown in the table below.

Description	Base	Prefix	Example
Octal	8	'0' (zero)	052
Decimal	10	No prefix	42
Hexadecimal	16	'0x' (zero + x)	0x2A

Decimal values may be signed or unsigned, where permitted, whereas hexadecimal and octal values may only be unsigned.

String parameter values

String parameters consist of one or more printable ASCII characters. All uppercase characters in the string are converted to lowercase unless the string is enclosed in double quotes. For example, the parameter value `AnExampleParameter` will be interpreted as `anexampleparameter` when the command is processed, whereas the value `"AnExampleParameter2"` will be interpreted as `AnExampleParameter2`.

The same quoting technique can be used to specify strings containing whitespace. For example, the parameter value `a string` will be interpreted as two separate parameters, `a` and `string`, whereas the parameter `"a string"` will be interpreted as the single parameter `a string`.

Under certain circumstances, it may be necessary to use escaped characters within a string. The most common situation where this occurs is when double quote characters are to be interpreted as part of the string parameter itself. For example, the parameter value `"value"` will be interpreted as `value`, whereas `"\"value\""` will be interpreted as `"value"`. Escaped quotes may only be specified within a quoted string. It is not valid to specify `\"value\"`.

Command redirection

The GEM CLI supports the ability to direct a command to be executed on another processing device within the enclosure by prefixing the command name with a redirection character. The redirection options supported by a GEM instance depend on the product. The table below provides command redirection prefixes.

Command prefix	Applicability	Target component	Example
–	Exos/Nytro E and AP	Partner IOM GEM instance	`-ver`
+	Exos/Nytro AP	Local GEMSat instance	`+ver`
%	Exos/Nytro AP	Partner GEMSat instance	`%ver`

Command redirection for GEMSat instances

If commands are executed directly on a GEMSat instance within an AP enclosure, the '-', '+' and '%' prefixes redirect to the partner GEMSat, local GEM, and partner GEM instances respectively. The table below provides GEMSat command redirection prefixes.

Command prefix	Applicability	Target component	Example
–	Exos/Nytro E and AP	Partner IOM GEM instance	`-ver`
+	Exos/Nytro AP	Local GEMSat instance	`+ver`
%	Exos/Nytro AP	Partner GEMSat instance	`%ver`

Limitations

The command line length is limited to a maximum of 120 characters.

Commands overview

This section introduces the command categories that will contain the respective commands that will be presented in the guide. The presentation of command content will also be reviewed. This section contains the following topics:

- Command categories
- User Command sub-categories
- Engineering command sub-categories
- Testing command sub-categories
- Command content and presentation

Command categories

The table below identifies and describes the command types contained in the guide.

Command type	Description
User	Commands that are accessible by user-level accounts. These include commands that pertain to essential enclosure control and status, and diagnostic collection.
Testing	Commands used for test purposes. They induce or simulate fault conditions in the enclosure.
Engineering	Commands for use by Seagate Engineering personnel.

The table below identifies and describes the User, Testing, and Engineering command sub-categories contained in the guide.

Cable management	These commands are used to manage data-path host port cables.
Canister management	These commands are used to access status for or control the enclosure I/O modules.
CLI in-built	These commands are basic to any system that uses GEM.
Drive management	These commands are related to managing the enclosure drive bays.
Environmental control	These commands are related to environmental controls.
GEMNet	These commands are used to access remote GEMLite nodes.
Human Interface Device (HID)	These commands control the general enclosure and operations panel indicators.
IPMI system	These commands are only available on products with a baseboard management controller (BMC) managing an application processor domain.
Logging	These commands manage the enclosure error logs.
Network	These commands available on canisters that support direct Ethernet connections to GEM.
SAS	These commands are used to query and control SAS protocol and hardware related functionality.

Command content and presentation

Command content is presented in table format. The table below shows an example of the structure of command topics in this guide.

Command	`cblmgr_faults`
Command synopsis	Reports cable manager faults.
Command description	Reports overall cable status, local cable fault conditions, and remote cable fault conditions. Overall status includes the severity of each cable fault, fault LED state, and ident LED state.
Command parameters	None
Command type	Fault reporting
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	4.0 or later
Current status	Active

2 User commands

This chapter contains information about the GEM commands provided for general use. User commands require the General access level.

NOTE Additional commands are available for advanced users. Contact your Sales Engineer for further information about those commands.

Cable management commands

These commands are used to manage data-path host port cables.

cblmgr_faults

Command	`cblmgr_faults`
Command synopsis	Reports cable manager faults.
Command description	Reports overall cable status, local cable fault conditions, and remote cable fault conditions. Overall status includes the severity of each cable fault, fault LED state, and ident LED state.
Command parameters	None
Command type	Fault reporting
Access level	General
Applicable Products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	4.0 or later
Current status	Active

Canister management commands

These commands are used to access status for or control the enclosure I/O modules.

flashinfo

Command	`flashinfo`
Command synopsis	Reports information about the firmware flash memory storage.
Command description	Reports information concerning the flash device used by the SAS expander for firmware storage.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E
Supported in versions	5.2 or later
Current status	Active

fwstatus

Command	`fwstatus`
Command synopsis	Reports information about the SAS expander firmware images.
Command description	Reports firmware image status for the SAS expander, such as whether an image is active or valid.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E
Supported in versions	5.2 or later
Current status	Active

getboardid

Command	`getboardid[hex]`
Command synopsis	Reports the canister ID and mode.
Command description	Reports the slot ID and HA operation mode of the I/O module on which the command is executed.
Command parameters	`hex` • When set to `hex`, the command reports the slot ID and high availability (HA) mode in two-byte hexadecimal format. The slot ID is reported in byte position 0 and the mode is reported in byte position 1. If the I/O module is in the primary position, the HA mode is set to 0x01. If it is in the secondary position, the mode is 0x00. • If `hex` is not specified or is set to a value other than `hex`, the slot ID and mode are rendered as a human-readable string.
Command type	Debug
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

getenclosuresn

Command	`getenclosuresn`
Command synopsis	Reports the enclosure serial number.
Command description	Reports and displays the serial number for the enclosure. For a full inventory of the enclosure FRUs, including the enclosure chassis, use the `getvpd` command.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

getenclosurewwn

Command	`getenclosurewwn`
Command synopsis	Reports the enclosure's WWN.
Command description	Reports and displays globally unique WWN for the enclosure. For a full inventory of the enclosure FRUs, including the enclosure chassis, use the `getvpd` command.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

getsepwwn

Command	`getsepwwn`
Command synopsis	Reports the SES target's WWN.
Command description	Reports and displays globally unique WWN for the I/O module's SES target. For a full inventory of the enclosure FRUs, including the enclosure chassis, use the `getvpd` command.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

getvpd

Command	`getvpd`
Command synopsis	List all VPD information.

Command description	Displays all the Vital Product Data (VPD) for the storage enclosure, by category.
	Enclosure VPD:
	- Enclosure vendor - Enclosure product ID - Enclosure WWN - Enclosure serial number - Enclosure part number
	Canister data:
	- Canister VPD version - Canister vendor - Canister product ID - Canister SAS address - Canister serial number - Canister part number
	Midplane data:
	- Midplane VPD version - Midplane product ID - Midplane serial number - Midplane part number
	PCM data:
	- PCM VPD version - PCM vendor - PCM product ID - PCM serial number - PCM part number
	The following fields are applicable only for the systems with batteries.
	- Battery device ID - Battery manufacture string - Part number - Serial number - Date of manufacture - PCB serial number
Command parameters	None
Command type	Debug
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

reboot

Command	`reboot [mode]`
Command synopsis	Reboots the I/O module.
Command description	Reboots the management portion of the I/O module. On Exos/Nytro E platforms, the entire I/O module is rebooted. On Exos/Nytro AP platforms, only the enclosure management process is restarted.
Command parameters	`mode` `hard`: performs a hard reboot of the I/O module. `soft`: performs a I/O non-disruptive soft reset of the I/O module.

Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

setcanisterhealth

Command	`setcanisterhealth[state]`
Command synopsis	Changes the local I/O module health status.
Command description	Changes the I/O module's health indication state. This state is usually managed by GEM's HA service. However, it can be configured to pass ownership to an external client such as an auxiliary processor.
	The method for displaying this status may vary on a per product basis. See the product's installation guide for specific details.
Command parameters	`state`
	• `1` sets the canister health indication state to ON.
	• `0` sets the canister health indication state to OFF.
	• If no parameters are specified, the current state of the local I/O module's health indication state is returned.
Command type	Control
Access level	General
Applicable products	Exos AP, Nytro AP
Supported in versions	2.0 or later
Current status	Active

setcanisterindicator

Command	`setcanisterindicator[state]`
Command synopsis	Sets the local I/O module identification state.
Command description	Sets the I/O module's identification indicator. The specific method used to identify the I/O module is product-specific.
	On products with a dedicated blue IDENT LED on the I/O module, the blue LED will blink when you set the state to '1'.
	On products without a dedicated blue IDENT LED on the I/O module, the amber LED will blink when the state is set to '1'.
Command parameters	`state`
	• `1` sets the identification indicator state to ON.
	• `0` sets the identification indicator state to OFF.
	• If no parameters are specified, the current state of the local I/O module's identification indicator state is returned.
Command type	Test
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	2.0 or later
Current status	Active

setcanisterstr

Command	`setcanisterstr[state]`
Command synopsis	Changes the local I/O module safe-to-remove status.
Command description	Changes an application/RAID I/O module's safe-to-remove indication status. This state is usually managed by GEM's processor service. The method for displaying this status may vary on a per product basis. See the product's installation procedures for specific details.
Command parameters	`state` • `1` sets the safe-to-remove indicator state to ON. • `0` sets the safe-to-remove indicator state to OFF. • If no parameters are specified: the current state of the local I/O module's safe-to-remove indicator state is returned.
Command type	Control
Access level	General
Applicable products	Exos AP, Nytro AP
Supported in versions	2.0 or later
Current status	Active

settime

Command	`settime [format <parameters>]`
Command synopsis	Sets current time on the enclosure.
Command description	Sets or reports the current time of the enclosure. Two time-stamp formats are supported: • Relative time: This is a timestamp expressed as the number of days, hours, minutes, seconds and milliseconds since a given epoch. • Calendar time: This is a timestamp expressed as the full Gregorian calendar year, month, day, hour, minute and second, with the earliest representable date being 1970-01-01 00:00:00. I/O modules not fitted with a real-time clock default to reporting relative time, where the epoch is the point at which the system last booted.

Command parameters	`-u` Sets the time using the relative timestamp format. When this option is used, the parameter format is: <days> <hours> <minutes> <seconds>. `-c` Sets the time using the calendar timestamp format. When this option is used, the parameter format is: <YYYY> <MM> <DD> <hh> <mm> <ss>. `days` The number of complete days elapsed since the epoch. `hours` The number of hours elapsed since the last complete day. `minutes` The number of minutes elapsed since the last complete hour. `seconds` The number of seconds elapsed since the last complete minute. `YYYY` The four-digit calendar year. `MM` The calendar month (1-12). `DD` The calendar day of month (1-31). `hh` The hour (0-23). `mm` The minute (0-59). `ss` The second (0-59). - When no parameter is specified, the current time is reported.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

uptime

Command	`uptime`
Command synopsis	Reports the enclosure uptime.
Command description	Reports the duration that the enclosure has been operating since the last power cycle or concurrent reboot of both I/O modules.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

ver

Command	`ver`
Command synopsis	Displays version information.
Command description	Displays the version numbers and information of the components of the local I/O module, midplane and PCMs.
Command parameters	None
Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

CLI in-built commands

These commands are basic to any system using GEM.

change_password

Command	`change_password`
Command synopsis	Changes login password.
Command description	Changes the password of the currently logged in user. This command is only applicable to interactive CLI sessions, such as UART or Telnet. When run, the command will guide the user through the process of changing the password.
Command parameters	None
Command type	Local Only
Access level	General
Applicable products	Exos E, Nytro E
Supported in versions	5.0 or later
Current status	Active

ddump

Command	`ddump [filter <canister|sideplane>]`
Command synopsis	Used for system-wide diagnostic dump.
Command description	Used to capture a diagnostic snapshot of the enclosure operating state. It calls all the commands of type 'diagnostic' that do not require a parameter.
Command parameters	`filter` `canister` only reports diagnostic state for the I/O module on which the command is executed. `sideplane` only reports diagnostic state for the sideplane expanders directly attached to the I/O module on which the command is executed. - If no filter parameter is specified, all local ddump information is captured.
Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

ddumpo

Command	ddumpo[filter <canister|sideplane>]
Command synopsis	Used for ordered system-wide diagnostic dump.
Command description	Used to capture an ordered diagnostic snapshot of the enclosure operating state. It calls all the commands of type 'diagnostic' that do not demand a parameter. Whereas the ddump command executes the sub-commands in alphabetical order, the ddumpo command executes them in the order of category.
Command parameters	- filter - canister only reports diagnostic state for the I/O module on which the command is executed. - sideplane only reports diagnostic state for the sideplane expanders directly attached to the I/O module on which the command is executed. - If no filter parameter is specified, all local ddump information is captured.
Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	4.0 or later
Current status	Active

ddump_* commands

Command	Description
ddump_*	The help command displays a number of additional commands with the the ddump_ prefix. These commands are subsets of the ddump and ddumpo commands and may be used to retrieve specific portions of the diagnostic dump output when the full content is not required. For example ddump_cblmgr can be used to retrieve status on the host port cables. These commands are provided for convenience. However, for reporting issues, the full ddump command should be used to collect diagnostics.

help

Command	help[command]
Command synopsis	Displays command help information.
Command description	Displays the available CLI commands or to report extended help information for a specific command.
Command parameters	[command] The name of the command to retrieve usage information for. - If no command parameter is provided, the list of all supported commands is returned.
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

report_faults

Command	report_faults
Command synopsis	Reports all system-wide faults.
Command description	Reports all known faults, collected from each GEM service.
Command parameters	None

Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

exit

Command	`exit`
Command synopsis	Exits from a logged in session.
Command description	Exits a logged-in interactive session such as UART or Telnet.
Command parameters	None
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	4.0 or later
Current status	Active

Drive management commands

These commands are related to managing the enclosure drive bays.

cleardriveindicator

Command	`cleardriveindicator[bay]`
Command synopsis	Turns off a drive identification indicator.
Command description	Turns off a drive bay's identification indicator status. The method for displaying this status may vary on a per product basis. See the product's installation guide for specific details.
Command parameters	`bay` The drive bay ID (0-based)
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	2.0 or later
Current status	Active

driveinv

Command	`driveinv` The command is supported in all products, but the feature may not be enabled. The command will report if the feature is enabled or not.
Command synopsis	Displays drive inventory.
Command description	Displays inventory information for the populated SAS drives, including model number, serial number, vendor, firmware version and temperature.

Command parameters	None
Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.0 or later
Current status	Active

dumpdrives

Command	`dumpdrives`
Command synopsis	Displays brief drive bay state information.
Command description	Displays a summary of the drive bay power and fault status.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

getdrivestatus

Command	`getdrivestatus <bay>`
Command synopsis	Reports detailed drive bay status.
Command description	Reports detailed status for the specified drive bay.
Command parameters	`bay` The drive bay ID (0-based)
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

poweroffdrive

Command	`poweroffdrive[all] <bay>`
Command synopsis	Disconnects power to a drive.
Command description	Disconnects power from one or more drives in the enclosure.
Command parameters	• `bay` A comma separated list of drive bays with no space character between the comma and the drive bay ID, e.g., "0,1,5,8". • `all` Alternatively the value [`all`] may be specified to indicate that all drives are to be powered off.
Command type	Control
Access leve	General

Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

powerondrive

Command	`powerondrive[all]<bay>`
Command synopsis	Connects power to a drive.
Command description	Connects power to one or more drives in the enclosure.
Command parameters	`bay` A comma separated list of drive bays with no space character between the comma and the drive bay ID, e.g. "0,1,5,8". `all` Alternatively the value `[all]` may be specified to indicate that all drives are to be powered on.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

setdriveindicator

Command	`setdriveindicator<bay>[state]`
Command synopsis	Changes a drive identification indicator.
Command description	Changes a drive bay's identification indicator status. The method for displaying this status may vary on a per product basis. See the product's installation guide for specific details.
Command parameters	`bay` The drive bay ID (0-based) `state` `1` sets the identification indicator state to ON. `0` sets the identification indicator state to OFF. - If no state parameter is specified, the current state of the drive bay's identification indicator state is returned.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	2.0 or later
Current status	Active

Environmental control commands

These commands are related to environmental controls.

envctrl_fan

Command	`envctrl_fan[level]`
Command synopsis	Displays fan status
Command description	Displays a summary for the status for all cooling devices in the enclosure.
Command parameters	`level` The amount of detail provided in the output (verbosity level): • `0` sets the verbosity level as brief. • `1` sets the verbosity level as verbose.
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

envctrl_zone

Command	`envctrl_zone[level]`
Command synopsis	Displays temperature sensor status.
Command description	Displays a summary for the status for all temperature sensors in the enclosure.
Command parameters	`level` The amount of detail provided in the output (verbosity level): • `0` sets the verbosity level as brief. • `1` sets the verbosity level as verbose.
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

GEMNet commands

These commands are used to access remote GEMLite nodes.

gncli

Command	`gncli <address> <command[args]>`
Command synopsis	Executes a CLI command on a remote GEMNet node.
Command description	Executes a CLI command to be run on a remotely attached expander, such as the ones located on 5U84 sideplanes. This command applies to high-density enclosures only. Output from the command is routed back over the GEMNet link and returned to the CLI connection used to invoke `gncli`.

Command parameters	`address` The address of the GEMNet node. The address may take one of two formats: - Expander address: Uses the format `exp:<index>` where `<index>` is the relative index of the corresponding expander element in SES page 02h. - GEMNet node address: Uses the format `3,<sled>,<index>`, where `<sled>` is the index of the drive drawer or subsection and `<index>` is the index of the node within the sled. - Aliases may be used for the sled and index fields to permit the execution of a command on more than one node. These aliases are: `all`, `local` and `remote`. For example: - An address of `3,all,0` would cause a command to be run on node 0 on all sleds. - An address of `exp:local` would cause the command to be run on all expander nodes attached to the I/O module on which the `gncli` command was executed. `command` The name of the CLI command to execute on the remote node. `args` The parameters to pass to the command on the remote node.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP (5U84, 4U106, 4U100)
Supported in versions	3.0 or later
Current status	Active

Human interface device (HID) commands

These commands control the general enclosure and operations panel indicators.

hid_set_ident

Command	`hid_set_ident[state]`
Command synopsis	Changes enclosure identify mode.
Command description	Changes the identify indicator state of the enclosure. This state is signified by flashing the operations panel display/identify LED.
Command parameters	`state` `1` sets the identification indicator state to ON. `0` sets the identification indicator state to OFF.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

set_encl_id

Command	`set_encl_id[id]`
Command synopsis	Sets the enclosure ID

Command description	Sets the enclosure ID in non-volatile memory. Where supported, this ID displays on a 7-segment display on the enclosure operations panel.
Command parameters	• `id` The new enclosure ID value (0-99) • If no `id` parameter is provided, the current ID is displayed.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

IPMI system commands

These commands are only available on products with a baseboard management controller (BMC) managing an application processor domain.

ipmi_power

Command	`ipmi_power <op>`
Command synopsis	Allows the user to performs I/O module power control using chassis commands to BMC.
Command description	Allows the user to request an I/O module level shutdown through the BMC. This operation has the benefit of cleanly shutting down the x86 subsystem using ACPI.
Command parameters	`op #` The IPMI power operation to perform, where # can be: • `2` is for soft - Orchestrated shutdown of x86 complex. • `3` is for off - Immediate shutdown of x86 complex. • `4` is for cycle - Canister power cycle. • `5` is for reset - Canister reset. • `6` is for on - Wake x86 complex from standby/soft-off.
Command type	Control
Access level	General
Applicable products	Exos AP, Nytro AP
Supported in versions	2.0 or later
Current status	Active

Logging commands

These commands manage the enclosure error logs.

logcmt

Command	`logcmt <message>`
Command synopsis	Inserts comment in logdump.
Command description	Inserts a custom message into the I/O module's error log.

Command parameters	message The message to write to the log. Use double quotes if the message contains space. The maximum size of the message string is 72 characters.
Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	4.0 or later
Current status	Active

logdump

Command name	logdump[region[order[count[rep_ts.[rep_sub[rep_srv]]]]]]
Command synopsis	Displays logged messages.
Command description	Displays the I/O module's error log.
Command parameters	• region The area of memory to retrieve log messages from. ▪ r is ram. ▪ n is non-volatile. • order The order of the log messages. ▪ old is oldest first. ▪ new is newest first. • count The number of logged messages to display. ▪ all is to to display all logged messages. ▪ Deleting this parameter will also display all logged messages. • rep_ts ▪ 1 (default) is to include the timestamp in the log messages ▪ 0 is to exclude the timestamp. • rep_sub ▪ 1 (default) is to include the subsystem name in the log messages. ▪ 0 is to exclude the subsystem name. • rep_srv ▪ 1 (default) is to include the service name in the log messages. ▪ 0 is to exclude the service name. • Default for omitted command parameters: the default for omitted command parameters will be to display all logged messages from ram, newest first, with all message fields enabled.
Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

logdumpnv

Command name	logdumpnv[count[rep_ts[rep_sub[rep_srv]]]]
Command synopsis	Displays non-volatile log messages.

Command description	Displays the chosen number or all of log messages from chosen service of chosen subsystem from first or last of list of messages.

Command parameters	• `region`
	  The area of memory to retrieve log messages from.
	  ▪ `r` is ram.
	  ▪ `n` is non-volatile.
	• `order`
	  The order of the log messages.
	  ▪ `old` is oldest first.
	  ▪ `new` is newest first.
	• `count`
	  The number of logged messages to display.
	  ▪ `all` is to to display all logged messages.
	  ▪ Deleting this parameter will also display all logged messages.
	• `rep_ts`
	  ▪ `1` (default) is to include the timestamp in the log messages
	  ▪ `0` is to exclude the timestamp.
	• `rep_sub`
	  ▪ `1` (default) is to include the subsystem name in the log messages.
	  ▪ `0` is to exclude the subsystem name.
	• `rep_srv`
	  ▪ `1` (default) is to include the service name in the log messages.
	  ▪ `0` is to exclude the service name.
	• Default for omitted command parameters: the default for omitted command parameters will be to display all logged messages from ram, newest first, with all message fields enabled.

Command type	Diagnostic
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

Network commands

This command is only available on canisters that support direct Ethernet connections to GEM.

ipconfig

Command	`ipconfig[setting]<args>`
Command synopsis	Used to view and configure TCP/IP.
Command description	Used to view and configure TCP/IP settings and save changes to persistent memory in the I/O Module. Note that some setting changes may require a reboot of the I/O module to take effect.

Command parameters	`setting`
	The setting to change. values may be:
	• `dhcp <enable|disable>` is to enable/disable DHCP
	• `dns <dns1|dns2>` is to set DNS server IPv4 address
	• `ether <enable|disable>` is to enable/disable the Ethernet interface
	• `ip <ipaddr> <netmask> [gateway]` is to set the IP address, subnet mask and gateway
	• `telnet <enable|disable>` is to enable/disable Telnet
	If no parameters are provided, the current active settings are displayed.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E
Supported in versions	1.0 or later
Current status	Active

SAS commands

These commands are used to query and control SAS protocol and hardware related functionality.

phydump

Command name	`phydump`
Command synopsis	Reports SAS expander PHY state.
Command description	Reports the state of the SAS expander PHYs (ports).
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

phy_zone

Command name	`phy_zone`
Command synopsis	Reports PHY zone information.
Command description	Reports SAS zone information for each of the SAS expander's PHYs.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active

reset_saved_zone_info

Command name	`reset_saved_zone_info`
Command synopsis	Used to reset saved zone tables to defaults.
Command description	Used to clear the I/O module's saved zone tables to restore the default zone configuration when custom SPL zoning is enabled.
Command parameters	None
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.0 or later
Current status	Active

set_zone_mode

Command name	`set_zone_mode[id]`
Command synopsis	used to set the zone mode configuration.
Command description	Used to query and change the current operational zone mode when predefined SAS zone modes are supported by the product. Once set, the updated zone mode is enforced on both enclosure I/O modules. Any setting changes made using this command are preserved over a power cycle.
Command parameters	`id` • Sets the zone mode to the specified value. Valid values are 0 to 5, where 0 disables zoning. See product documentation for the interpretation of the zone mode ID. • When no parameter is specified, the command will return the current zone mode configured.
Command type	Control
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	1.0 or later
Current status	Active

zone_perms

Command name	`zone_perms`
Command synopsis	Reports the SAS zone permission tables.
Command description	Reports the SAS zone permission tables for the expander.
Command parameters	None
Command type	Status
Access level	General
Applicable products	Exos E, Nytro E, Exos AP, Nytro AP
Supported in versions	5.2 or later
Current status	Active