SAS Host Adapter Command Line Interface

USER Guide

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WARRANTY

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INTRODUCTION

1. Introduction

This user guide provides Command Line Interface (CLI) intructions for configuring and maintaining your SAS host adapter.
Before using this CLI, we assume that you have already installed your SAS host adapter in your system. If you have not yet installed SAS host adapter, see SAS host adapter user manual for instructions.

1.1 Overview

This Command Line Interface (CLI) is provided for you to configure and manage the SAS host adapter components in Windows, Linux, FreeBSD, Solaris and Mac OS X environments. The CLI is useful in environments where a graphical user interface (GUI) is not available. Through the CLI, you perform most of the storage management tasks that you can perform with the storage manager GUI. With CLI, you can also use the CLI commands in both interactive and non-interactive (script) mode, providing higher level API functionalities.

1.2 Supported Operating Systems

- Windows: Windows XP 64-bit, Windows Server 2003, Windows Vista, Windows 2008 and Windows 7.
- Linux: RedHat, SuSE, ……etc.
- FreeBSD
- Solaris 10/11
- Mac OS X 10.4.x/10.5.x/10.6.x/10.7.x

CLI supports both 32-bit and 64-bit versions. Be sure you are installing the correct version.

SOFTWARE INSTALLATION

2. Installing the Host Adapter CLI

This section describes the procedures for installing Command Line Interface (CLI).

2.1 CLI Installation

2.1.1 For Windows

Below screenshots in this section are taken from a Windows XP installation. If you are running other Windows, your installing screen may look different, but the CLI installation is essentially the same.

1. Insert the SAS host adapter CD in the CD-ROM drive. You aslo can download the CLI from the website: www.areca.com.tw
2. Run the setup.exe file that resides at: <CD-ROM>\http\windows\setup.exe on the CD-ROM.
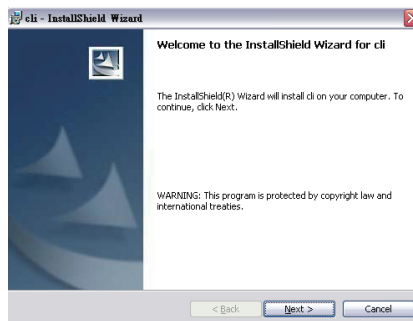
3. Click on the "Setup" file then the Welcome screen appears. Follow the on-screen prompts to complete CLI installation.
4. A program bar appears that measures the progress of the CLI.

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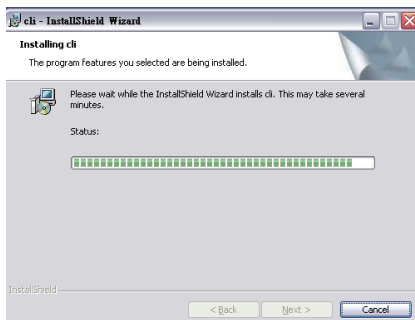
5. When this screen complete, you have completed the CLI software setup.
6. After a successful installation, the "Setup Complete" dialog box of the installation program is displayed.
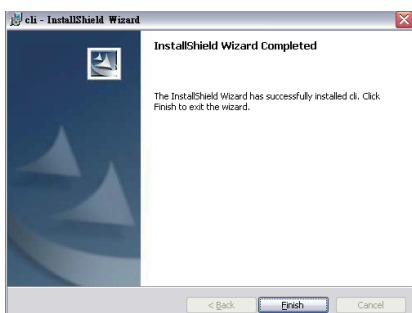
Click the "Finish" button to complete the installation.

2.1.2 For Linux, FreeBSD, Mac and Solaris

The CLI utility can be installed from the shipping software CD, or downloaded from the areca web site: www.areca.com.tw

The following step is the CLI installation procedure in the Linux, FreeBSD, Mac and Solaris.

1. Insert the SAS host adapter CD in the CD-ROM drive.
2. Copy the file CLI to the installation directory from which you want to run the program.

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2.2 Accessing CLI

2.2.1 For Windows

This section discusses the methods for accessing the CLI in Windows.

To access the CLI:
1. Click on the "Start" button in the Windows XP/2003/Vista /2008/7 task bar and then click "Program".
2. CLI screen appears.

The CLI prompt is displayed in a DOS console window.

2.2.2 For Linux, FreeBSD, Mac OS X and Solaris

To access the CLI from the Linux/FreeBSD/Mac/Solaris prompt, display a window and type CLI in the directory. When the system displays the CLI> prompt, which indicates that you can start to use CLI commands.

For the commands to work in any directory, the path in the start-up, please see your Linux/FreeBSD/Mac/Solaris documentation for information on setting up directory paths.

CLI CONFIGURATION

3. CLI Command Line Configuration

You can enter only valid CLI commands at the command line prompt.

All commands use the following syntax:

<CMD> [sub-command] [parameters]

The CLI syntax uses the following conventions for parameter:

<text> indicates items that you must specify.
[text]   The text item within brackets is optional.
< ¦ >   indicates an 'or' situation where the user has a choice between more than one option, but only one can be specified.
< ~ >   indicates a range values where the user has a choice between these two values, but only one can be specified.
< , >   Comma, indicates a separation between integer value.

3.1 Working Mode

You can also use the CLI commands in both interactive and non-interactive (script) mode.

• Interactive Mode: Entering CLI commands at the main prompt
• Non-interactive Mode: As a series of single commands or creating a script file (a multiple commands input)

3.1.1 Interactive Mode

You can run CLI in interactive mode, entering commands at the main prompt and observing the results on the screen. The examples shown in this CLI manual reflect this interactive mode.

To run the CLI in the interactive mode

1. To enter interactive mode, type "CLI" and press "Enter". The main prompt (CLI>) is displayed. This indicates that the CLI program is waiting for a command input.

2. At the CLI prompt, you can input the commands.

Syntax

set <curctrl=xx >

Parameters

curctrl=xx

Example: CLI >set curctrl=1 [Enter]
Open the controller 1 to accept the CLI command.

3.1.2 Non-interactive Mode

To run the CLI in a single command

You can use CLI with syntax and parameters, processing a single command at a time. To process it, simply enter the command with syntax and parameters.

Syntax

CLI <command line with syntax and parameters>
CLI set <curctrl=xx >

Example: CLI set curctrl=1
Open the controller 1 to accept the CLI command.

To run the CLI using automated script

This part describes how to write batch files and CLI command scripts to perform the controller detail tasks. You can run CLI scripts by executing a batch file. The batch file is a text file containing a valid list of CLI commands which you have included in the file. A carriage return linefeed follows each command.
You can use the CLI commands alone in CLI command scripts or in DOS batch files. You should already understand how to write DOS batch files and be familiar with Windows-related backup commands.

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To execute a CLI command script, type the file name that contains the CLI commands.

Syntax

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

Creating an Automated Script example

In its simplest example form, a text file contains two valid CLI commands. A carriage return linefeed follows each command. The setpass is the file included the command:

CLI set curctrl=1 -→set controller 1.

To run the automated script, enter: setpass
The CLI command script sets the controller 1 to accept the CLI command.

3.2 Command Categories

This chapter provides detailed information about the SAS host adapter CLI commands. From a functional point of view, command can be grouped into the following functional categories. This list may vary depending upon the SAS host adapter model and the installed features.

The following table is the CLI command summary:

CMD	Description
main	Show command categories
set	Open the controller to accept the CLI. It includes the controller assignment.
sys	Perform the SAS host adapter system function
disk	Perform individual disk function
pm	Show SAS controller port multiplier function on the SAS host adapter
enc	Access the enclosure function
exp	Access the expander function
event	System events records or clears all system events in the buffer
hw	Hardware monitor information shows all system environment status
exit	Exit CLI

Main Command

Main command in this category allows you to display main command in the SAS host adapter. For details, see "Main Command" on section 3.2.1.

Set Commands

To prepare a SAS host adapter to receive a CLI command, you first need to select the controller. The set commands select controller and prepare it to receive more CLI Commands. For details, see "Set Commands" on section 3.2.2.

Sys Commands

The sys commands perform the BIOS updating and information on SAS host adapter. For details, see "Sys Commands" on section 3.2.3.

Disk Commands

The disk commands perform all pass-through operations on the drives connect to the SAS host adapter. Typical operations included: identify selected drive, refresh all drives, SMART func-

tion, cache mode, speed mode, update drive firmware and view disk information from the SAS host adapter. For details, see "Disk Function" on section 3.2.4.

Pm Commands

The pm commands allows you to display the SAS controller port multiplier function. For details, see "Pm Commands" on section 3.2.5.

Enc Commands

The enc command allows you to display all enclosure information which connect on the selected SAS host adapter. It can also support the identify the enclosure physically position. For details, see "Enc Commands" on section 3.2.6.

Exp Commands

The exp command allows you to display all expander information which connect on the selected SAS host adapter. It can also support the in-band SES expander firmware update function.For details, see "Exp Commands" on section 3.2.7.

Event Commands

The event command allows you to display system and clear event notification that have been generated events by the SAS host adapter. Typical operations include: clear and view system information from the SAS host adapter. For details, see "Event Function" on section 3.2.8.

Hw Commands

The hw command allows you to display hardware information that have been collected by SAS host adapters. For details, see "Hardware Monitor Function" on section 3.2.9.

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Exit Command

To close the currently selected controller and exit the CLI, use the exit command.

Syntax

exit

Help Command

This command provides an on-line table of contents, providing brief descriptions of the help sub-commands. You can use the <CMD> -h or –help to get detail information about the subcommand.

Syntax

<CMD> -h or help
CMD: set, sys, disk, pm, enc, exp, event or hw.

3.2.1 Main Commands

The main command shows the currently selected controller and all controllers installed in the system.
This command provides a table of contents, providing brief descriptions of the commands and SAS host adapter installed in the system. Typical output looks like:

```
Copyright (c) 2004-2011 Areca, Inc. All Rights Reserved.
Areca CLI, Version: 1.86, Arclib: 310, Date: Nov 18 2011( Windows )

S  #    Name        Type            Interface
===================================================
[*] 1   ARC-1300    SAS Adapter     PCI
===================================================

CMD     Description
===========================================================
main    Show Command Categories.
set     General Settings.
sys     System Functions.
disk    Physical Drive Functions.
pm      Port Multiplier Functions.
enc     Enclosure Functions.
exp     Expander Functions.
event   Event Functions.
hw      Hardware Monitor Functions.
exit    Exit CLI.
===========================================================
Command Format: <CMD> [Sub-Command] [Parameters].
Note: Use <CMD> -h or -help to get details.
CLI> _
```

CLI CONFIGURATION

3.2.2 Set Commands

If there is more than one SAS host adapter in the system, use this command to select the appropriate host adapter on which to perform an action. All actions or commands will be performed only on the currently selected controller.

The help command set –h provides a table of contents, providing brief descriptions of the sub-commands. Typical output looks like:

```
CLI> set

Sub-Command & Parameters Of [ set ]
Sub-Command Description
===========================================================
None.     Parameter: <curctrl=xx>

          Fn: Set the controller# of currently using.
          Ex: Set the controller 1 to use.
          Command: set curctrl=1 [Enter]
===========================================================

CLI>
```

To prepare a controller to receive a CLI command, you firstly need to select the controller. To select the controller and prepare it to receive CLI commands:

Syntax
set <curctrl=xx >

Parameters
<curctrl=xx>

Description:
To prepare a SAS host adapter to receive a CLI command, you firstly need to select the adapter. You can select one SAS host adapter at any time. To select host adapter and prepare it to receive more CLI Commands.

Example:
CLI >set curctrl=1 [Enter]
Select the controller 1 to receive the CLI command.

3.2.3 Sys Commands

This command provides an on-line table of contents, providing brief descriptions of the help sub-commands. You can use the <CMD> -h or –help to get detail information about the command.

The help command sys –h provides a table of contents, providing brief descriptions of the sub-commands. Typical output looks like:

```
CLI> sys

Sub-Command & Parameters Of [ sys ]
Sub-Command Description
=====================================================================
ncqmode     Parameter: <p=<0(disabled)!1(enabled)>>
            Fn: Set NCQ Mode.
            Ex: Set NCQ Mode To Enabled.
            Command: sys ncqmode p=1[Enter]
smartmode   Parameter: <p=<0(disabled)!1(enabled)>>
            Fn: Set S.M.A.R.T Status Polling Mode.
            Ex: Set S.M.A.R.T Status Polling Mode To Enabled.
            Command: sys smartmode p=1[Enter]
cachemode   Parameter: <p=<0(disabled)!1(enabled)>>
            Fn: Set Write Cache Mode.
            Ex: Set Write Cache Mode To Enabled.
            Command: sys cachemode p=1[Enter]
speedmode   Parameter: <p=<0(Auto)!1(1.5G)!2(3.0G)!3(6.0G)>>
            Fn: Set PHY Link Rate.
            Ex: Set PHY Link Rate To 3.0G.
            Command: sys speedmode p=2[Enter]
cmdxferlen  Parameter: <p=<0(1M)!1(4M)>>
            Fn: Set Max Command Transfer Length.
            Ex: Set Max Command Transfer Length To 4M.
            Command: sys cmdxferlen p=1[Enter]
rediscover  Parameter: None.
            Fn: Re-Discover Devices.
            Ex: Re-Discover Devices.
            Command: sys rediscover [Enter]
updatebios  Parameter: <path=<PATH_OF_BIOS_FILE>>
            Fn: BIOS Updating.
            Ex: Update BIOS And File Path Is In [C:\FW\I13_1300.BIN].
            Command: sys updatebios path=c:\fw\I13_1300.BIN [Enter]
info        Parameter: None.
            Fn: Display System Info.
            Command: sys info [Enter]
=====================================================================
```

3.2.3.1 Set NCQ Mode

The controller supports both SAS and SATA disk drives. The NCQ allows SATA multiple commands to be outstanding within a drive at the same time. Drives that support NCQ have an internal queue where outstanding commands can be dynami-cally rescheduled or re-ordered, along with the necessary tracking mechanisms for outstanding and completed portions of the workload.

Syntax
sys ncqmode <p=<0<disabled>:1<enabled>>>

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Parameters
<p=<0<disabled>:1<enabled>>>

Description:
The SAS host adapter allows the user to select the SATA NCQ support: "Enabled" or "Disabled".

Example:
CLI >sys ncqmode=1 [Enter]
Set all SATA HDDs connected on the SAS adapter NCQ enabled.

3.2.3.2 Set Smart Status Polling Mode

Use this command to change SAS host adapter SMART status polling mode, follow the procedure below:

Syntax
sys smartmode <p=<0<disabled>:1<enabled>>>

Parameter
<p=<0<disabled>:1<enabled>>>

Description:
A SATA HDD " SMART Status Polling" function was added to enable scanning of all SATA HDDs SMART information function on the device driver. It is necessary to enable "SMART Status Polling" function before the selected SATA drive SMART information is accessible. This function is used to control the ability of the device driver function. It is disabled by default.

Example:
CLI >sys smartmode p=0 [Enter]
Set the SATA HDD "SMART Status Polling" function on SAS host adapter at disabled mode.

3.3.3.3 Set Write Cache Mode

User can set the disk "Write Cache Mode" to Enabled, or Disabled. "Enabled" increases speed, "Disabled" increases reliability.

Syntax
sys cachemode <p=<0<disabled>:1<enabled>>>

Parameters
<p=<0<disabled>:1<enabled>>>

Description:
The SAS host adapter allows the user to change the HDD write cache support mode: "Enabled" or "Disabled".

Example:
CLI >sys cachemode=1 [Enter]
Set all HDDs connected on the SAS adapter write cache mode enabled.

3.3.3.4 Set PHY Link Rate

A SAS device is required to support all link rate between and including the specified Max. and Min. hardware link rate. The initiator determines the negotiated physical PHY link rate along all pathways by querring all of the relevant PHYs during discovery. If there is problem on the SAS speed negotiation sequence, you can use this function to adjust the PHY link rate.

Syntax
sys speedmode <p=<0<auto>:1<1.5G>:2<3.0G>:3<6.0G>>>

Parameter
<p=<0<auto>:<1<1.5G>:2<3.0G>:3<6.0G>>>

Description:
When you choose this option, the max PHY link rate on the same expander or a different expander within the topology will set this value.

Example:
CLI >sys speedmode p=2 [Enter]
Set the max PHY link rate is 3Gb/s as a default link rate for the SAS host adapter.

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3.3.3.5 Set Max Command Transfer Length

The largest amount of data that can be transferred by a single SAS command is often a concern. The SAS host adapter could have transfer size limits as could the transport and finally the SAS/SATA device itself.
Use this command to set a "best" IO size for the SAS host adapter.

Syntax
sys cmdxferlen <p=<0<1M>:1<4M>>>

Parameter
<p=<0<1M>:1<4M>>>

Description:
When you choose this option, the max setting in the device driver is the maximum number of IO size allowed in a single SAS command's scatter gather lists (for data transfers).

Example:
CLI >sys cmdxferlen p=1 [Enter]
Set the max command transfer length is 4MB as a "best" IO size for the SAS host adapter.

3.2.3.6 Rediscover Device

When you physically insert disk drives into the SAS host adapter while the system is running, you can use this option to reflect the change.
To update new add devices to the system, follow the procedure below:

Syntax
sys rediscover

Description:
It is used to rediscover devices and to dynamically update the device list.

Example:
CLI>sys rediscover [Enter]
Update the selected SAS host adapter device list on the system.

3.2.3.7 Update Adapter BIOS

To update SAS host adapter BIOS, follow the procedure below:

Syntax
sys updatebios <path=<PATH_OF_BIOS_FILE>>

Parameter
<path=<PATH_OF_BIOS_FILE>>

Description:
Since the SAS host adapter features flash BIOS, it is not necessary to change the hardware flash chip in order to upgrade the SAS host adapter BIOS. The user can simply re-program the old BIOS through this command. New releases of the BIOS are available in the form of a DOS file at shipping CD, website or FTP.

Example:
CLI >sys updatebios path=c:\fw\I13_1300.BIN [Enter]
Update BIOS and file path is [C:\fw\I13_1300.BIN] to the currently selected SAS host adapter.

3.2.3.8 View System Information

After installing all host adapters, use this command to display controller system properties about the selected SAS host adapter.
To view the system information, please follow the procedure below:

Syntax
sys info

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Description:
The selected SAS host adapter system properties will be shown as following.

Example:
CLI>sys info
Display the selected SAS host adapter system detail information.

```
CLI> sys info
The HBA Information
========================================
Vendor ID                    : 17d3
Device ID                    : 1300
Chip Revision                : 2
# Of Port                    : 4
PM(Port Multiplier)          : Supported
Expander                     : Supported
Maximum Supported PM         : 4
Maximum Supported Expander   : 8
Maximum Supported Device     : 135
NCQ(Native Command Queuing)  : Enabled
S.M.A.R.T Status Polling     : Disabled
Disk Write Cache             : Enabled
Max PHY Link Rate            : Auto
Max Transfer Length          : 1M
BIOS Flags                   : 0xA5
========================================
GuiErrMsg<0x00>: Success.

CLI>
```

3.2.4 Disk Commands

Use the disk commands to manage disks connected to the SAS host adapter. The CLI enables you to inquiry and modify the individual disk characteristics. The number of direct-connected disk drives is limited to the number of 8 phys supported by the SAS host adapter. Some backplanes support daisy-chain expansion to other backplanes. For example, you can daisy-chain up to eight enclosures with a maximum 128 SAS/SATA device to a single SAS host adapter in a host system.

SAS host adapters assign target IDs to enclosure SES and disks. When you are using enclosures, each disk has a "target ID." These are the IDs that are used by the SAS host bus adapters to identify the disks and that the adapter presents to the BIOS and OS.

The help command disk –h provides a table of contents, providing brief descriptions of the sub-commands. Typical output looks like:

```
Sub-Command & Parameters Of [ disk ]
Sub-Command Description
==============================================================================
ident       Parameter: <no=xx>.
            Fn: Identify Selected Drive.
            Ex: Identify Disk#5.
            Command: disk ident no=5 [Enter]
            Note: no=0 To End Identification.
refresh     Parameter: None.
            Fn: Refresh All Drives.
            Ex: Refresh All Drives.
            Command: disk refresh [Enter]
smartdata   Parameter: <no=xx>
            Fn: Display Disk S.M.A.R.T Data.
            Ex: Display Disk#1 S.M.A.R.T Data.
            Command: disk smartdata no=1 [Enter]
smartmode   Parameter: <no=xx> <p=<0(disabled)!1(enabled)>>
            Fn: Set Disk S.M.A.R.T Mode.
            Ex: Set Disk#1 S.M.A.R.T Mode To Enabled.
            Command: disk smartmode no=1 p=1[Enter]
cachemode   Parameter: <no=xx> <p=<0(disabled)!1(enabled)>>
            Fn: Set Disk Cache Mode.
            Ex: Set Disk#1 Cache Mode To Enabled.
            Command: disk cachemode no=1 p=1[Enter]
speedmode   Parameter: <no=xx> <p=<0(1.5G)!1(3.0G)!2(6.0G)>>
            Fn: Set Disk Speed.
            Ex: Set Disk#1 Speed To 3.0G.
            Command: disk speedmode no=1 p=1[Enter]
chid        Parameter: <no=xx> <p=<xx>>
            Fn: Set Disk SCSI ID.
            Ex: Set Disk#2's SCSI ID To 3.
            Command: disk chid no=2 p=3[Enter]
updatefw    Parameter: <no=xx> <path=<PATH_OF_FIRMWARE_FILE>>
            Fn: Disk Firmware Updating.
            Ex: Update Disk Firmware And File Path Is In
            [C:\fw\disk_firm.bin].
            Note: Disk Have To Support ATA-8 Specification
            Command: disk updatefw no=1 path=c:\fw\disk_firm.bin [Enter]
info        Parameter: [no=xx].
            Fn: Display Disks Info.
            Command: disk info [Enter]
            Ex: Display Disk#1 Info.
            Command: disk info no=1 [Enter]
==============================================================================
```

A SAS host adapter is responsable for traversing the device tree connected to it, assigning No. to each of the devices, and presenting the CLI with a list of devices it's attached to. When you have a SAS host bus adapter, the No. (number) is determined by the total "enclosure slot mapping". This occurs automatically and means that the location of a disk is determined by the disk bay it is in. The No. is indicated the total "enclosure slot mapping" in order number (from 1 to the end).

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3.2.4.1 Identify Selected Drive

You can use the "Identify Selected Drive" feature to prevent removing the wrong drive, the selected No. (number) drive fault LED will be blank.

Syntax
disk ident <no=xx>

Parameters :
<no=xx>

Description:
There is one LED per port. When lit, each LED indicates the corresponding drive has identified. Use this option to prevent removing the wrong No. drive.

3.2.4.2 Refresh All Drives

When a device is moved from one expander Phy to a different expander Phy (of the same expander or a different expander within the topology), the expander shall always assign it to orginally target ID. This command can use to reassign all disks target ID number based on the enclosure order. This can help user to keep the disk drive target ID in order number (from 0 to 127).

Syntax
disk refresh

Description:
Use this option to reassign the target ID number (from 0 to 127) based on the enclosure order.

3.2.4.3 Display Disk SMART Data

Use this command to show the No. SATA HDD SMART information.

Syntax
disk smartsata <no=xx>

Parameter
<no=xx>

Description:
When you choose this option, the specify physical disks connected to the SAS host adapter SMART informations are listed.

Example:
CLI >disk smartdata no=1 [Enter]
Display No.=1 disk drive SATA SMART information, which belong to the currently selected SAS host adapter.

3.2.4.4 Set Disk SMART Mode

Use this command to enable or disable the No. of SATA HDD SMART status mode, follow the procedure below:

Syntax
disk smartmode <no=xx><p=<0<disabled>:1<enabled>>>

Parameter
<no=xx>
<p=<0<disabled>:1<enabled>>>

Description:
A disk SMART mode is added to enable scanning of the specify SATA HDD SMART data function on the device driver. It is necessary to enable "Disk SMART Mode" function before the selected drive SMART data is accessible. This function is disabled by default.

Example:
CLI >disk smartmode no=1 p=0 [Enter]
Set the SAS host adapter No. =1 disk drive works at SMART disabled mode.

3.2.4.5 Set Disk Cache Mode

Use this command to program the No. disk drive write cache mode.

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Syntax
disk cachemode <no=xx> <p=<0<disabled>:1<enable>>>

Parameter
<no=xx>
<p=<p=<0<disabled>:1<enable>>>

Description:
User can set the "Disk Write Cache Mode" to Enabled, or Disabled. "Enabled" increases speed, "Disabled" increases reliability for the selected No. disk drive.

Example:
CLI >disk cachemode no=1 p=0 [Enter]
Set the No.=1 disk drive works at enable mode.

3.2.4.6 Set Disk Speed

To change the max speed of the specify SATA HDD on the selected SAS host adapter following the procedure below:

Syntax
disk speedmode <no=xx>
<p=<0<1.5G>:1<3.0G>:2<6.0G>>>

Parameter
<no=xx>
<p=<0<1.5G>:1<3.0G>:2<6.0G>>>

Description:
The "Speed Mode" function item is used to control the specify HDD speed. Select speedmode to change the speed mode temporarily. The default speed will still activate on the next event. The SAS host adapter allows the user to choose the speed Mode: 1.5Gb/s, 3.0Gb/s and 6Gb/s for the specify HDD.

Example:
CLI >disk speedmode no=1 p=2 [Enter]
To change the max speed of the No.=1 HDD on the selected SAS host adapter to run on 6Gb/s speed.

3.2.4.7 Set Disk Target ID

To change SAS host adapter device target ID, follow the procedure below:

Syntax
disk chid <no=xx> <p=xx>

Parameter
<no=xx> <p=xx>

Description:
User can assign the disk slot number to a fixed target ID number.

Example:
CLI >disk chid no=2 p=3 [Enter]
Set the No.=2 of disk slot drive target ID=3.

3.2.4.8 Disk Firmware Update

Areca has supported the ATA-8 spec for microcode download, allowing customer using the Areca's entire family PCI express-series of high performance SAS host adapters and need of a way to perform an system level update SATA HDD's firmware without having to remove each drive single and upgrade.
To update firmware following the procedure below:

Syntax
disk updatefw <no=xx> <path=<PATH_OF_FIRMWARE_FILE>>

Parameter
<no=xx>
<path=<PATH_OF_FIRMWARE_FILE>>

Description:
The currently way to upgrade the HDD microcode is pull out the drivers from the SAS host adapter and insert the drive into a PC with pure SATA port. Either running under windows 2003, or maybe booting up with a DOS bootable CD to upgrade all the drives one by one while drives are in the unit. It takes much

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time to update the all SAS host adapter drives firmware. Areca has supported the ATA-8 microcode download to perform as a system level update without having to remove each drive single and upgrade.

If the system has the same mode HDDs, it will update all same modes HDD Microcode one time. Areca has provided one utility for customer to make the SATA HDD firmware for readable by Areca firmware.

Example:
CLI >disk updatefw no=1 path=c:\fw\disk_firm.bin [Enter]
Update NO.=1 of disk drive firmware and file path is [C:\FW\disk_firm.bin] to the currently selected SAS host adapter.

3.2.4.9 Display Disks Information

A SAS host adapter is responsable for traversing the device tree connected to it, assigning target IDs to each of the disks, No. of sisk slots, and presenting the host with a list of devices it's attached to.
After connecting all disks, use this command to display drive information about the selected SAS host adapter. The disk information screen presents a view of the adapter's SAS hierarchy. To view all disks information, please follow the procedure below:

Syntax
disk info

Description:
When you choose this option, the physical disks connected to the SAS host adapters are listed.

Example:
CLI> disk info [Enter]
You can connect the SAS/SATA drives to the controller through direct cable and backplane solutions. In the direct connection, drives are directly connected to SAS host adapter PHY port.

```
CLI> disk info
The Disk Information
 No Id:Lun Location Model                    Serial        Rev    Capacity
===========================================================================
<< Enclosure#1 : ARC-8016-.B0.00.Areca    b000 >>
  1  0:0    SLOT 01   SEAGATE ST3500620SS    9QM328MW      0001    465.8GB
  2  1:0    SLOT 02   FUJITSU MAX3036RC      DQL0P7700L1J  0104     34.2GB
  3  2:0    SLOT 03   FUJITSU MAX3036RC      DQL0P7700L4A  0104     34.2GB
  4  3:0    SLOT 04   FUJITSU MAX3036RC      DQL0P7700L5R  0104     34.2GB
  5  4:0    SLOT 05   FUJITSU MAU3036RC      AQL0P54001T2  0104     34.2GB
  6  5:0    SLOT 06   FUJITSU MAX3036RC      DQL0P7500K04  0104     34.2GB
  7  6:0    SLOT 07   FUJITSU MAX3036RC      DQL0P7500JYB  0104     34.2GB
  8  7:0    SLOT 08   SEAGATE ST373455SS     3LQ0XTD6      S513     68.4GB
  9  8:0    SLOT 09   FUJITSU MAX3036RC      DQL0P7500JY0  0104     34.2GB
 10  9:0    SLOT 10   FUJITSU MAX3036RC      DQL0P7700L51  0104     34.2GB
 11 10:0    SLOT 11   FUJITSU MAX3036RC      DQL0P7500JYN  0104     34.2GB
 12 11:0    SLOT 12   HITACHI HUS151436VLS300 J3XA9P6J     A600     34.2GB
 13 12:0    SLOT 13   HITACHI HUS151436VLS300 JBVWK7TJ     A540     34.2GB
 14 13:0    SLOT 14   HITACHI HUS151436VLS300 JBVWJYTJ     A540     34.2GB
 15 14:0    SLOT 15   HITACHI HUS151436VLS300 J3X6V52J     A600     34.2GB
 16 15:0    SLOT 16   HITACHI HUS151436VLS300 JBV685KK     A420     34.2GB
<< Enclosure#9 : Virtual SES    Areca   0123 >>
 17          SLOT 01   N.A.                   N.A.          N.A.     0.0GB
 18          SLOT 02   N.A.                   N.A.          N.A.     0.0GB
 19          SLOT 03   N.A.                   N.A.          N.A.     0.0GB
 20          SLOT 04   N.A.                   N.A.          N.A.     0.0GB
 21          SLOT 05   N.A.                   N.A.          N.A.     0.0GB
 22          SLOT 06   N.A.                   N.A.          N.A.     0.0GB
 23          SLOT 07   N.A.                   N.A.          N.A.     0.0GB
 24          SLOT 08   N.A.                   N.A.          N.A.     0.0GB
===========================================================================
GuiErrMsg<0x00>: Success.
```

Enclosure #9 is the virtual No. for the SAS controller ports. The virtual No. emulate a host adapter SAS controller, which can support up to eight devices if there is no any expander existed.

Syntax
disk info <no=xx>

Parameter
<no=xx>

Description:
The selected disk information will be shown as following.

Example:
CLI>disk info no=1 [Enter]
Display the No.=1 of disk drive detail information.

```
CLI> disk info no=1
The Disk Information
========================================================
Target ID<ID:LUN>              : 0:0
Model Name                     : WDC WD1500HLFS-01G6U0
Serial Number                  : WD-WXJ608AT1538
Firmware Rev.                  : 04.04V01
Parent                         : Port Multiplier 11AB:4140
Location                       : SLOT 00
SAS Address                    : 50-01-B4-D8-00-00-00-40
Type                           : SATA H.D.D
Capacity                       : 139.7GB(146523384K)
Write Cache Capability         : Supported
S.M.A.R.T Capability           : Supported
NCQ Capability                 : Supported
48 Bits LBA Capability         : Supported
Supported Speed                : 1.5Gb/s 3.0Gb/s
Write Cache                    : Enabled
S.M.A.R.T                      : Disabled
Current Speed                  : 3.0Gb/s
Rotation Rate                  : 10000
========================================================
GuiErrMsg<0x00>: Success.
```

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3.2.5 Pm Commands

Port multipliers are devices that allow a single Serial ATA port to communicate with multiple drives. The port multiplier is transparent to the drives, but the host is aware that it is communicating with multiple drives. Port multipliers typically reside on an enclosure's backplane and support all standard SATA drives.
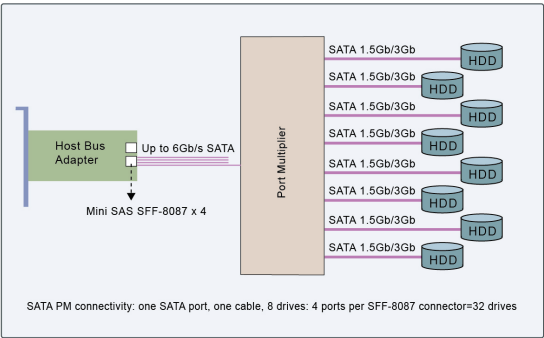
Typically, Serial ATA (SATA) connectivity consists of a single drive connected to a single controller port via a single cable. The maximum number of drives in an array is predicated on the controller's port count. The SATA Port Multiplier (SATA PM) permits a change to that point-to-point relationship via port multiplication technology. Port multipliers allow easy, cost-effective storage expansion and enable the aggregation of the performance of multiple drives as well.

The following disk information is shown on one port multiplier which connects on one of the SAS host port.

```
CLI> disk info
The Disk Information
No Id:Lun Location Model                     Serial          Rev      Capacity
===============================================================================
<< Port Multiplier#1 : 0x11AB:0x4140 >>
  1  0:0   SLOT 00  WDC WD1500HLFS-01G6U0    WD-WXJ608AT1538 04.04V01  139.7GB
  2  1:0   SLOT 01  ST3750640NS              5QD1RRJ8        3.AEG     698.6GB
  3  2:0   SLOT 02  WDC WD2002FYPS-01U1B0    WD-WCAVY0398323 04.05G04 1863.0GB
  4  3:0   SLOT 03  WDC WD1001FALS-00J7B0    WD-WMATV0169046 05.00K05  931.5GB
<< Enclosure#9 : Virtual SES    Areca   0123 >>
  5        SLOT 01  N.A.                     N.A.            N.A.        0.0GB
  6        SLOT 02  N.A.                     N.A.            N.A.        0.0GB
  7        SLOT 03  N.A.                     N.A.            N.A.        0.0GB
  8        SLOT 04  N.A.                     N.A.            N.A.        0.0GB
  9        SLOT 05  N.A.                     N.A.            N.A.        0.0GB
 10        SLOT 06  N.A.                     N.A.            N.A.        0.0GB
 11        SLOT 07  N.A.                     N.A.            N.A.        0.0GB
 12        SLOT 08  N.A.                     N.A.            N.A.        0.0GB
===============================================================================
GuiErrMsg<0x00>: Success.
```

The pm -h command can view the sub-command and parameters of the pm function.

```
CLI> pm

Sub-Command & Parameters Of [ pm ]
Sub-Command Description
===========================================================
info        None.
            Fn: Display Port Multiplier Info.
            Command: pm info [Enter]
===========================================================

CLI>
```

3.2.5.1 Display Port Multiplier Information

After connecting all port multiplier enclosure, use this command to display port multiplier information.

To view all port multiplier enclosure information, please follow the procedure below:

Syntax
pm info

Description:
When you choose this option, the physical port multiplier enclosure connected to the SAS host adapters are listed.

```
CLI> pm info
The PortMultiplier Information
No  VendorID    DeviceID    Product-Rev  PM-Rev    PortNumber
===========================================================
 1  11AB        4140        C1           C         5
 2  N.A.        N.A.        N.A.         N.A.      N.A.
 3  N.A.        N.A.        N.A.         N.A.      N.A.
 4  N.A.        N.A.        N.A.         N.A.      N.A.
===========================================================
GuiErrMsg<0x00>: Success.
```

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3.2.6 Enc Commands

Use the enc commands to manage enclosure connected to the SAS host adapter. The SAS host adapter can support a up to 8 (no=1~8) enclosure with maximum 128 SAS/SATA devices. The following example figure shows how to connect the external Mini SAS cable from the SAS host adapter controller that has external connectors to the external drive enclosures.
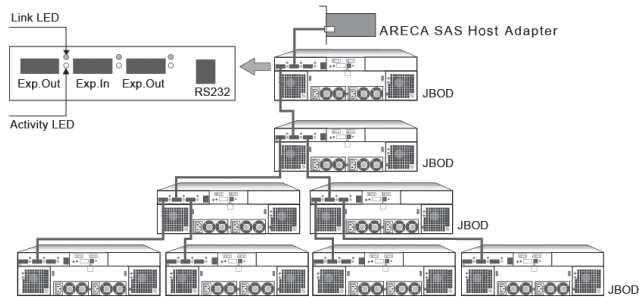
The help command enc –h provides a table of contents, providing brief descriptions of the sub-commands. Typical output looks like:

3.2.6.1 Identify Selected Enclosure

After connecting all enclosures, use this command to physically identify a enclosure expander on the selected SAS host adapter.

To identify enclosure physical position, please follow the procedure below:

Syntax
exp ident <no=xx> <p=<0<indicator off>:1<indicator on>>>

Parameters :
<no=xx> xx=1~8
<p=<0<indicator off>:1<indicator on>>>

Description:
To prevent removing the wrong enclosure, the selected Areca expander enclosure all disks fault LED indicator will light for physically locating the selected enclosure when the "Identify Enclosure" is selected. This function will also light the enclosure LED indicator, if it is existed.

Example:
CLI>enc ident no=1 p=1 [Enter]
Display the enclosure number=1 physical position indicator on.

3.2.6.2 Display Enclosure Information

After connecting all enclosures, use this command to display all enclosure information on the selected SAS host adapter.
To view all enclosures information, please follow the procedure below:

Syntax
enc info

Description:
When you choose this option, the physical enclosures connected to the SAS host adapters are listed.

Example:
CLI>enc info [Enter]

Display all enclosure brief information.

```
CLI> enc info
The Enclosure Information
No Vendor Name    Product Name      Product Rev
=====================================================================
 1 Areca          ARC-8016-.B0.00.  b000
 2 N.A.           N.A.              N.A.
 3 N.A.           N.A.              N.A.
 4 N.A.           N.A.              N.A.
 5 N.A.           N.A.              N.A.
 6 N.A.           N.A.              N.A.
 7 N.A.           N.A.              N.A.
 8 N.A.           N.A.              N.A.
 9 Areca          Virtual SES       0123
=====================================================================
```

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3.2.7. Exp Commands

Use the exp commands to manage expanders inside the enclosure connected to the SAS host adapter. Expanders are also considered "targets" and have a target ID. Each SAS enclosure has one expander. The CLI enables you to support in-band SES expander firmware update and expander identify function.

The help command exp –h provides a table of contents, providing brief descriptions of the sub-commands. Typical output looks like:

```
Sub-Command & Parameters Of [ exp ]
Sub-Command Description
===========================================================================
updatefw    Parameter: <no=xx> <path=<PATH_OF_FIRMWARE_FILE>> <type=<1~8>>
            Fn: Expander Firmware Updating.
            Note: For 3G Expanders:
                    1: CODE - Firmware (.bin)
                    2: DATA region - Data file (mfgdataXXXXXX.rom)
                    3: DAT1 region - Data file (mfgdata1XXXXXX.rom)
                    4: DAT2 region - Data file (mfg-hbaXXXXXX.rom)
                  For 6G Expanders:
                    5: BOOT code region (sas2xfwXXXX.bin)
                    6: FW code region (sas2xfwXXXX.bin)
                    7: Candidate DATA region - Data file (6gXXX-XX.bin)
                    8: DATA region ( mfgdat6gXXXXXX.rom)
            Ex: Update 6G Expander FW code region And File Path Is In
            [C:\fw\sas2xfwXXXX.bin].
            Command: exp updatefw no=1 path=c:\fw\sas2xfwXXXX.bin
                     type=6 [Enter]
info        Parameter: [no=xx].
            Fn: Display Expander Info.
            Command: exp info [Enter]
            Ex: Display Expander#1 Info.
            Command: exp info no=1 [Enter]
===========================================================================
```

3.2.7.1 Expander Firmware Update

To update Areca expander firmware following the procedure below:

Syntax
exp <no=xx> updatefw <path=<PATH_OF_FIRMWARE_FILE>
<type=1~8>

Parameter
<no=xx> xx=1~8
Note: id number 1 is for expander 1 which is on enclosure 1.
<path=<PATH_OF_FIRMWARE_FILE>>
NOTE: For 3Gb/s expander
        1: CODE - Firmwrae <romXXXXXX.bin>
        2: DATA region - Data file <mfgdataXXXXXX.rom>
        3: DATA1 region - Data file <mfgdata1XXXXXX.rom>

4:.DATA2 region - Data file <mfg-hbaXXXXXX.rom>
For 6Gb/s expander
5: BOOT code region <sas2xfwXXXX.bin>
6: FW Code region <sas2xfwXXXX.bin>
7: Candidate DATA region - Data file <6gXXX-XX.bin>
8: DATA region <mfgdat6gXXXXXX.rom

Description:
Since the expander controller features flash firmware, it is necessary to use the serial or Lan port in order to upgrade the expander controller firmware. The user can simply re-program the old expander firmware through this command. New releases of the expander firmware are available in the form of a DOS file at shipping CD, website or FTP.

Example:
CLI >exp updatefw no=1 path=c:\fw\sas2xfwXXXX.bin type=6 [Enter]
Update 6Gb/s expander FW code region and file path ib in [c:\fw\sas2xfwXXXX.bin] to the selected expander (number 1) controller.

3.2.7.2 Display Expander Information

After connecting all enclosure expanders, use this command to display enclosure expander information about the selected SAS host adapter. To view all enclosure expanders information, please follow the procedure below:

Syntax
exp info

Description:
When you choose this option, the physical enclosure expanders connected to the SAS host adapters are listed.

Example:
CLI>exp info [Enter]
Display all expanders detail information.

```
CLI> exp info
The Expander Information
 No Vendor Name      Product Name        Product Rev  SAS Address
==========================================================================
  1 Areca            ARC-8016-.B0.00.    b000         50-01-B4-69-00-00-00-3F
  2 N.A.             N.A.                N.A.         N.A.
  3 N.A.             N.A.                N.A.         N.A.
  4 N.A.             N.A.                N.A.         N.A.
  5 N.A.             N.A.                N.A.         N.A.
  6 N.A.             N.A.                N.A.         N.A.
  7 N.A.             N.A.                N.A.         N.A.
  8 N.A.             N.A.                N.A.         N.A.
==========================================================================
GuiErrMsg<0x00>: Success.
```

Syntax
exp info <no=xx>

Parameter
<no=xx>
Description:
The selected enclosure expander information will be shown as following.

Example:
CLI>exp info no=1 [Enter]
Display the expander number=1 detail information.

3.2.8 View System Events

The event command provides a log of events that have occurred on the SAS host adapter. An event occurs when the SAS host adapter requires attention, such as when a disk is inserted or removed.
The event -h command can view the sub-command and parameters of the event function.

```
CLI> event

Sub-Command & Parameters Of [ event ]
Sub-Command Description
==========================================================
info        Parameter: None.
            Fn: Display System Events.
            Command: event info [Enter]

clear       Parameter: None.
            Fn: Clear System Events.
            Command: event clear [Enter]
==========================================================

CLI> _
```

Syntax
event info

Description:
Choose this option to view the system events information.

Example:
CLI >event info [Enter]
All the event of the currently selected controller information will be displayed.

```
CLI> event info
Date-Time           Device          Event Type
===============================================================================
2011-11-18 11:05:30  Exp#0 Slot#12   Device Removed
2011-11-18 11:05:30  Exp#0 Slot#8    Device Removed
2011-11-18 11:05:31  Exp#0 Slot#7    Device Removed
2011-11-18 11:05:31  Exp#0 Slot#11   Device Removed
2011-11-18 11:05:32  Exp#0 Slot#3    Device Removed
2011-11-18 11:05:32  Exp#0 Slot#5    Device Removed
2011-11-18 11:05:33  Exp#0 Slot#9    Device Removed
2011-11-18 11:05:33  Exp#0 Slot#2    Device Removed
2011-11-18 11:05:34  Exp#0 Slot#10   Device Removed
2011-11-18 11:05:34  Exp#0 Slot#6    Device Removed
2011-11-18 11:05:35  Exp#0 Enc#128   Device Removed
2011-11-18 11:05:40  Exp#0 Slot#9    H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#11   H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#12   H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#10   H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#2    H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#7    H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#3    H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#6    H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#5    H.D.D write cache mode enabled
2011-11-18 11:05:40  Exp#0 Slot#8    H.D.D write cache mode enabled
2011-11-18 11:05:41  Exp#0 Slot#7    Device Added
2011-11-18 11:05:41  Exp#0 Slot#11   Device Added
2011-11-18 11:05:42  Exp#0 Slot#3    Device Added
2011-11-18 11:05:42  Exp#0 Slot#5    Device Added
2011-11-18 11:05:43  Exp#0 Slot#9    Device Added
2011-11-18 11:05:43  Exp#0 Slot#2    Device Added
2011-11-18 11:05:44  Exp#0 Slot#10   Device Added
2011-11-18 11:05:44  Exp#0 Slot#6    Device Added
2011-11-18 11:05:45  Exp#0 Enc#128   Device Added
2011-11-18 11:05:45  Exp#0 Slot#12   Device Added
2011-11-18 11:05:46  Exp#0 Slot#8    Device Added
===============================================================================
GuiErrMsg<0x00>: Success.
```

Syntax
event clear

Description:
This command clears the entire events buffer information.
Example
CLI >event clear [Enter]
All the event of the currently selected controller information will be cleared.

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3.2.9 Display Hardware Monitor Information

To display the cooler fan, voltage, controller voltage and the associated disk temperature status on the enclosure, use the hardware monitor command.
The hw -h command can view the sub-command and parameters of the [hw] function.
To view the hardware monitor information, follow the procedure below:

Syntax
hw info

Description:
Choose this option to view the hardware monitor information.

```
CLI> hw

Sub-Command & Parameters Of [ hw ]
Sub-Command Description
========================================================
info        Parameter: None.
            Fn: Display Hardware Monitor Info.
            Command: hw info [Enter]
========================================================

CLI> _
```

Example
CLI >hw info [Enter]

All the hardware monitor information of the currently selected controller will be displayed.

```
CLI> hw info
The Hardware Monitor Information
==================================================
[Enclosure#1 : Areca   ARC-8016-.B0.00.b000]
   1V                : 1.040 V
   5V                : 5.080 V
   3.3V              : 3.340 V
   12V               : 11.870 V
   Fan 01            : 2350 RPM
   Fan 02            : 310 RPM
   Fan 03            : 240 RPM
   Fan 04            : 2510 RPM
   PowerSupply01     : OK
   PowerSupply02     : OK
   ENC. Temp         : 28 C
   Chip Temp         : 38 C
   Slot01 Temp       : 30 C
   Slot02 Temp       : 31 C
   Slot03 Temp       : 31 C
   Slot04 Temp       : 30 C
   Slot05 Temp       : 31 C
   Slot06 Temp       : 31 C
   Slot07 Temp       : 31 C
   Slot08 Temp       : 32 C
   Slot09 Temp       : 31 C
   Slot10 Temp       : 31 C
   Slot11 Temp       : 30 C
   Slot12 Temp       : 32 C
   Slot13 Temp       : 29 C
   Slot14 Temp       : 28 C
   Slot15 Temp       : 28 C
   Slot16 Temp       : 29 C
[Enclosure#9 : Areca   Virtual SES     0123]
==================================================
GuiErrMsg<0x00>: Success.
```