

SAS Host Adapters

ARC-1320 Series

(PCIe 2.0 x8 Lanes 6Gb/s SAS Host Adapters)

USER'S Manual

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FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

Manufacturer's Declaration for CE Certification

We confirm ARC-1320 series SAS host adapters have been tested and found compliant with the requirements in the council directive relating to the EMC Directive 2004/108/EC. Regarding to the electromagnetic compatibility, the following standards were applied:

EN 55022: 2006, Class B
EN 61000-3-2: 2006
EN 61000-3-3: 1995+A1: 2001+A2: 2005

EN 55024:1998+A1:2001=A2:2003
IEC61000-4-2: 2001
IEC61000-4-3: 2006
IEC61000-4-4: 2004
IEC61000-4-5: 2005
IEC61000-4-6: 2006
IEC61000-4-8: 2001
IEC61000-4-11: 2004

Contents

1. Introduction	6
1.1 Overview	6
1.2 Features	7
2. Hardware Installation	9
2.1 Before Your Begin Installation	9
2.2 Board Layout.....	9
2.3 Installation.....	14
1: Internal Mini SAS 4i to SATA Cable	16
2: Internal Mini SAS 4i to 4xSFF-8482 Cable	17
3: Internal Mini SAS 4i to Internal Mini SAS 4i Cable	18
4: External Mini SAS 4x Drive Boxes and Drive Expander	18
3. Host_BIOS Setup Manager	24
3.1 Starting the Host_BIOS Setup Manager.....	24
3.2 Main Menu	26
3.2.1 Physical Devices.....	28
3.2.1.1 Display Device Information	29
3.2.1.2 Low Level Format Disk	30
3.2.1.3 Verify Disk.....	32
3.2.1.4 Identify Disk	34
3.2.2 Miscellaneous Settings	35
3.2.2.1 SATA NCQ Support.....	35
3.2.2.2 SMART Status Polling	36
3.2.2.3 Disk Write Cache	36
3.2.2.4 Max. Phy Link Rate	37
3.2.2.5 Max. Command Xfer Length	37
3.2.2.6 INT 13 Service	38
3.2.2.7 Clear Persistent Mapping	38
3.2.2.8 Staggered Spin-up Config	40
3.2.2.9 Reset BIOS Parameters	42
3.2.3 System Information.....	43
3.2.4 Channel Write Protect	44
4. Driver Installation	47
4.1 Creating the Driver Diskettes.....	47
4.2 Driver Installation for Windows	49
4.2.1 Installing Windows on a SAS Host Adapter Volume.....	49
4.2.2 Installing Controller on an Existing Windows	50
4.2.3 Uninstall controller from Windows	52

4.3 Driver Installation for Linux	52
4.4 Driver Installation for FreeBSD.....	53
4.5 Driver Installation for Solaris	53
4.6 Driver Installation for Mac OS X	54
4.6.1 Installation Procedures.....	54
4.6.2 Making Volume Sets Available to Mac OS X	55
5. CLI Introduction.....	58
5.1 Supported Operating Systems.....	58
5.2. CLI Installation	58
5.2.1. For Windows.....	58
5.2.2 For Linux, FreeBSD and Solaris	60
5.3 Accessing CLI	60
5.3.1 For Windows.....	60
5.3.2 For Linux, FreeBSD and Solaris	60
5.4. CLI Command Line Configuration	61
5.4.1 Conventions	61
5.4.2 Working Mode.....	61
5.4.2.1 Interactive Mode	61
5.4.2.2 Non-interactive Mode	62
5.4.3 Command Categories.....	63
5.4.3.1 Help Command	65
5.4.3.2 Main Command	66
5.4.3.3 Set Commands.....	66
5.4.3.4 Sys Commands	67
5.4.3.5 Disk Commands	73
5.4.3.6 Pm Commands.....	80
5.4.3.7 Enc Commands	82
5.4.3.8 Exp Commands	84
5.4.3.9 Event Commands	87
5.4.3.10 Hw Commands	88
5.4.3.11 Exit Command.....	90
Appendix A.....	91
Expander CLI Function	91
Appendix B.....	92
Upgrading Adapter Flash ROM Process.....	92
Upgrading BIOS Through Oflash.exe Flash DOS Utility	92

INTRODUCTION

1. Introduction

This section presents brief overview of the SAS 6Gb/s host adapters: ARC-1320-8i, ARC-1320-4i4x, ARC-1320-8x and ARC-1320ix-16.

1.1 Overview

The ARC-1320 SAS host adapters are a line of PCIe 2.0 x8 lanes 6Gb/s SAS bus low profile host adapters. The adapters bring the fastest available connections to SAS/SATA storage on any computer, workstation and server with PCI Express interface. ARC-1320 host adapters provide a blazing-fast storage connectivity solution with enhanced reliability and performance and a wide variety of internal and external connector configurations to support any application and tiered storage solution. With connectivity options including 8-internal ports, 4-internal/4-external ports, 8-external ports, and 16-internal/8-external ports, ARC-1320 6Gb/s host adapters are ideal for large capacity external server storage RAID and no-RAID enclosure.

ARC-1320 6Gb/s SAS host adapters are able to connect to SATA and SAS hard disk drives, allowing for tiered storage that optimizes costs and performance. SAS drives are optimal when speed and reliability are of the utmost concern while SATA drives are appropriate when capacity and cost are more important. System integrators can use the ARC-1320 series to meet different storage infrastructure applications that support both SAS and SATA devices. API library for customer combines the ARC-1320 series function code to its monitor utility.

Device drivers are also supported for the major operating systems for compatibility with a full range of SAS peripherals including hard disk drives (HDDs), tape drives, tape autoloaders, solid state drives (SSDs) and removable media (DAS/JBOD).

1.2 Features

Hardware Specification

- PCIe 2.0 x8 lanes (x8, x4, and x1 lane widths)
- Up to 6Gb/s transfer rates per SAS port
- Support 1.5, 3.0 and 6 Gb/s SAS and SATA link rates
- Support a maximum 128 SAS/SATA devices using SAS expander
- Low-profile form factor
- RoHS compliant

Serial Attached SCSI (SAS) 6Gb/s

- Serial Attached SCSI (SAS-2.0) compliant
- Supports Wide port (Any combination of x1, x2, and 4x)
- Supports Serial SCSI Protocol (SSP)
- Supports SAS Management Protocol (SMP)
- Supports Serial ATA Tunneling Protocol (STP)
- Hot-plug capability
- Staggered spin-up control

Easy Management

- Legacy BIOS setup utility
- Supports Command Line Interface (CLI)
- API library for customer to write monitor utility
- Enclosure management for internal port via LED header and SES2/SGPIO
- Enclosure management for external port via SAS expander

Operating System

- Windows 10, 8, server 2012, 7, 2008, Vista, 2003 and XP
- Linux (Red Hat and SuSE, ...)
- XenServer
- illumos
- unRAID
- FreeBSD
- FreeNAS
- NAS4Free
- Solaris 10/11
- Mac OS X 10.5.x or higher (EFI BIOS for bootable)

INTRODUCTION

6Gb/s SAS Host Adapter				
Model Name	ARC-1320-8i	ARC-1320-4i4x	ARC-1320-8x	ARC-1320ix-16
Host Bus Type	PCIe 2.0 x8 Lanes			
RAID Level	Non-RAID			
Form Factor	MD2 Low Profile			Low Profile
Drives Support	128 X 3Gb/s and 6Gb/s SAS/SATA			
Connector	2 x SFF-8087	1 x SFF-8087 1 x SFF-8088	2 x SFF-8088	4 x SFF-8087 2 x SFF-8088
Dimension(LxH)	167 X 64 mm			214 X 64 mm

2. Hardware Installation

This section describes the procedures for installing the ARC-1320 series SAS host adapters.

2.1 Before Your Begin Installation

Thanks for purchasing the ARC-1320 series host adapters as your data storage subsystem. This user manual gives simple step-by-step instructions for installing and configuring the host adapters. To ensure personal safety and to protect your equipment and data, reading the following information package list carefully before you begin installing.

Package Contents

If your package is missing any of the items listed below, contact your local dealers before you install.

- 1 x PCIe 2.0 x 8 lanes host adapter in an ESD-protective bag
- 1 x Installation CD – containing driver, relative software, an electronic version of this manual and other related manual
- 1 x User manual
- 1 x Low-profile bracket

2.2 Board Layout

This section provides the board layout and connector/jumper for the SAS host adapters.

HARDWARE INSTALLATION

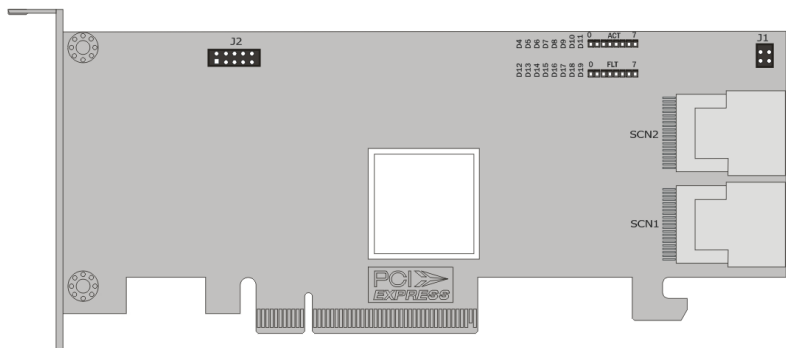


Figure 2-1, ARC-1320-8i Host Adapter

Connector	Type	Description
1. (J2)	Manufacture Purpose Port	10-pin header
2. (J1)	Global Fault/Activity LED	4-pin header
3. (D4-D11)	Activity LED for SAS Port 0-7	SMT LED
4. (D12-D19)	Fault LED for SAS Port 0-7	SMT LED
5. (SCN2)	SAS 1-4 Ports (Internal)	SFF-8087
6. (SCN1)	SAS 5-8 Ports (Internal)	SFF-8087

Table 2-1, ARC-1320-8i Connectors

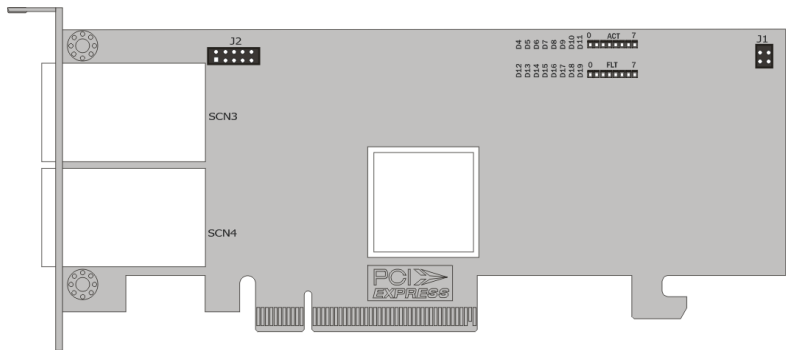


Figure 2-2, ARC-1320-8x Host Adapter

HARDWARE INSTALLATION

Connector	Type	Description
1. (J2)	Manufacture Purpose Port	10-pin header
2. (J1)	Global Fault/Activity LED	4-pin header
3. (D4-D11)	Activity LED for SAS Port 0-7	SMT LED
4. (D12-D19)	Fault LED for SAS Port 0-7	SMT LED
5. (SCN3)	SAS 1-4 Ports (External)	SFF-8088
6. (SCN4)	SAS 5-8 Ports (External)	SFF-8088

Table 2-2, ARC-1320-8x Connectors

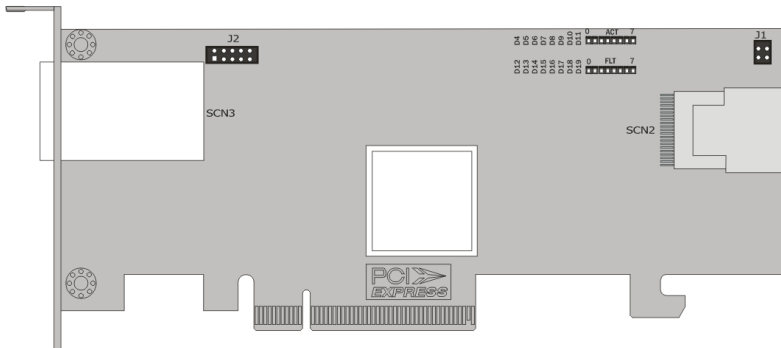


Figure 2-3, ARC-1320-4i4x SAS Host Adapter

Connector	Type	Description
1. (J2)	Manufacture Purpose Port	10-pin header
2. (J1)	Global Fault/Activity LED	4-pin header
3. (D4-D11)	Activity LED for SAS Port 0-7	SMT LED
4. (D12-D19)	Fault LED for SAS Port 0-7	SMT LED
5. (SCN2)	SAS 1-4 Ports (Internal)	SFF-8087
6. (SCN3)	SAS 5-8 Ports (External)	SFF-8088

Table 2-3, ARC-1320-4i4x Connectors

HARDWARE INSTALLATION

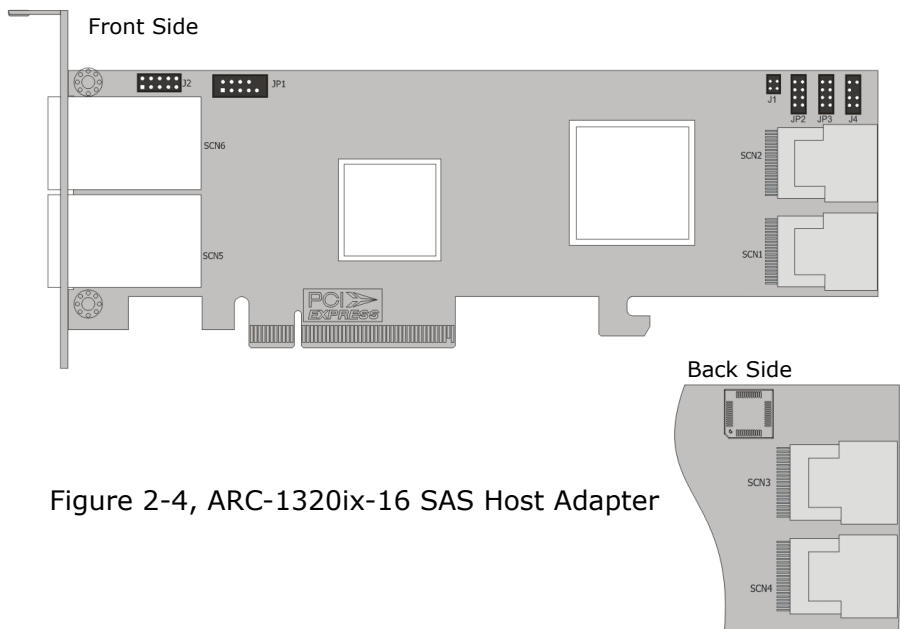


Figure 2-4, ARC-1320ix-16 SAS Host Adapter

Connector	Type	Description
Front Side		
1. (J2)	Manufacture Purpose Port	10-pin header
2. (JP1)	RS232 for Expander Configuration	10-pin box header
3. (J1)	Global Activity/Fault Header	4-pin header
5. (JP2)	Individual Fault LED Header for SAS 1-8 Ports	8-pin header
6. (JP3)	Individual Fault LED Header for SAS 9-16 Ports	8-pin header
7. (J4)	I2C/LCD Connector	8-pin header
8. (SCN2)	SAS 5-8 Ports (Internal)	SFF-8087
9. (SCN1)	SAS 1-4 Ports (Internal)	SFF-8087
10. (SCN6)	SAS 5-8 Ports (External)	SFF-8088
11. (SCN5)	SAS 1-4 Ports (External)	SFF-8088
Back Side		
12. (SCN4)	SAS 13-16 Ports (Internal)	SFF-8087
13. (SCN3)	SAS 9-12 Ports (Internal)	SFF-8087

Table 2-4, ARC-1320ix-16 Connectors

HARDWARE INSTALLATION

Tools Required

An ESD grounding strap or mat is required. Also required are standard hand tools to open your system's case.

System Requirement

The ARC-1320 series host adapters can be installed in a universal PCIe slot and requires a motherboard that:

- Comply with the PCIe x 2.0 x8 lanes
It can work on the PCIe 1.0/2.0 expansion slot x1, x4, x8, and x16 signals with x8 or x16 slot M/B.

Installation Tools

The following items may be needed to assist with installing the ARC-1320 series host adapters into an available PCIe expansion slot.

- Small screwdriver
- Host system hardware manuals and manuals for the disk or enclosure being installed.

Personal Safety Instructions

Use the following safety instructions to help you protect your computer system from potential damage and to ensure your own personal safety.

- Always wear a grounding strap or work on an ESD-protective mat.
- Before opening the system cover, turn off power switches and unplug the power cords. Do not reconnect the power cords until you have replaced the covers.

Warning:

High voltages may be found inside computer equipment. Before installing any of the hardware in this package or removing the protective covers of any computer equipment, turn off power switches and disconnect power cords. Do not reconnect the power cords until you have replaced the covers.

HARDWARE INSTALLATION

Electrostatic Discharge

Static electricity can cause serious damage to the electronic components on this SAS host adapter. To avoid damage caused by electrostatic discharge, observe the following precautions:

- Do not remove the host adapters from its anti-static packaging until you are ready to install it into a computer case.
- Handle the host adapters by its edges or by the metal mounting brackets at its each end.
- Before you handle the host adapters in any way, touch a grounded, anti-static surface, such as an unpainted portion of the system chassis, for a few seconds to discharge any built-up static electricity.

2.3 Installation

Use the following instructions below to install a PCIe host adapter.

Step 1. Unpack the Host Adapters

Unpack and remove the PCIe host adapters from the package. Inspect it carefully, if anything is missing or damaged, contact your local dealer.

Step 2. Power PC/Server Off

Turn off computer and remove the AC power cord. Remove the system's cover. For the instructions, please see the computer system documentation.

Step 3. Install the PCIe SAS Host Adapters

To install the PCIe host adapters, remove the mounting screw and existing bracket from the rear panel behind the selected PCIe slot. Align the gold-fingered edge on the card with the selected PCIe slot. Press down gently but firmly to ensure that the card is properly seated in the slot, as shown in Figure 2-5. Then, screw the bracket into the computer chassis. ARC-1320 series host adapters require a PCIe x8 or x16 slot.

HARDWARE INSTALLATION

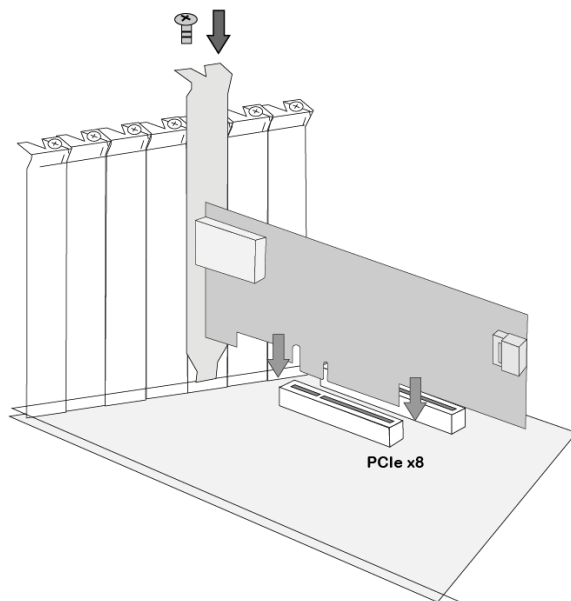


Figure 2-5, Insert ARC-1320 series host adapters into a PCIe x8 slot

Note:

Some PCIe slots on desktop board support only graphics boards, these PCIe slots may be not able to support other add-on cards such as storage adapters.

Step 4. Install Cable

You can connect the end devices to each other through direct cables or through the SAS expander/backplane connections. The SAS host adapters support daisy-chain expansion up to 128 end point devices through SAS expander enclosures. The following is an example of some internal SAS/SATA cables and an external SAS cable.

You can connect the SAS/SATA drives to the host adapters through direct cable and backplane solutions. In the direct connection, SAS/SATA drives are directly connected to ARC-1320-4i4x or ARC-1320-8i internal ports with SAS/SATA cables.

HARDWARE INSTALLATION

The following pictures are the cables that can use on ARC-1320 series SAS host adapters with your application.

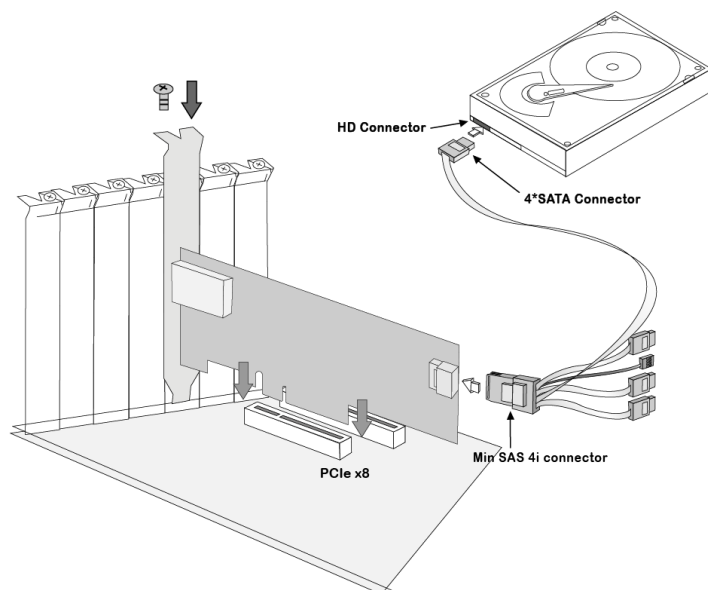


Figure 2-6, SAS cable connect to HD

1: Internal Mini SAS 4i to SATA Cable

The Mini SAS 4i to SATA cables are used for connection between the ARC-1320ix-16 internal connectors and connectors on the SAS/SATA disk drives or SATA connector backplane.

The SFF-8448 sideband signals cable is reserved for the backplane with header on it. Please refer to page 19 for definitions of sideband header signals.

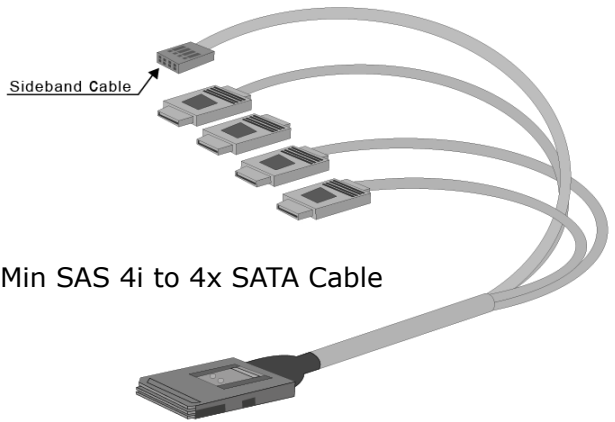


Figure 2-7, Internal Mini SAS 4i to 4x SATA Cable

2: Internal Mini SAS 4i to 4xSFF-8482 Cable

These host adapters can be installed in a server enclosure without a backplane. The kind of cable will attach directly to the SAS disk drives. The following diagram shows the picture of Mini SAS 4i to 4xSFF-8482 cables.

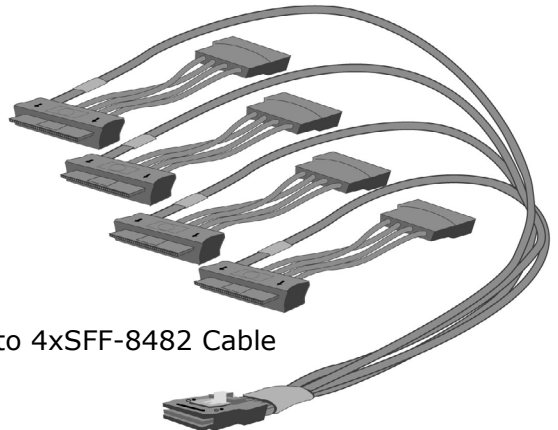


Figure 2-8, Mini SAS 4i to 4xSFF-8482 Cable

HARDWARE INSTALLATION

3: Internal Mini SAS 4i to Internal Mini SAS 4i Cable

The ARC-1320-4i4x, ARC-1320-8i or ARC-1320ix-16 host adapters have Mini SAS 4i internal connectors, each of them can support up to four SAS/SATA signals. These adapters can be installed in a server RAID enclosure with Mini SAS 4i internal connectors backplane. This Mini SAS 4i cable has eight signal pins to support four SAS/SATA drives and six pins for the SGPIO (Serial General Purpose Input/Output) side-band signals. The SGPIO bus is used for efficient LED management and for sensing drive locate status.

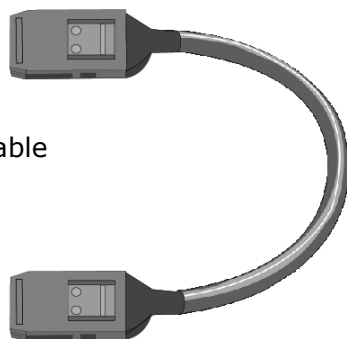


Figure 2-9, Mini SAS 4i to Min SAS 4i Cable

4: External Mini SAS 4x Drive Boxes and Drive Expander

The Mini SAS 4x external cables are used for connection between the SAS host adapters external connectors and connectors on the external drive boxes or drive expanders (JBOD). The SAS host adapters have Mini SAS 4x (SFF-8088) external connector, each of them can support up to four SAS/SATA signals.

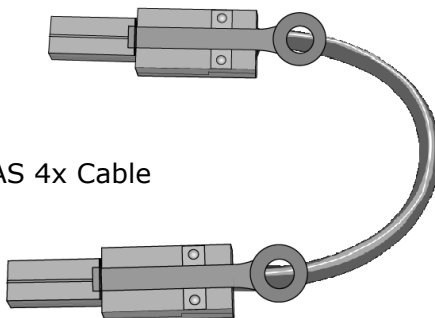
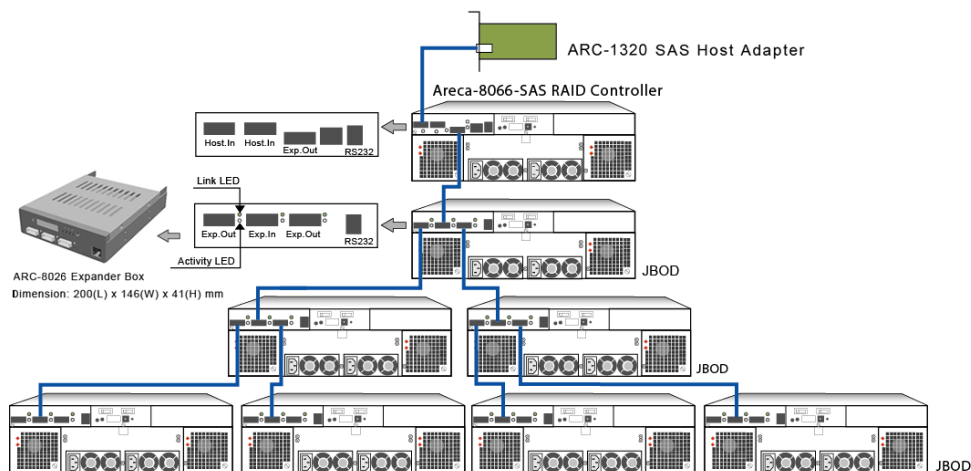


Figure 2-10, Min SAS 4x to Min SAS 4x Cable

HARDWARE INSTALLATION

The ARC-1320-4i4x, ARC-1320-8x or ARC-1320ix-16 host adapters can support daisy-chain up to 128 end point devices through external expander enclosures. The following figure shows how to connect the external Mini SAS cable from the ARC-1320-4i4x or ARC-1320ix-16 series host adapters that have external SFF-8088 connectors to the external drive boxes or drive enclosures.



Step 5. Install the LED Cable (option)

The preferred I/O connector for server backplanes is the Mini SAS 4i internal connector. This connector has eight signal pins to support four SAS/SATA drives and six pins for the SGPIO (Serial General Purpose Input/Output) side-band signals. The SGPIO bus is used for efficient LED management and for sensing drive Locate status. See SFF 8485 for the specification of the SGPIO bus. For backplane without SGPIO supporting, Please use the individual cables for fault/activity LED cable installation.

LED Management: The backplane may contain LEDs to indicate drive status. Light from the LEDs could be transmitted to the outside of the server by using light pipes mounted on the SAS drive tray. A small microcontroller on the backplane, connected via the SGPIO bus to a ARC-1320ix-16 could control the LEDs. Activity: blinking 5 times/second and Fault: solid illuminated.

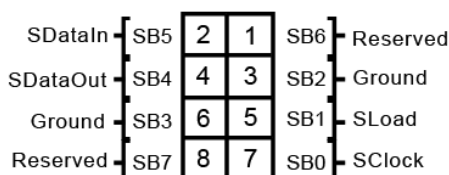
HARDWARE INSTALLATION

Drive Locate Circuitry: The location of a drive may be detected by sensing the voltage level of one of the pre-charge pins before and after a drive is installed.

The following signals define the SGPIO assignments for the Mini SAS 4i internal connector (SFF-8087) in the SAS host adapters. The pin assignment of the sideband inputs follow SFF-8448 specification.

Pin	Description	Pin	Description
SideBand0	SClock (Clock signal)	SideBand1	SLoad (Last clock of a bit stream)
SideBand2	Ground	SideBand3	Ground
SideBand4	SDataOut (Serial data output bit stream)	SideBand5	SDataIn (Serial data input bit stream)
SideBand6	Reserved	SideBand7	Reserved

The following signal defines the sideband header signals which can work with Areca sideband cable on its SFF-8087 to 4 SATA cable. The sideband header is located at backplane. For SGPIO to work properly, please connect Areca 8-pin sideband cable to the sideband header as shown below.



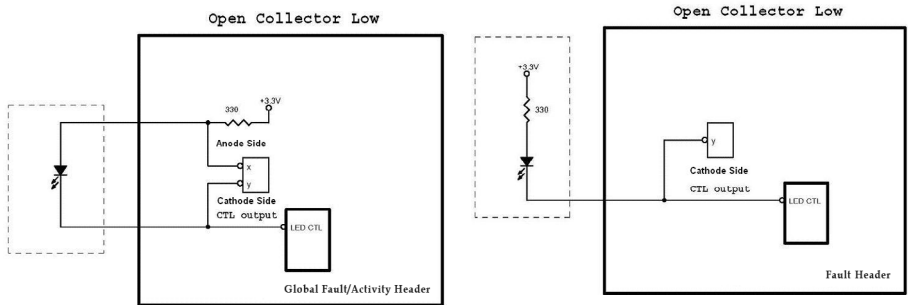
Sideband Pin Definitions

There is no SGPIO supported in the most of old version SATA backplane. The ARC-1320ix-16/ARC-1320-4i4x/ARC-1320-8i host adapters also provide two kinds of alternative LED cable header to support the fault/activity status for those backplanes. The Global Indicator Connector is used by the server global indicator LED.

The following electronics schematic is the ARC-1320ix-16/ARC-1320-4i4x/ARC-1320-8i host adapters logical of fault/activity header. The signal for each pin is cathode (-) side.

HARDWARE INSTALLATION

The following diagrams and descriptions describe each type of connector.



Note:

A cable for the global indicator comes with your computer system. Cables for the individual drive LEDs may come with a drive cage, or you may need to purchase them.

1: Individual Fault LED Connector

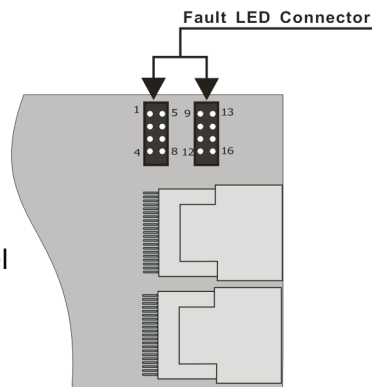
Most of the backplane has supported the HDD activity from the HDD. The ARC-1320ix-16 SAS host adapter also provides the fault connector for fault LED. Connect the cables for the drive fault LEDs between the backplane of the cage and the respective connector on the SAS host adapters.

The following table is the fault LED signal behavior.

LED	Normal Status	Problem Indication
Fault LED	When the fault LED is solid illuminated, there is no disk present. When the fault LED is off, then disk is present and status is normal.	When the fault LED is slow blinking (2 times/sec), that disk drive has failed and should be hot-swapped immediately. When the activity LED is illuminated and fault LED is fast blinking (10 times/sec) there is re-building activity on that disk drive.

HARDWARE INSTALLATION

Figure 2-11, ARC-1320ix-16 individual fault LED for each channel drive.



2: Global LED Indicator Connector

If the system will use only a single global indicator, attach the LED to the two pins of the global fault/activity connector. The global fault pin pair connector is the overall fault signal. This signal will light up in any disk drive failure. The global activity pin pair connector is the overall activity. This global activity signal will light up in any disk activity.

The following diagrams shows global fault/activity connectors and pin locations.

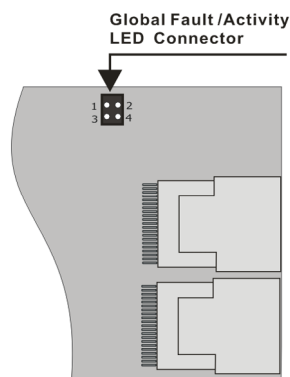


Figure 2-12, ARC-1320ix-16 global indicator connector for computer case.

Step 6. Power up the System

Thoroughly check the installation, reinstall the computer cover, and reconnect the power cord cables. Turn on the power switch at the rear of the computer (if equipped) and then press the power button at the front of the host computer.

HARDWARE INSTALLATION

Step 7. Install Host Adapters Driver

For a new system:

- Driver installation usually takes places as part of operating system installation. Please refer to Chapter 4 Diver Installation for the detailed installation procedure.

In an existing system:

- To install the host adapters driver into the existing operating system. For the detailed installation procedure, please refer to the Chapter 4, Driver Installation.

Step 8. Format, Partition and Mount the Volumes

After you create a unit, it needs to be partitioned, formatted, and mounted by the operating system. There are various steps, that depend on what operating system you are using (Windows, Linux, FreeBSD, Solaris or Mac, etc.). Detailed steps for each operating system are provided on their disk utility. After that, the ARC-1320 SAS host adapters can be fully used.

Step 9. Determining the Boot Sequences

The ARC-1320 series host adapters are a bootable host adapter. If your system already contains a bootable device with an installed operating system, you can set up your system to boot a second operating system from the new host adapters. To add a second bootable host adapter, you may need to enter setup of motherboard BIOS and change the device boot sequence so that the SAS host adapters head the list. If the system BIOS setup does not allow this change, your system may be not configurable to allow the ARC-1320 series host adapters to act as a second boot device.

BIOS CONFIGURATION

3. Host_BIOS Setup Manager

The system mainboard BIOS automatically configures the following SAS host adapter parameters at power-up:

- PCI Bus/Device/Function
- I/O Port Address
- Interrupt Channel (IRQ)
- Adapter ROM Base Address

Use Host_BIOS setup manager to further configure the SAS host adapters to suit your server hardware and operating system.

3.1 Starting the Host_BIOS Setup Manager

This section explains how to use the Host_BIOS setup manager to configure your host adapters. The Host_BIOS setup manager is designed to be user-friendly. It is a menu-driven program, residing in the flash ROM, which allows you to scroll through various menus and sub-menus and select among the predetermined configuration options.

When starting a system with a SAS host adapter installed, it will display the following message on the monitor during the start-up sequence (after the system bios startup screen but before the operating system boots):

```
ARC-1320 PCI-Ex8-2.5G SAS Cntrlr - BIOS V1.05 / Date: 2010-2-20

> Bus / Dev / Func=1/0/0, I/O-Port=FD9FF000h, IRQ=10, BIOS=D000:0h
>>> [Disk -SATA-II] P/I/L=0/00/000 < ST6700630NS >Size=76(GB)
>>> [Disk -SAS-3.0] P/I/L=1/01/000 < HUS151436VLS300 >Size=34(GB)
>>> [Disk -SAS-3.0] P/I/L=2/02/000 < ATLAS10K5_147SAS >Size=137(GB)
>>> [Disk -SAS-3.0] P/I/L=3/03/000 < HUS151436VLS300 >Size=34(GB)
>>> #Total device(s):<4>, #Int13 device(s):<4>. Areca SAS BIOS installed!
>>> Press <Tab/F6> to enter SETUP menu. 4 second(s) left <ESC to skip>..
```

The information fields on the adapter setup screen are as follows:

Bus: Indicates the PCI Bus number assigned by the system BIOS to the selected adapter (range 0 - 255 decimal)

Dev: Indicates the PCI Device assigned by the system BIOS to the selected adapter (range 0 - 31 decimal)

BIOS CONFIGURATION

Fnc: Indicates the PCI Function assigned by the system BIOS to the selected adapter (range 0 - 7 decimal)

I/O: Indicates the I/O port address assigned by the system BIOS to an adapter

IRQ: Indicates the interrupt (IRQ) channel of the selected adapter

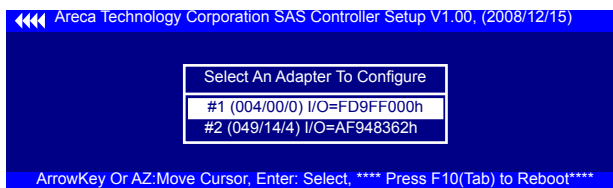
BIOS: Indicates the BIOS address assigned by the system BIOS to the selected address

The adapters scan and up to **eight** devices' information and total connected device count during system bootup. But, the adapters can only boot up from the first **eight** devices on the screen. The operating system device driver will recognize up to 128 end-point devices. The bootable devices need to be put on the first **eight** devices connected to the controller.

Note:

It is normal when it appears "No BIOS disk found. Areca SAS controller BIOS not installed!" during system boot. It represents that there was no bootable SAS device such as SAS HDD found after SAS BIOS detected SAS devices. Thus, above message is shown and this will not affect system operation.

The Host_BIOS setup manager message remains on your screen for about five seconds, giving you time to start the setup menu by pressing **Tab** or **F6**. If you do not wish to enter setup menu, press **ESC** to skip configuration immediately. When activated, the Host_BIOS setup manager appears showing a selection dialog box listing the SAS host adapters that are installed in the system. The legend at the bottom of the screen shows you what keys are enabled for the screens.



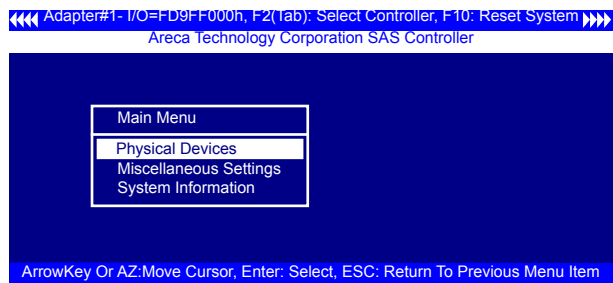
The adapter setup screen displays a scrolling list of up to 128 SAS end point devices in the system, and provides information about each of them.

BIOS CONFIGURATION

Use the **Up** and **Down** arrow keys to select the adapter you want to setup. While the desired adapter is highlighted, press the **Enter** key to enter the main menu of the Host_BIOS setup manager.

3.2 Main Menu

The main menu shows all functions that are available for executing actions, which is accomplished by clicking on the appropriate link. **Esc** - Aborts the current context operation, or exits the current screen. If you have changed settings, you will be asked to confirm the exit.



Option	Description
Physical Devices	View individual disk information
Miscellaneous Settings	Configure adapter's control parameters
System Information	View the host adapter system information

Write Protection Channel

When “Write Protection Channel” is enabled on the “Data Protection”, host commands fail if they are issued to a channel in that HBA and attempt to modify a disk’s data or attributes.

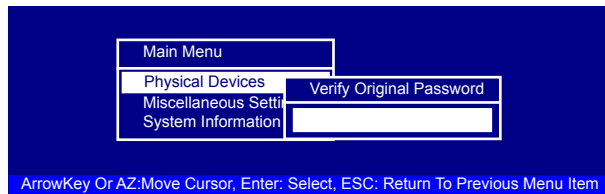
The following procedures are used to set the “Data Protection Function”.

BIOS CONFIGURATION

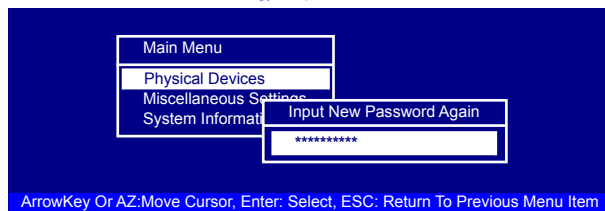
(1). How To Enter BIOS HBA's Data Protection Password Feature

Once in Main Menu setup, you use the **Ctrl** key along with the **F7** key (**Ctrl+F7**) to enter password setup and change their values. The password option allows user to set the SAS Host Adapter's password protection feature. The user can only setup the Write Protection feature by providing the correct password. The password is used to protect the SAS host adapter's Write Protection feature from unauthorized entry. The manufacture default password is set to **0000**.

◀◀◀ Adapter#1- I/O=F09F-F000h, F2(Tab): Select Controller, F10: Reset System ▶▶▶
Areca Technology Corporation SAS Controller



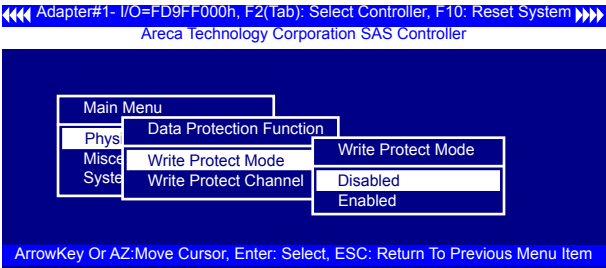
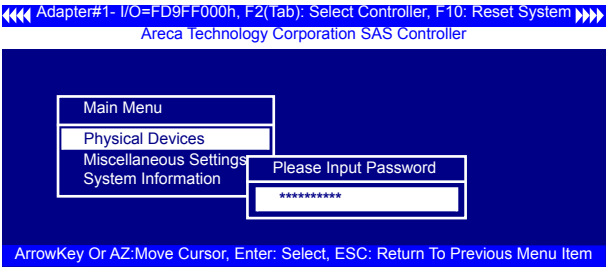
◀◀◀ Adapter#1- I/O=F09F-F000h, F2(Tab): Select Controller, F10: Reset System ▶▶▶
Areca Technology Corporation SAS Controller



(2). How To Enter BIOS HBA's Data Protection Function

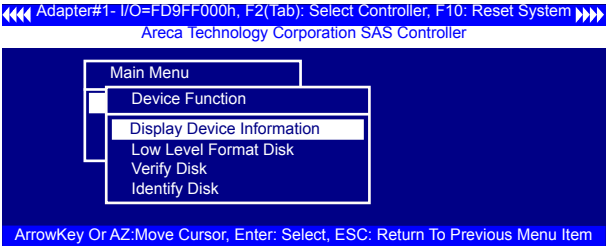
Once in Main Menu setup, you use the **Ctrl** key along with the **F8** key (**Ctrl+F8**) to enter Data Write Protection Function setup. The SAS host adapter will check the password when entering the Data Protection Function setup from the main menu screen. This screen is used to configure the Write Protect Mode and Write Protect Channel. The default for the Write Protect Mode is for the Write Protect to be disabled. Enabling the Write Protect prevents the Write Protect Channel devices from being accessed. When Write Protect Channel is enabled on the Data Protection Function, host commands fail if they are issued to a channel in that HBA and attempt to modify a disk's data or attributes.

BIOS CONFIGURATION



3.2.1 Physical Devices

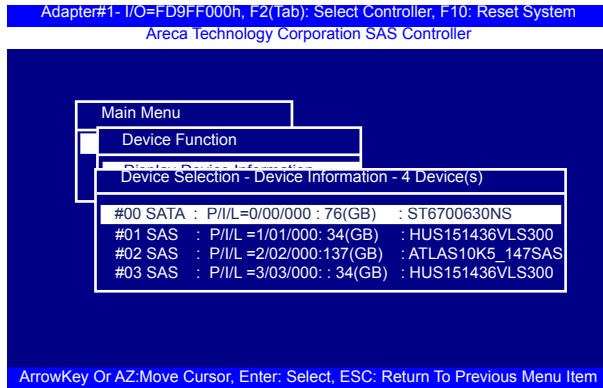
To access the physical device function screen, highlight the “Physical Devices” field on the adapter’s main menu screen and press **Enter**. (But, the Device Function can only work with the first eight devices. You can use the CLI or GUI utility to set others devices not listed on the BIOS boot up screen.) A screen similar to the following appears:



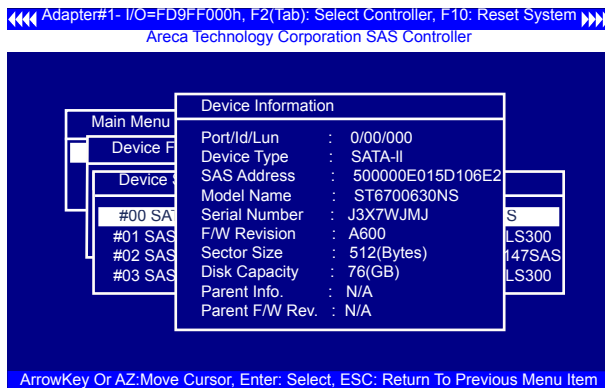
BIOS CONFIGURATION

3.2.1.1 Display Device Information

To view first eight installed devices on the selected host adapter, highlight the "Display Device Information" field and press **Enter**. A screen similar to the following appears:



To display the device information screen for a disk, highlight the disk name in the "Device Selection-Device Information" screen and press **Enter**. A "Device Information" screen similar to the following appears:

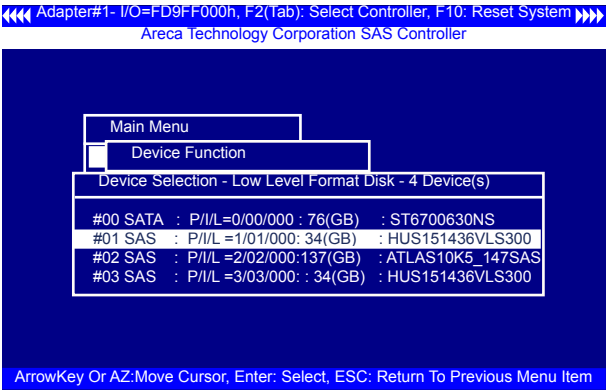


The information fields on the "Device Information" screen are as follows: Port/Id/Lun, Device Type, SAS Address, Model Name, Serial Number, F/W Revision and Disk Capacity.

BIOS CONFIGURATION

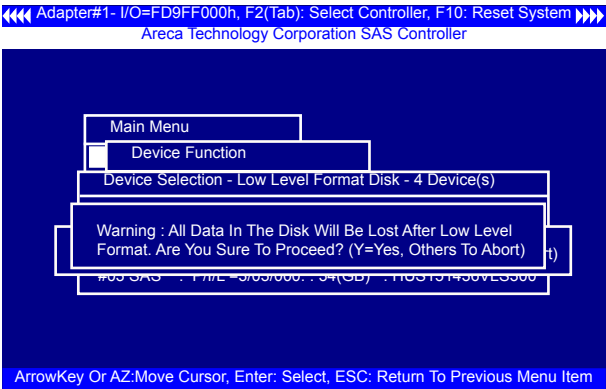
3.2.1.2 Low Level Format Disk

To select the SAS disk for the low level format from the attached disks on the host adapter, highlight the "Low Level Format Disk" field on the "Device Function" screen and press **Enter**. A screen similar to the following appears:



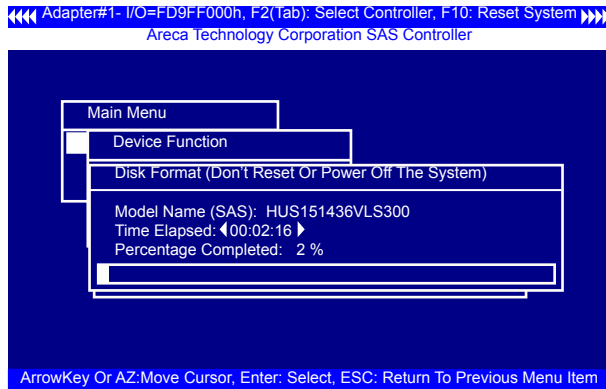
The "Device Selection-Low Level Format Disk" screen displays a scrolling list of installed disks on the selected host adapter. The SATA HDD is not possible to low level format.

Highlight the SAS disk name in the "Device Selection-Low Level Format Disk" screen and press **Enter**. A screen similar to the following appears:



BIOS CONFIGURATION

The "Low Level Format Disk" screen to perform a low-level format of the device. The default format is 512-bytes per sector. To start the format, press **Y**. A screen similar to the following appears:



After format begins, you cannot stop or cancel it. The information fields on the "Disk Format" are as follows:

Model Name: Indicates the device name for the format.

Time Elapsed: Displays the time elapsed since the start of the format operation.

Percentage Completed: Indicates the completion percentage of the format operation.

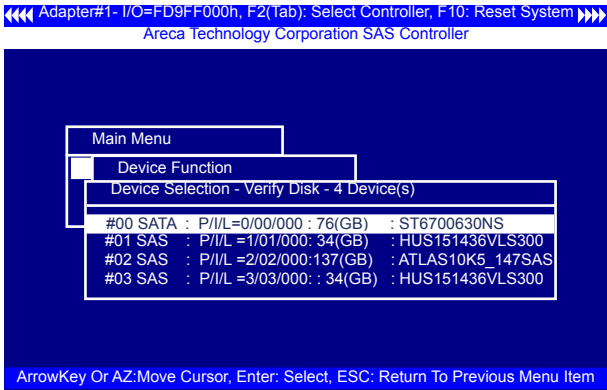
Note:

Formatting erases all data on a device. Be sure that you have a current, valid backup of important data on the device before you format it.

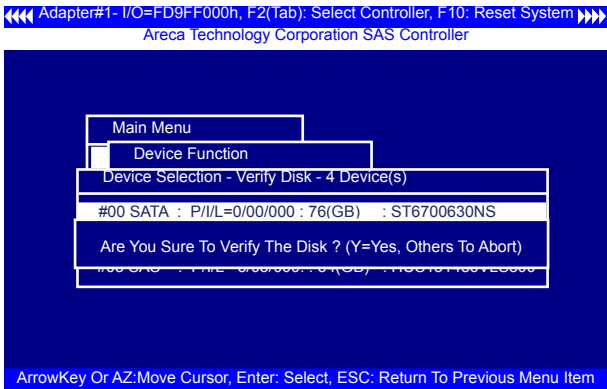
BIOS CONFIGURATION

3.2.1.3 Verify Disk

To select the disk for the verification from the attached disks on the host adapters, highlight the "Verify Disk" field on the "Device Function" screen and press **Enter**. A screen similar to the following appears:

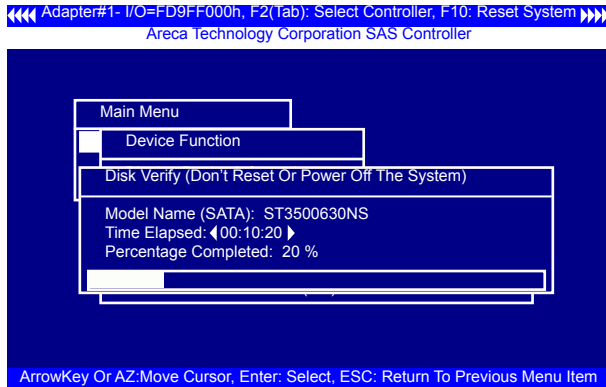


The "Device Selection-Verify Disk" screen displays a scrolling list of installed disks on the selected host adapter. Highlight the disk name in the "Device Selection-Verify Disk" screen and press **Enter**. A screen similar to the following appears:



BIOS CONFIGURATION

The "Disk Verify" screen start to perform a verification of the selected device. Use the "Verify Disk" function to verify the sectors on the device and reassign defective Logical Block Addresses (LBAs). To start the verification of the selected device, press **Y**. A screen similar to the following appears:



The information fields on the "Disk Verify" are as follows:

Model Name: Indicates the device name for the verification inquiry data.

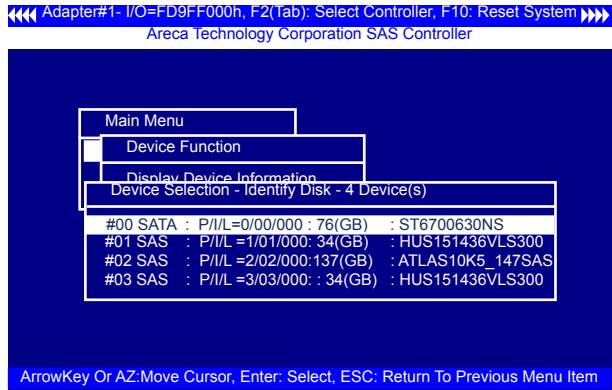
Time Elapsed: Displays the time elapsed since the start of the verify operation.

Percentage Completed: Indicates the completion percentage of the verify operation.

BIOS CONFIGURATION

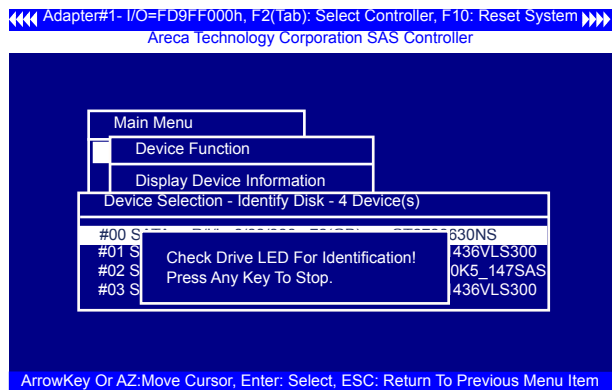
3.2.1.4 Identify Disk

To select the disk for the identification from the attached disks on the host adapter, highlight the "Identify Disk" field on the "Device Function" screen and press **Enter**. A screen similar to the following appears:



The "Device Selection-Identify Disk" screen displays a scrolling list of installed disks on the selected host adapter.

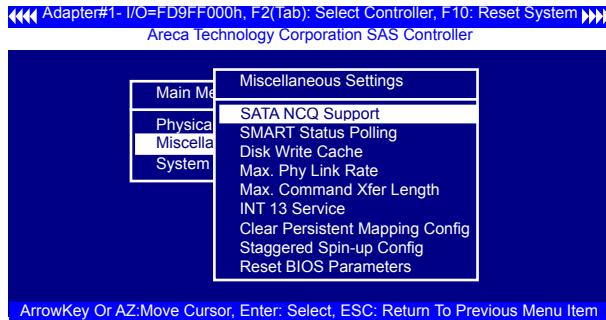
Highlight the disk name in the "Device Selection-Identify Disk" screen and press **Enter**. The selected disk activity indicator will light for physically locating the selected disk. A screen similar to the following appears:



BIOS CONFIGURATION

3.2.2 Miscellaneous Settings

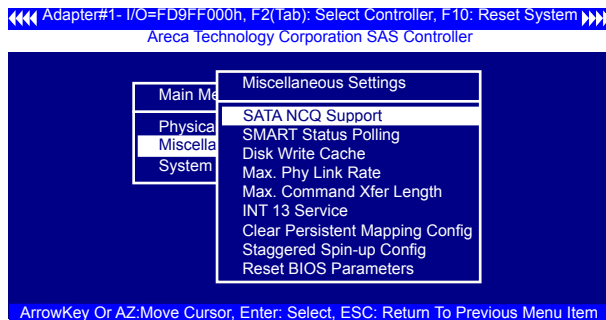
To access the host adapter miscellaneous settings properties, highlight the "Miscellaneous Settings" field on the main menu screen and press **Enter**. A screen similar to the following appears:



Changes to the "Miscellaneous Settings" are reflected in the option field of the "Miscellaneous Settings" menu. However, the new setting does not take effect until you reboot the system.

3.2.2.1 SATA NCQ Support

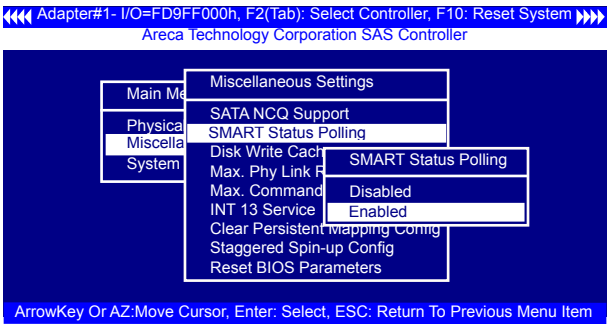
The controller supports both SAS and SATA disk drives. The NCQ allows SATA multiple commands to be outstanding within a drive at the same time. Drives that support NCQ have an internal queue where outstanding commands can be dynamically rescheduled or re-ordered, along with the necessary tracking mechanisms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



BIOS CONFIGURATION

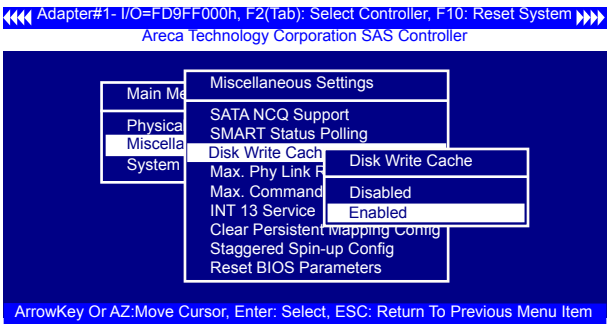
3.2.2.2 SMART Status Polling

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.



3.2.2.3 Disk Write Cache

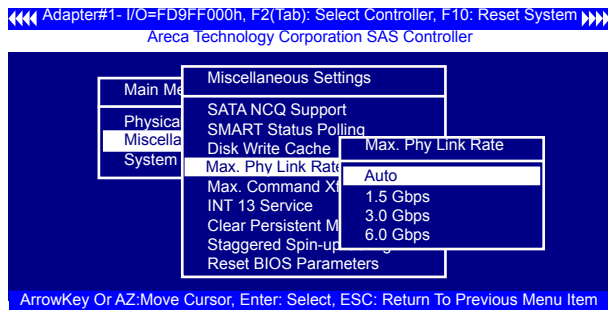
Use this command to program the No. disk drive write cache mode. User can set the “Disk Write Cache Mode” to Enabled, or Disabled. “Enabled” increases speed, “Disabled” increases reliability for the selected No. disk drive.



BIOS CONFIGURATION

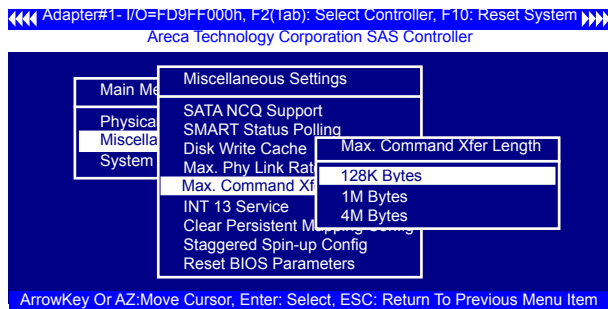
3.2.2.4 Max. Phy Link Rate

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. 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.



3.2.2.5 Max. Command Xfer 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. 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).

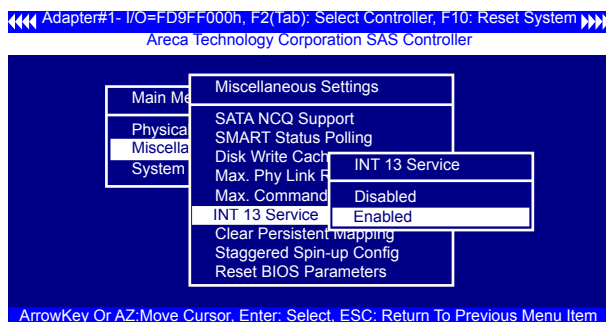


BIOS CONFIGURATION

3.2.2.6 INT 13 Service

To access the INT 13 service properties, highlight the "INT 13 Service" field from the "Miscellaneous Settings" screen and press **Enter**. A screen similar to the following appears:

The "INT 13 Service" indicates whether the adapter is eligible for BIOS control, or is reserved for control by OS device driver. The information fields on the "INT 13 Service" screen are as follows:



Disabled: The SAS host adapter is controlled only by the OS device driver and adapter's BIOS is not installed on the system ROM area.

Enabled: The SAS host adapter is controlled only by the BIOS. This setting may not be supported by all OS drivers.

3.2.2.7 Clear Persistent Mapping

To access the persistent device mapping config, highlight the "Clear Persistent Mapping" from the "Miscellaneous Settings" screen and press **Enter**.

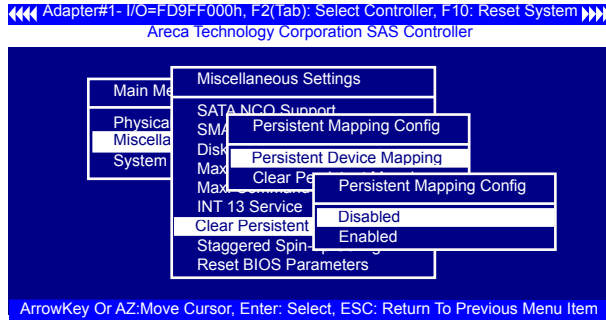
A screen similar to the following appears:

Clear Persistent Mapping is used to ensure the operating system of a server always sees presented LUNs with the same SAS target ID across reboots. On systems where no logical volume manager is present, the specific target and device used to map a file system to its disk will hard code the target and disk number. It is possible that the target number could change, if disks are added or removed from the system. Persistent mapping function maps a user defined LUNs to a SAS ports and ensures that the relationship remains static across reboots.

BIOS CONFIGURATION

3.2.2.7.1 Persistent Device Config

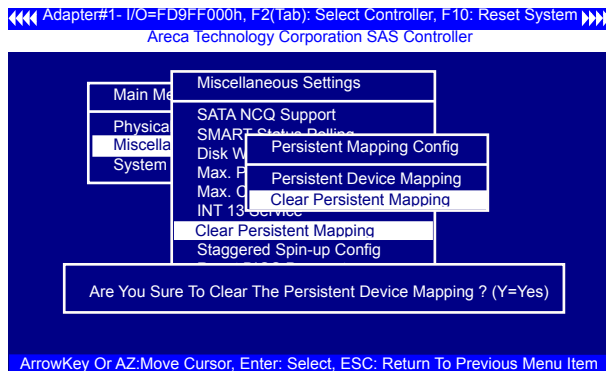
To access the persistent mapping function, highlight the "Persistent Device Mapping" from the "Persistent Mapping Config" screen and press **Enter**. A screen similar to the following appears:



Enabled: LUNs relative mapping remains static across reboots.
Disabled: LUNs relative mapping is gathered from the SAS HBA device driver on every reboot.

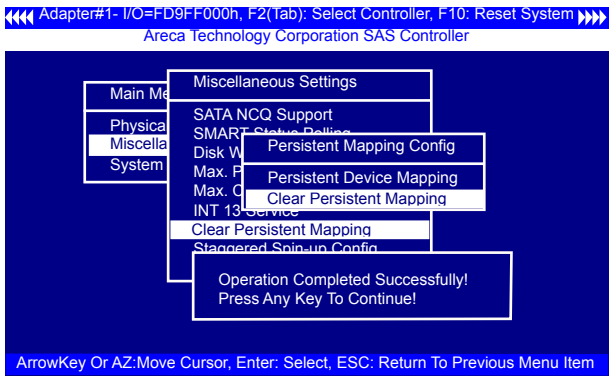
3.2.2.7.2 Clear Persistent Mapping

To enable the clear mapping registry on the HBA, highlight the "Clear Persistent Mapping" from the "Persistent Mapping Config" screen and press **Enter**. A screen similar to the following appears:



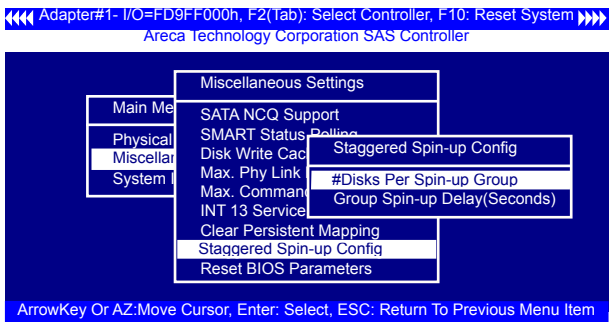
BIOS CONFIGURATION

The device driver detects the hardware SAS devices via SAS HBA. This detection phase then stores or maps SAS drive LUNs information in the HBA when you enable the persistent mapping. When device persistence is in use this operation clears persistent mappings for devices that are not currently present. It is required to clear the HBA previous persistent mapping that ARC-1320 device uses as a bootable device on the new operating system installation. The clear function is for user to reset the registry store on HBA. To start the clear persistent mapping, press **Y**. A screen similar to the following appears:



3.2.2.8 Staggered Spin-up Config

To access the host adapter staggered spin-up configuration properties, highlight the "Staggered Spin-up Config" field from the "Miscellaneous Settings" screen and press **Enter**. A screen similar to the following appears:

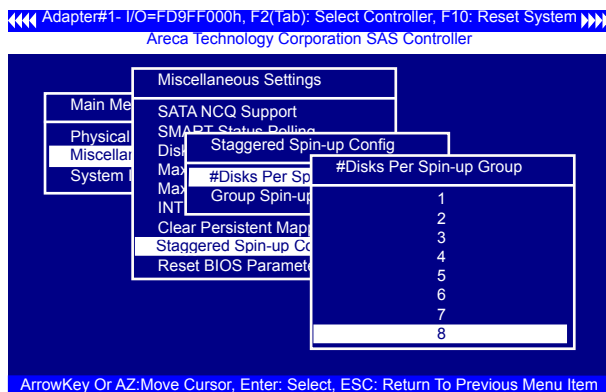


BIOS CONFIGURATION

In a PC system with only one or two drives, the power can supply enough power to spin up both drives simultaneously. But In a systems with more than two drives, the startup current from spinning up the drives all at once can overload the power supply, causing damage to the power supply, disk drives and other system components. This damage can be avoided by allowing the host to stagger the spin-up of the drives. New SATA drives have supported staggered spin-up capabilities to boost reliability. Staggered spin-up is a very useful feature for managing multiple disk drives in a storage subsystem. It gives the host the ability to spin up the disk drives sequentially or in groups, allowing the drives to come ready at the optimum time without straining the system power supply. Staggering drive spin-up in a multiple drive environment also avoids the extra cost of a power supply designed to meet short-term startup power demand as well as steady state conditions.

3.2.2.8.1 #Disks Per Spin-up Group

To define the # of disks per spin-up group, highlight the "# Disks Per Spin-up Group" field from the "Staggered Spin-up Config" screen and press **Enter**. A screen similar to the following appears:

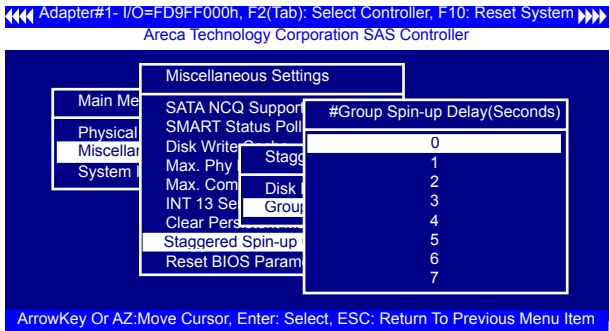


ARC-1320 series host adapters have included the option for customer to select the number of disk drives group per stagger power up value. The values can be selected from 1 to 8 disks per step which powers up the system.

BIOS CONFIGURATION

3.2.2.8.2 Group Spin-up Delay(Seconds)

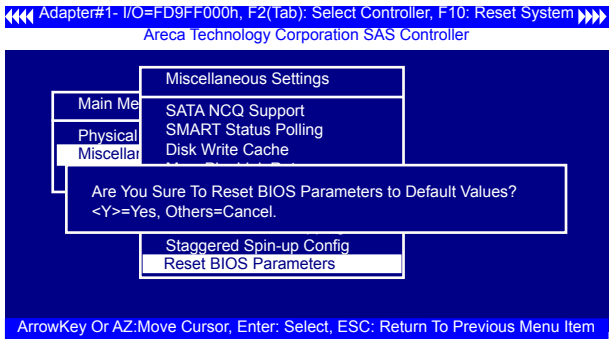
To define the group of disks spin-up delay, highlight the "Group Spin-up Delay" field from the "Staggered Spin-up Config" screen and press **Enter**. A screen similar to the following appears:



Areca host adapters have included the option for customer to select the group of disk drives sequentially stagger power up value. The values can be selected from 0s to 7s per step which powers up one group of disk drives.

3.2.2.9 Reset BIOS Parameters

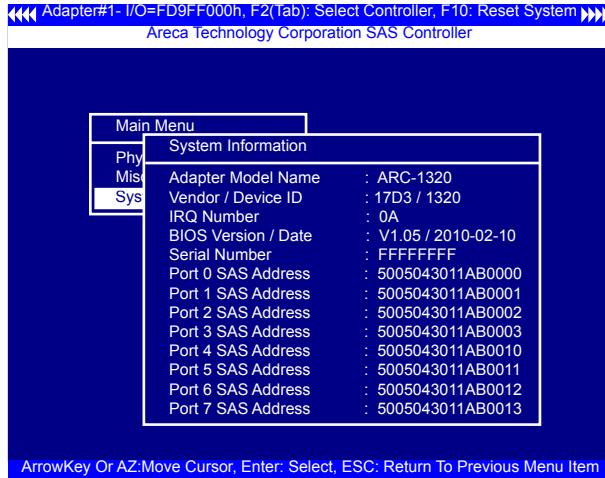
In addition to restoring the BIOS parameters manufacture defaults, if you've recently added new hardware or resetting the default values did not help resolve your issues, you may also want to reset the BIOS parameters. To set this feature, select Reset BIOS Parameters from the Miscellaneous Settings menu and press <Enter>.



BIOS CONFIGURATION

3.2.3 System Information

To access the host adapters system information properties, highlight the "System Information" field on the main menu screen and press **Enter**. A screen similar to the following appears:



Information fields on the "System Information" properties are as follows:

Adapter Mode Name: Indicates the name of the host adapter.

Vendor/Device: Indicates the controller's vendor ID and device name.

IRQ Number: Indicates the Interrupt Request Line used by the adapter. This is assigned by the system BIOS.

BIOS Version / Date: Indicates the revision version and date of this adapter BIOS.

Serial Number: Indicates the production serial number from the manufacture.

Port 0(0 to N) SAS Address: Indicates the SAS address of the the associated SAS Port (0 to N) as configured on this adapter.

Note:

The adapter can not be used, if the 16-digit adapter SAS address is not displayed.

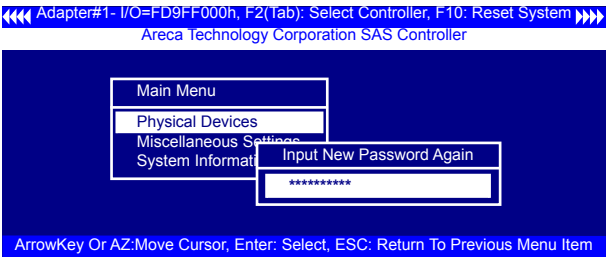
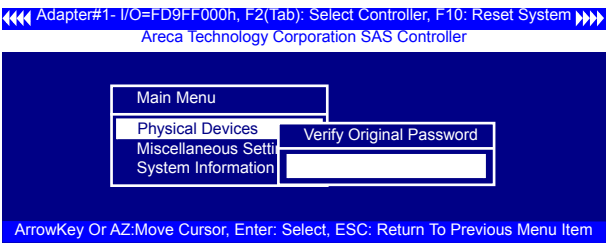
BIOS CONFIGURATION

3.2.4 Channel Write Protect

When “Channel Write Protect” is enabled on the “Data Protection Function”, host commands fail if they are issued to a channel in that HBA and attempt to modify a disk’s data or attributes. This function only works under directly attach to the SAS controller chip not through expander chip. This feature will be disabled when using the expander.

(1). How to Change the Password

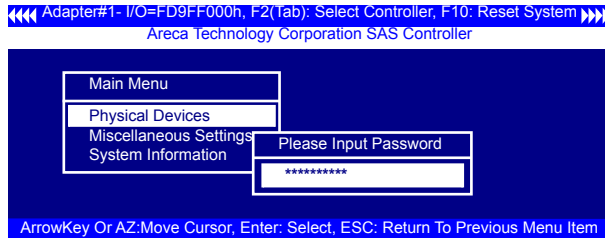
The password option allows user to modify the HBA’s password protection feature. The password is used to protect the SAS host adapter from unauthorized entry. The HBA will check the password only when entering the “Data Protection Function” from Main Menu screen. If you have never assigned a new password for the HBA, the manufacture default password is “0000”. However, this is insecure. For instructions on assigning a new password, press the **Ctrl-F7** (hold down Ctrl and press F7) at the Main Menu. The “Verify Original Password” screen appears. Follow the on-screen steps to complete the password modification.



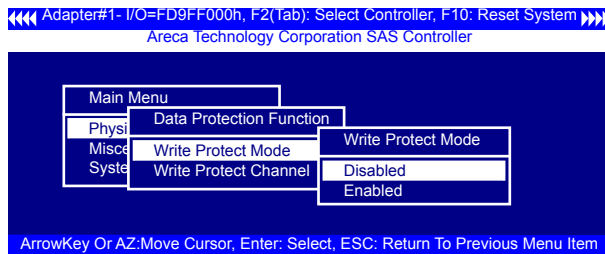
BIOS CONFIGURATION

(2). How to Configure Data Protection Function

For instructions on configuring data protection function, press the **Ctrl-F8** (hold down Ctrl and press F8) at the Main Menu to enter the setup screen. The "Please Input Password" screen appears. Follow the on-screen steps to enter the password for verification. You must provide correct password before executing the "Data Protection Function".



When you provide the correct password, the "Data Protection Function" screen appears. To access the write protect mode, highlight the "Write Protect Mode" item and then press **Enter** key.



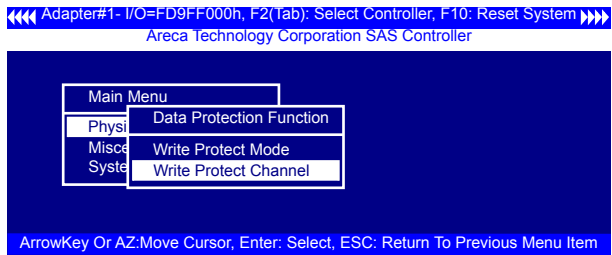
The "Write Protect Mode" screen will appear. Write Protect Mode is used for user to have the ability of control the HBA channel protected capability where a host access data within the write protected channels but without the risk of modifying it.

Enabled: Select this option to enable "Write Protect Mode" for channels that are associated with the HBA. Write protection (read-only) on a channel prevents the contents on the connected disk from being changed.

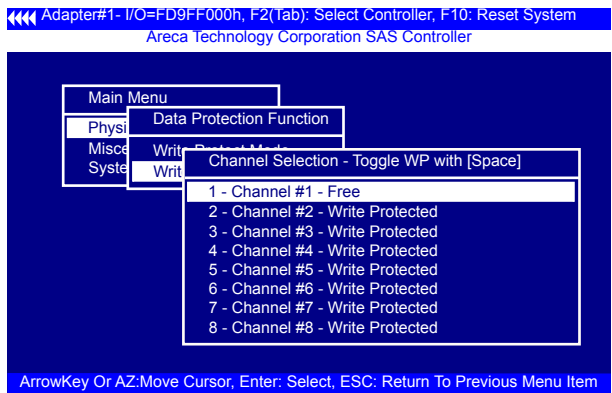
Disabled: Select this option to disable "Write Protect Mode" feature on the HBA. No Write Protect settings are in effect.

BIOS CONFIGURATION

To configure each channel write protect setting on the HBA, move the cursor bar to the "Write Protect Channel" option on the "Data Protection Function" screen and click on it.



The "Channel Selection" screen will show all channel numbers on the HBA. Tick on the target channel number that you want to configure and then press "**Space**" key to toggle the channel setting: **Write Protected** or **Free** on it. If Write Protect Mode is enabled with default "**Write Protected**" setting on a channel, any host command fails if it attempts to modify disk data or disk attributes. However, any host command that is issued to a channel that is a "**Free**" setting can continue with full read and write access to all disks.



4. Driver Installation

This chapter describes how to install the ARC-1320 series SAS host adapters device driver to your operating system. The installation procedures use the following terminology:

Installing operating system on the ARC-1320 volume

If you have a new drive configuration without an operating system and want to install operating system on a disk drive managed by the SAS host adapters. The device driver installation is a part of the operating system installation.

Installing SAS host adapter into an existing operating system

The computer has an existing operating system installed and the ARC-1320 series host adapters are being installed as a secondary controller.

Have all required system hardware and software components on hand before proceeding with the setup and installation.

Materials required:

- Microsoft Windows 8/Server 2012/7/2008/Vista/XP/2003, Linux, FreeBSD, Solaris, and Mac Pro installation CD
- ARC-1320 series host adapters software CD
- ARC-1320 series host adapters

4.1 Creating the Driver Diskettes

The software CD disc shipped with the ARC-1320 series host adapters are a self-booting CD. In order to create driver diskettes for Windows, Linux, and FreeBSD installation drivers, your system is required to support booting from the CD-ROM.

If you do not have the software CD disc with the package, contact your local dealers or you can also download the latest version drivers for Windows 8/Server 2012/7/2008/Vista/XP/2003, Linux, FreeBSD, Solaris and Mac Pro from the Areca web site at <http://www.areca.com.tw>

DRIVER INSTALLATION

These driver diskettes are intended for use with new operating system installations. For Windows 8/Server 2012/7/2008/Vista/XP/2003, you can copy the Windows driver file to USB device and installed from it. Determine the correct kernel version and identify which diskette images contain drivers for that kernel. If the driver file ends in .img, create the appropriate driver diskette using "dd" utility. The following steps are required to create the driver diskettes:

1. The computer system BIOS must be set to boot-up from the CD-ROM.
2. Insert the ARC-1320 software driver CD disc into the CD-ROM drive.
3. The system will boot-up from CD-ROM Drive; to create the driver diskettes, select the "SAS Host Adapter Driver Diskette Make Utility", and a screen with several choices will be displayed.
4. Move the highlight bar to the "Create Driver Disk" entry and press **Enter**.
5. The screen queries the ARC-1320 SAS host adapters support driver database and displays a list of available drivers. Move the highlight bar to the correct driver entry and press **Enter** to select.
6. The next screen will show "Please insert a formatted diskette into drive A:!! Press any key to continue". Insert the formatted diskette in drive "A" and press any key to continue.
7. The window will display the driver building message: "Now is writing to Cylinder.." as it copies the image file from the CD-ROM to driver diskette.
8. The "Write Complete !!" message will display when the driver diskette ready.

The driver diskette is made now. Proceed to the following instruction for installation procedures.

4.2 Driver Installation for Windows

The ARC-1320 series host adapters can be used with Microsoft Windows 8/Server 2012/7/2008/Vista/XP/2003 with SCSI Miniport and StorPort Drivers.

4.2.1 Installing Windows on a SAS Host Adapter Volume

For completed details on installing Windows, see the Windows User's Manual. The following instructions explain how to install the ARC-1320 series host adapters device driver while installing Windows 8/Server 2012/7/2008/Vista/XP/2003. Have your bootable Microsoft Windows CD and follow the required procedure below to install ARC-1320 series host adapters:

1. Make sure you follow the instructions in Chapter 2 "Hardware Installation" to install the controller and connect the disk drives or enclosure.
2. Start the system and then press Tab/F6 to access the Host_BIOS setup utility. Use the Host_BIOS setup utility to configure the ARC-1320 series host adapters to which you will install Windows. For details, see Chapter 3 "BIOS Configuration". Once ARC-1320 series host adapters has been configured, continue with next step to install the operating system.
3. Insert the Windows setup CD and reboot the system to begin the Windows installation.
4. Follow the on-screen instructions to begin the Windows installation.
5. When prompted to specify a location for Windows, select **"Load Driver"**.
6. Insert the USB driver disk or floppy drive, browse to the driver location, then click **"OK"**.

DRIVER INSTALLATION

7. Window will check the floppy; select the correct card and CPU type for your hardware from the listing and press "**Next**" to install it.
8. Click on "**Next**" again to accept the default partition configuration, or refer to your Windows documentation to configure partitions manually.
9. From this point on, simply follow the Microsoft Windows installation procedure. Follow the on-screen instructions, responding as needed, to complete the installation.
10. After the installation is completed, reboot the system to load the new driver/operating system.

After you finish installing device driver, the following steps show how to make any new independent disks accessible to Windows.

- (a). Click "**Start**" ==> right-click "**Computer**" and select "**Manage**".
- (b). Click "**Disk Management**" in the left pane.
- (c). Scroll down to the bottom of the middle pane.
Windows will display a list of new drives attached to your system with a label such as "Disk 1" or "Disk 2", etc.
- (d). Right-click on the drive you want to partition and then again to format it
- (e). Once it's formatted, Windows automatically assigns the next available drive letter to it and then it will appear in Windows Explorer.

4.2.2 Installing Controller on an Existing Windows

In this scenario, you are installing the controller in an existing Windows system. To install the driver:

DRIVER INSTALLATION

1. Follow the instructions in Chapter 2, the Hardware Installation Chapter, to install the controller and connect the disk drives or enclosure.
2. Start the system and then press Tab/F6 to enter the controller Host_BIOS setup utility. Use the setup utility to configure the host adapter parameter. For details, see Chapter 3, BIOS Configuration. Once the host adapters miscellaneous settings properties configured, continue with installation of the driver.
3. Re-Boot Windows and the OS will recognize the SAS host adapter and launch the "Found New Hardware Wizard", this guides you in installing the SAS host adapter driver.
4. The Windows will pop-up and provide a choice of how to proceed. so that you can choose a specific driver.
5. When the next screen queries the user about utilizing the currently installed driver, click on the "**Have Disk**" button.
6. Insert the SAS host adapter driver media to locate the correct path. Click on the "**Next**" button.
7. Windows automatically copies the appropriate driver files and rebuilds its driver database.
8. The summary screen appears; click on the "**close**" button.
9. Restart the computer to load the new drivers.

After you finish installing device driver, the following steps show how to make any new independent disks accessible to Windows.

- (a). Click "**Start**" ==> right-click "**Computer**" and select "**Manage**".
- (b). Click "**Disk Management**" in the left pane.
- (c). Scroll down to the bottom of the middle pane.
Windows will display a list of new drives attached to your your system with a label such as "Disk 1" or "Disk 2", etc.

DRIVER INSTALLATION

- (d). Right-click on the drive you want to partition and then again to format it
- (e). Once it's formatted, Windows automatically assigns the next available drive letter to it and then it will appear in Windows Explorer.

4.2.3 Uninstall controller from Windows

To remove the SAS host adapter driver from the Windows system, follow the instructions below.

1. Ensure that you have closed all applications and are logged in with administrative rights.
2. Open "Control Panel" and start the "Add/Remove Program" icon and uninstall and software for the SAS host adapter.
3. Go to "Control Panel" and select "System". Select the "Hardware" tab and then click the "Device Manager" button. In device manager, expand the "Storage controllers" section. Right click on the "ARECA(X86-32-STORPORT) SAS 6G PCI Host Adapter" and select "Uninstall".
4. Click **Yes** to confirm removing the SAS host adapter driver. The prompt to restart the system will then be displayed.

4.3 Driver Installation for Linux

This chapter describes how to install the ARC-1320 series host adapters driver to Red Hat Linux, SuSE and other versions of Linux. Before installing the ARC-1320 series host adapters driver to the Linux, complete the following actions:

1. Install host adapter and hard disk drives according to the instructions in Chapter 2 Hardware Installation.
2. Start the system and then press **Tab+F6** to enter the Host_BIOS setup utility. Using the Host_BIOS setup utility to configure host adapter miscellaneous settings parameter. For details, see Chapter 3, BIOS Configuration.

DRIVER INSTALLATION

Compiled and tested drivers for Red Hat and SuSE Linux are included on the shipped software CD. You can download updated versions of compiled and tested drivers for RedHat or SuSE Linux from the Areca web site at <http://www.areca.com.tw>.

Please refer to the "readme.txt" file on the included software CD or website to make driver diskette and to install driver on the system.

4.4 Driver Installation for FreeBSD

This chapter describes how to install the ARC-1320 series host adapters driver to FreeBSD. Before installing the ARC-1320 series host adapters driver to the FreeBSD, complete the following actions:

1. Install host adapters and hard disk drives according to the instructions in Chapter 2 Hardware Installation.
2. Start the system and then press **Tab+F6** to enter the Host_BIOS setup utility. Using the Host_BIOS setup utility to configure host adapters miscellaneous settings parameter. For details, see Chapter 3. BIOS Configuration.

The supplied software CD that comes with ARC-1320 series host adapters include the compiled and tested drivers for FreeBSD 7.x (7.2 and onwards) and 8.x (8.0 and onwards). You can download updated versions of compiled and tested drivers for FreeBSD from the Areca web site at <http://www.areca.com.tw>.

Please refer to the "readme.txt" file on the included software CD or website to make driver diskette and to install driver on the system.

4.5 Driver Installation for Solaris

This chapter describes how to install the ARC-1320 series host adapters driver to Red Hat Linux, SuSE and other versions of Linux. Before installing the ARC-1320 series host adapters driver to the Linux, complete the following actions:

1. Install host adapters and hard disk drives according to the instructions in Chapter 2 Hardware Installation.

DRIVER INSTALLATION

2. Start the system and then press **Tab+F6** to enter the Host_BIOS setup utility. Using the Host_BIOS setup utility to configure host adapters miscellaneous settings parameter. For details, see Chapter 3, BIOS Configuration.

Compiled and tested drivers for Solaris are included on the shipped software CD. You can download updated versions of compiled and tested drivers for Solaris from the Areca web site at <http://www.areca.com.tw>.

Please refer to the "readme.txt" file on the included software CD or website to make driver diskette and to install driver on the system.

4.6 Driver Installation for Mac OS X

After hardware installation, the SAS/SATA disk drives connected to the SAS host adapter must be configured and the volume set units initialized by the controller before they are ready to use by the system.

4.6.1 Installation Procedures

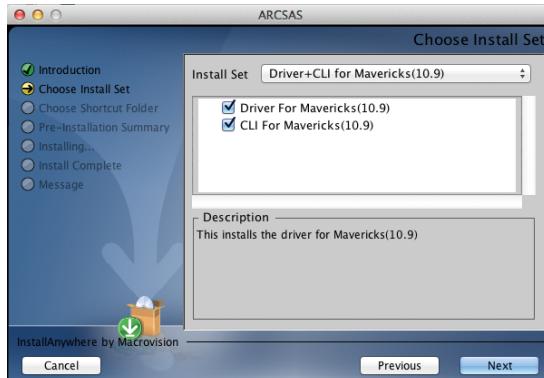
This section describes detailed instructions for installing the Areca Mac driver & CLI utility for the ARC-1320 series on your Intel-based Mac Pro. You must have administrative level permissions to install Mac driver & utility. You can use the ARCSAS installer to install Mac driver & CLI utility at once or "Custom" to install special components.

To follow the process to install driver & utility on Intel-based Mac as below:

1. Insert the Software CD that came with your Areca SAS host adapter.
2. Double-click on the "install_arcsas.zip" file that resides at <CD-ROM>\packages\MacOS to add the installer on the Finder.
3. Launch the installer by double-clicking the install_arcsas on the Finder.

DRIVER INSTALLATION

4. Follow the installer on-screen steps, responding as needed, to complete the Areca driver and CLI utility installation.



- **Driver** is required for the operating system to be able to interact with the Areca SAS host adapter.
- **Command Line Interface (CLI)** lets you set up and manage SAS host adapter through a command line interface. CLI performs many tasks at the command line. You can download CLI manual from Areca website or software CD <CDROM>\DOCS directory.

5. A reboot is required to complete the installation.

There is one "ARCSAS" icon showing on your desktop. Double-click on the "ARCSAS" icon to locate your CLI program file folder.

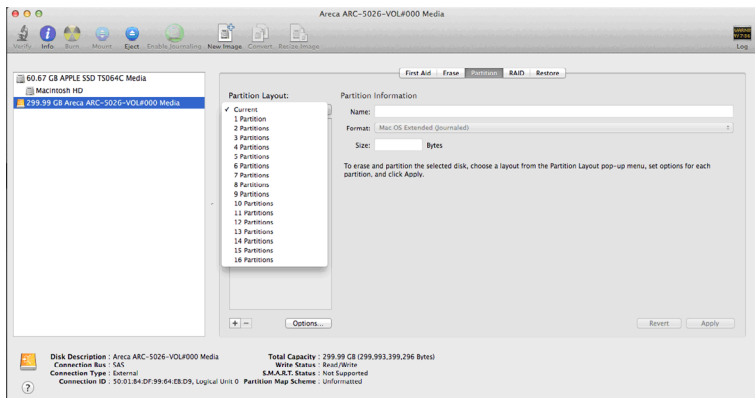
4.6.2 Making Volume Sets Available to Mac OS X

When you reboot the Mac machine, the Mac OS X recognizes that a new disk is avail, and displays a message asking what you next want to do. If the message does not show up, start the "Disk Utility" manually from the "Finder", use the "Go" menu and open the "Utilities" folder. Double-click on the "Disk Utility" program. Follow the on-screen prompts to create a volume set and to assign a disk drive letter.

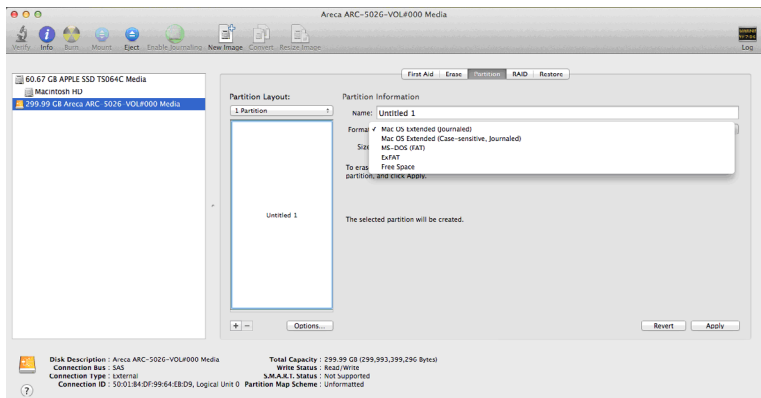
DRIVER INSTALLATION

To initialize and partition your unit

1. When the Disk Utility window opens, find and select the desired drive in the sidebar that represents your SAS host adapter and click on the "Partition" button.
2. In the Partition Layout column, click on the "Current" to show the drop-down menu and select the number of partitions that you want your SAS host adapter to have. Each partition will appear as a separate drive on your computer.



3. Specify your Partition Information, Option setting and click on the "Apply" button.



If you're not sure which format to use, choose Mac OS X Extended (Journaled).

DRIVER INSTALLATION

4. When a message asks you to confirm you want to partition the disk, click on the "Partition" button. This may take a couple of minutes, depending on the size of the drives in your SAS host adapter. When the partitioning is complete, icons for each new partition show up on your desktop. They are now ready to use.

COMMAND LINE INTERFACE

5. CLI Introduction

This Command Line Interface (CLI) is provided for you to configure and manage the Areca SAS host adapter components in Windows, Linux and FreeBSD and more 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 Host-BIOS setup manager. With CLI, you can also use the CLI commands in both interactive and non-interactive (script) mode, providing higher level API functionalities. Before using this CLI, we assume that you have already installed your controller in your system. If you have not yet installed SAS host adapter, see chapter 2 Hardware Installation for instructions.

5.1 Supported Operating Systems

- Windows: Windows 8/Server 2012/7/2008(R2)/Vista/XP/Server 2003.
- Linux: RedHat, SuSE,etc.
- FreeBSD
- Solaris 10/11
- Mac OS x10.4.x/10.5.x/10.6.x/10.7.x/10.8.x/10.9.x

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

5.2. CLI Installation

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

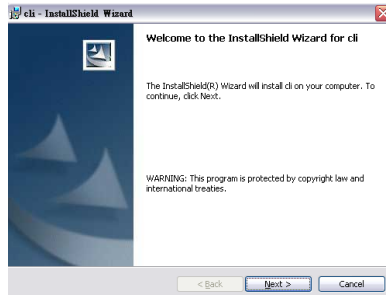
5.2.1. For Windows

Below screen 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.

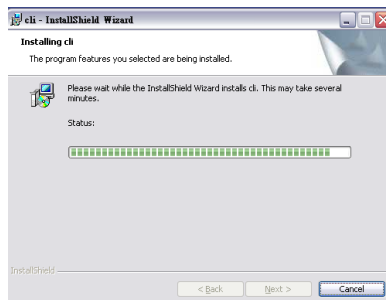
1. Insert the SAS host adapters CD in the CD-ROM drive. You also can download the CLI from the website: www.areca.com.tw

COMMAND LINE INTERFACE

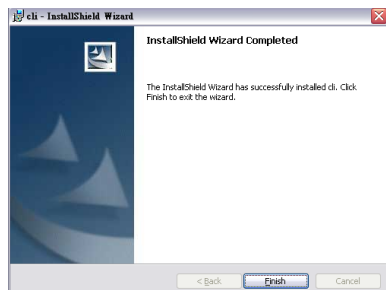
2. Run the setup.exe file that resides at: <CD-ROM>\CLI\windows\setup.exe on the CD-ROM.



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.



5. When this screen complete, you have completed the CLI software setup.
6. After a successful installation, the setup completed dialog box of the installation program is displayed.



Click the "Finish" button to complete the installation.

COMMAND LINE INTERFACE

5.2.2 For Linux, FreeBSD and Solaris

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

The following is the CLI installation procedure in the Linux, FreeBSD 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.

5.3 Accessing CLI

5.3.1 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 task bar and then click "Program".
2. CLI screen appears.

The CLI prompt is displayed in a DOS console window.

5.3.2 For Linux, FreeBSD and Solaris

To access the CLI from the Linux/FreeBSD/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/Solaris documentation for information on setting up directory paths.

5.4. CLI Command Line Configuration

5.4.1 Conventions

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.

5.4.2 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)

5.4.2.1 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.

COMMAND LINE INTERFACE

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

Syntax

Set <curctrl=xx>

Parameters

curctrl=xx

Example: CLI > set curctrl=1 [Enter]

Use this command to select the controller 1 on which to perform an action.

5.4.2.2 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

Use this command to select the controller 1 on which to perform an action.

To run the CLI using automated script

This part describes how to write batch files and CLI command scripts to perform the controller details task. 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.

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

COMMAND LINE INTERFACE

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 setsys is the file included the following two commands:

CLI set curctrl=1

CLI sys info

To run the automated script, enter: setsys

5.4.3 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 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

COMMAND LINE INTERFACE

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 function, 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.

COMMAND LINE INTERFACE

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.

Exit Command

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

Syntax

exit

5.4.3.1 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 sub-command.

Syntax

<CMD> -h or -help

CMD: main, set, sys, disk, pm, enc, exp, event or hw.

COMMAND LINE INTERFACE

5.4.3.2 Main Command

Main command in this category allows you to display main command in the SAS host adapters. The main command shows the currently selected host adapter and all host adapters installed in the system. This command provides a table of contents, providing brief descriptions of the commands and controller installed in the system. You can use the following command to get the **main** command function and description.

Syntax

CLI> main [Enter]

```
CLI> main
Copyright (c) 2004-2015 Areca, Inc. All Rights Reserved.
Areca CLI, Version: 1.14.7, Arclib: 350, Date: May 19 2015< Windows >

=====
S  #   Name      Type      Interface
=====
[*] 1   ARC-1320  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>
```

5.4.3.3 Set Commands

If there is more than one SAS host adapters in the system (up to 64 are supported), use this command to select the appropriate controller on which to perform an action. All actions or commands will be performed only on the currently selected host adapter. You can use the following command to get the **set** command function and description.

CLI > set -help [Enter]

Typical output looks like:

COMMAND LINE INTERFACE

```
CLI> set -help
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 SAS host adapter to receive a CLI command, you first need to select the host adapter. To select the adapter 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.

5.4.3.4 Sys Commands

Choose this option to display the host adapter system information properties. You can use the following command to get the sys command function and description.

CLI > sys -help [Enter]

Typical output looks like:

COMMAND LINE INTERFACE

```
CLI> sys -help
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]
smartnode    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 smartnode 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]
speednode    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 speednode 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]
=====
CLI>
```

5.4.3.4.1 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 dynamically 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)>>>
```

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.

5.4.3.4.2 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.

5.4.3.4.3 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>>>

COMMAND LINE INTERFACE

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.

5.4.3.4.4 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.

5.4.3.4.5 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.

COMMAND LINE INTERFACE

Use this command to set a "best" IO size for the SAS host adapter.

Syntax

sys cmdxfelen <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 cmdxfelen p=1 [Enter]

Set the max command transfer length is 4MB as a "best" IO size for the SAS host adapter.

5.4.3.4.6 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.

5.4.3.4.7 Update Adapter BIOS

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

COMMAND LINE INTERFACE

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_1320.BIN [Enter]

Update BIOS and file path is [C:\fw\I13_1320.BIN] to the currently selected SAS host adapter.

5.4.3.4.8 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

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.

COMMAND LINE INTERFACE

5.4.3.5 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:

```
CLI> disk -help
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]
=====
CLI> _
```

COMMAND LINE INTERFACE

A SAS host adapter is responsible 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).

5.4.3.5.1 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.

5.4.3.5.2 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 originally 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.

5.4.3.5.3 Display Disk SMART Data

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

Syntax

disk smartdata <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.

5.4.3.5.4 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.

COMMAND LINE INTERFACE

Example:

CLI >disk smartmode no=1 p=0 [Enter]

Set the SAS host adapter No. =1 disk drive works at SMART disabled mode.

5.4.3.5.5 Set Disk Cache Mode

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

Syntax

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

Parameter

<no=xx>

<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.

5.4.3.5.6 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 tem-

COMMAND LINE INTERFACE

porarily. 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.

5.4.3.5.7 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.

5.4.3.5.8 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>>
```

COMMAND LINE INTERFACE

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 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.

5.4.3.5.9 Display Disks Information

A SAS host adapter is responsible for traversing the device tree connected to it, assigning target IDs to each of the disks, No. of disk 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

COMMAND LINE INTERFACE

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. 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.

```
CLI> disk info
The Disk Information
=====
No Id:Lun Location Model Serial Rev Capacity
=====
<< Enclosure#1 : ARC-8016-.00.00.Areca h000 >>
1 0:0 SLOT 01 SEAGATE ST3500620SS 9QM328MV 0001 465.8GB
2 1:0 SLOT 02 FUJITSU MAX3036RC DQLP7700L1J 0104 34.2GB
3 2:0 SLOT 03 FUJITSU MAX3036RC DQLP7700L4A 0104 34.2GB
4 3:0 SLOT 04 FUJITSU MAX3036RC DQLP7700L5R 0104 34.2GB
5 4:0 SLOT 05 FUJITSU MAX3036RC DQLP7500L12 0104 34.2GB
6 5:0 SLOT 06 FUJITSU MAX3036RC DQLP7500H04 0104 34.2GB
7 6:0 SLOT 07 FUJITSU MAX3036RC DQLP7500JVB 0104 34.2GB
8 7:0 SLOT 08 SEAGATE ST373455SS 3LQ0K1D6 S513 60.4GB
9 8:0 SLOT 09 FUJITSU MAX3036RC DQLP7500JVB 0104 34.2GB
10 9:0 SLOT 10 FUJITSU MAX3036RC DQLP7700L51 0104 34.2GB
11 10:0 SLOT 11 FUJITSU MAX3036RC DQLP7500JVN 0104 34.2GB
12 11:0 SLOT 12 HITACHI HUS151436VLS300 J3889F6J A600 34.2GB
13 12:0 SLOT 13 HITACHI HUS151436VLS300 JB00K7TJ A540 34.2GB
14 13:0 SLOT 14 HITACHI HUS151436VLS300 JB00JVTJ A540 34.2GB
15 14:0 SLOT 15 HITACHI HUS151436VLS300 J386U52J A600 34.2GB
16 15:0 SLOT 16 HITACHI HUS151436VLS300 JB0685KK 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.
```

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]

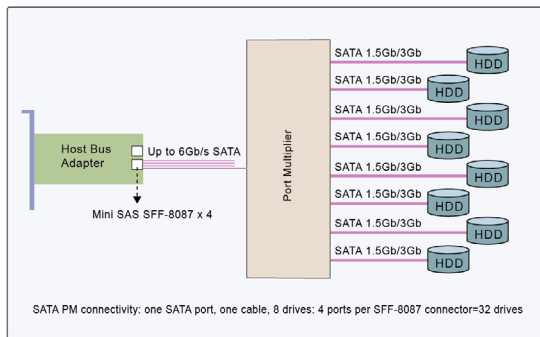
Display the No.=1 of disk drive detail information.

COMMAND LINE INTERFACE

```
CLI> disk info no=1
The Disk Information
=====
Target ID(ID:LUN)           : 0:0
Model Name                  : WDC WD1500HLFS-01G6U0
Serial Number               : WD-WXJ608ATI538
Firmware Rev.              : 04.04U01
Parent                     : Port Multiplier 118B: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.
```

5.4.3.6 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.

COMMAND LINE INTERFACE

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 : 0x110B:0x4140 >>
1 0:0 SLOT 00 UDC UD1500HIFS-01G6U0 UD-WXJ608AT1538 04.04U01 139.7GB
2 1:0 SLOT 01 ST3750640NS 50D1RRJ8 3.0EG 698.6GB
3 2:0 SLOT 02 UDC UD2002FVPS-01U1B0 UD-MCAVU0398323 04.05G04 1863.0GB
4 3:0 SLOT 03 UDC UD1001FALS-00J7B0 UD-UMATU0169046 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. You can use the following command to get the **pm** command function and description.

CLI > `pm -help` [Enter]

Typical output looks like:

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

5.4.3.6.1 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`

COMMAND LINE INTERFACE

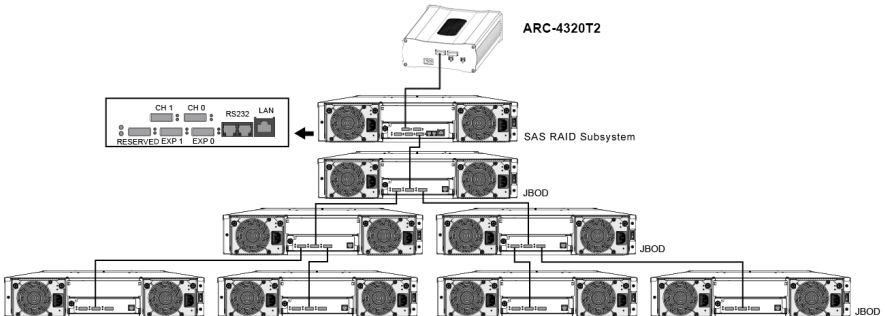
Description:

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.
```

5.4.3.7 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:

```
CLI> enc -help
Sub-Command & Parameters Of [ enc ]
Sub-Command Description
=====
ident      Parameter: <no=xx> <p=<0(indicator off)>1(indicator on)>>.
           Fn: Identify Selected Enclosure.
           Ex: Identify Enc#1.
           Command: enc ident no=1 p=1[Enter]
info       None.
           Fn: Display Enclosure Info.
           Command: enc info [Enter]
=====
CLI> _
```

COMMAND LINE INTERFACE

5.4.3.7.1 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.

5.4.3.7.2 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.

COMMAND LINE INTERFACE

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
=====
```

5.4.3.8 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:

```
CLI> exp -help
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 <mfgdataXXXXXXXX.XXX>
                3: DAT1 region - Data file <mfgdat1XXXXXXXX.XXX>
                4: Reserved
          For 6G Expanders:
                5: Reserved
                6: FW code region <sas2xfwXXXX.XXX>
                7: Reserved
                8: DATA region <mfgdat6gXXXXXXXX.XXX>
          Ex: Update 6G Expander FW code region And File Path Is In
          [C:\fu\sas2xfwXXXX.bin].
          Command: exp updatefw no=1 path=c:\fu\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]
=====
CLI>
```

COMMAND LINE INTERFACE

5.4.3.8.1 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 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 in [c:\fw\sas2xfwXXXX.bin] to the selected expander (number 1) controller.

COMMAND LINE INTERFACE

5.4.3.8.2 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-B4-69-00-00-3F
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.

COMMAND LINE INTERFACE

5.4.3.9 Event Commands

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. Typical output looks like:

```
CLI> event -help
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.

COMMAND LINE INTERFACE

```
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.

5.4.3.10 Hw Commands

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. Typical output looks like:

COMMAND LINE INTERFACE

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

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 -help
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.

COMMAND LINE INTERFACE

```
CLI> hw info
The Hardware Monitor Information
=====
[Enclosure#1 : Areca   ARC-8016-.B0.00.b000]
1V      : 1.040 V
5V      : 5.000 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.
```

5.4.3.11 Exit Command

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

Syntax

CLI> exit

Appendix A

Expander CLI Function

This Command Line Interface (CLI) is provided for you to configure the ARC-1320ix-16 SAS host adapter expander functions. The CLI is useful in environments where a graphical user interface (GUI) is not available. The CLI provides user to read or adjust the ARC-1320ix-16 on-board SAS expander parameters.

The CLI function can be done by using an ANSI/VT-100 compatible terminal emulation program. You must complete the appropriate installation procedure before proceeding with the CLI function. Whichever terminal emulation program is used must support the 1K XMODEM file transfer protocol.

The serial port on the SAS expander controller's back panel can be used in VT100 mode. The provided interface cable converts the RS232 signal of the RJ11 connector on the SAS expander controller into a 9-pin D-Sub male connector. The firmware-based terminal SAS expander management interface can access the expander through this RS-232 port. You can attach a VT-100 compatible terminal or a PC running a VT-100 terminal emulation program to the serial port for accessing the text-based setup menu. The ARC-1680ix Expander-CLI manual for expander is included on the shipped software <CD-ROM>\Documents\ARC-1680ix Expander-CLI.PDF. You can also download the latest version ARC-1680ix Expander-CLI manual from the websie <http://www.areca.com.tw/support/main.htm>.

APPENDIX

Appendix B

Upgrading Adapter Flash ROM Process

Since the PCIe SAS host adapter features flash ROM firmware, it is not necessary to change the hardware flash chip in order to upgrade the adapter BIOS. The user can simply re-program the old BIOS through the In-Band PCIe bus, using the oflash.exe flash DOS utility. The shipped CD contains the oflash.exe executable utility and a separate adapter flash image on the <CD-ROM>\BIOS\ . New releases of the adapter BIOS is available in the form of a DOS file on the shipped CD or Areca website. The following files name is available at the FTP site or the shipped CD :

i13_1320.bin: PCIe card BIOS for system board using readme.txt contains the history information of the BIOS code change in the main directory. Read this file first to make sure you are upgrading to the proper binary file. The BIOS version and date will be shown on the adapter BIOS startup banner. Select the right version file for the upgrade. Normally, user upgrades the i13_1320.bin for system M/B compatibility.

Upgrading BIOS Through Oflash.exe Flash DOS Utility

The oflash.exe flash utility program is a DOS application, which runs in the DOS operating system. Be sure of ensuring properly to communicate between SAS host adapter and oflash.exe flash DOS utility. Please make a bootable DOS floppy disk or UBS devices from other Windows operating system and copy SAS adapter BIOS package: oflash.exe and i13_1320.bin files to it.

Starting the OflashFlash Utility

You do not need to short any jumper cap on running oflash.exe flash utility. The oflasah.exe flash utility provides an on-line table of contents, brief descriptions of the help sub-commands.

Help Command

This `-h` or `-help` command provides an on-line table of contents, providing brief descriptions of the help sub-commands that the oflashflash utility recognizes.

The command syntax for the `oflash-h` or `-help` command is as follows:

`\> oflash-h` or `-help ---` display the oflashflash utility sub-command option.

The below example shows that oflashflash utility `oflash-h` or `-help` command gets detail information about its sub-command.

```
C:\>oflash
=====
= Copyright (c) 2009 Areca, Inc. All rights reserved.      =
= Areca SAS Host Adapter Flash Utility, Version: 1.04      =
=====
command: oflash[options]

/c ctrl#          -- assign controller number, default 0
/r filename       -- read, backup binary into filename from flash
/w filename       -- write, write binary into flash from filename
/l               -- list, list all adapters found

Example:
Write flash from file i13_1320.bin into adapter#0
command: oflash/ /c 0 /w i13_1320.bin [Enter]

c:\>_
```

/l Command

This `/l` command uses to display the oflash-supported SAS host adapter installed on your computer. Use this command to see which SAS host adapters are installed, and to identify the ID numbers assigned to each physical host adapter.

The command syntax for the `/l` command is as follows:

`\> oflash/l ---` list all SAS host adapters found.

This example shows a typical system response to a `/l` command:

`C:\> oflash/l`

APPENDIX

```
C:\>oflash/ l
=====
= Copyright (c) 2009 Areca, Inc. All rights reserved.      =
= Areca SAS Host Adapter Flash Utility, Version: 1.00      =
=====
Adapter Information
Adapter#00
Vendor ID/DeviceID/Bus/DevFunc: 17D3/1320/01/00 I/O Address: EFC80000

Adapter#01
DeviceID/Bus/DevFunc: 1320/1/0 I/O Address: CF00

c:\>_
```

/c Command

This /c command uses to select the host adapter for the /r read command or /w write command.

The command syntax for the /l command is as follows:

oflash/c ctrl# --- Assign controller number, default number=0
ctrl# is the SAS host adapter IDs representing the set of adapter(s) on which the command can be performed. By default, the oflash flash utility value set is host adapter 0.

/r Commands

This /r command uses to save the contents of a SAS host adapter's flash ROM contents into a file. The name of the save file is based on the command syntax filename.

The command syntax for the /r command is as follows:

oflash/c filename --- read, backup binary into filename from the flash.

The below example shows that oflashflash utility saves the SAS host adapter's flash ROM contents from SAS adapter 1 to a file name: 1320bak.bin.

```
C:\> oflash/c 1 /r 1320bak.bin
```

```
C:\>oflash/c 1 /r 1320bak.bin
=====
= Copyright (c) 2009 Areca, Inc. All rights reserved.      =
= Areca SAS Host Adapter Flash Utility, Version: 1.00      =
=====
Controller Information
  Controller#01
    DeviceID/Bus/DevFunc: 1320/1/0  I/O Address:   CF00

Current : Adapter #00 [AT25F2048]
Writing 262144 bytes into file 1320bak.bin: 100%
Read flash OK

c:\>_
```

/w Commands

This /w command uses to write a flash image data into SAS host adapter's flash ROM from the file. You must restart the computer for new BIOS to take effect after you complete the /w command. The command syntax for the write command is as follows:
oflash/w filename – write, write binary into flash from filename
The following example shows a typical system response after you completed the BIOS updated for the host adapter 1 from the i13_1320.bin file:

```
C:\> oflash c/1 /w i13_1320.bin
```

```
C:\>oflash/c 1 /w i13_1320.bin
=====
= Copyright (c) 2009 Areca, Inc. All rights reserved.      =
= Areca SAS Host Adapter Flash Utility, Version: 1.00      =
=====
Controller Information
  Controller#01
    DeviceID/Bus/DevFunc: 1320/4/0  I/O Address:   CF00

Current : Adapter #00 [AT25F2048]
Writing 55808 bytes into flash 100%
Write flash OK

c:\>_
```

APPENDIX

The following step by step instructions provide the process to update the flash.

1. Make the SAS adapter's BIOS package on bootable floppy disk or USB devices.
2. Insert the oflash floppy disk or USB device and restart your computer.

Note:

If your computer has not been set up to boot from the bootable floppy disk or USB device, enter the system BIOS setup utility to change the setting.

3. At the DOS command, type oflash followed by a /l command to list all SAS host adapter installed on your computer.
4. Update the flash ROM using oflash/c <ctrl#> /w <filename> command.
Where <ctrl#> is the number of the SAS host adapter which update its BIOS using the <filename> image data.
5. The oflashflash utility reads the image data from floppy disk or USB device and updates the flash ROM on the host adapter.