

Inspur Server 3008 Series RAID Controller Card Configuration Manual

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Abstract

This document describes the appearance and features of 12 G SAS RAID controller Inspur 3008IR/IT series, and provides instructions on how to configure RAID arrays and install drivers. These methods are also applicable to Broadcom 9300 and 9305 series.

Inspur assumes you have sufficient knowledge of servers and are well trained in protecting yourself from personal injury or product damages during service.

Symbol Conventions

Symbol	Description
	A potential for serious injury, or even death if not properly handled
	A potential for minor or moderate injury if not properly handled
	A potential loss of data or damage to equipment if not properly handled
	Operations or information that requires special attention to ensure successful installation or configuration
	Supplementary description of important information

The symbols that may be found in this document are defined as follows.

Revision History

Version	Date	Change
V1.4	2022/01/25	Optimized the contents and format
V1.3	2021/07/19	Updated names of figures and tables
V1.2	2021/07/05	Added recommended configurations for RAID controller cards
V1.1	2021/06/24	Optimized content and format
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Table of Contents

1	RAI	AID Introduction1					
	1.1	RAID	Functions1				
	1.2	RAID	Levels1				
		1.2.1	RAID 01				
		1.2.2	RAID 1				
		1.2.3	RAID 5				
		1.2.4	RAID 6				
		1.2.5	RAID 10				
		1.2.6	RAID 1E				
		1.2.7	RAID 505				
		1.2.8	RAID 605				
	1.3	SAS R	AID Controller Card Parameters6				
	1.4	Recor	nmended RAID Configurations6				
		1.4.1	With a Super-Capacitor6				
		1.4.2	Without a Super-Capacitor8				
2	Intr	oducti	on10				
	2.1	Abou	t Inspur SAS3008IR/IT10				
	2.2	Techr	nical Limitations of SAS3008IR11				
	2.3	Enviro	onmental Parameters of SAS RAID Controller Cards12				
3	Con	ifigurir	ng Inspur SAS3008IT/IR13				
	3.1	Initial	Configuration (Legacy Mode)13				
		3.1.1	Logging in to the CU Screen13				
		3.1.2	Creating RAID Arrays16				
		3.1.3	Configuring RAID Arrays32				
	3.2	Initial	Configuration (UEFI Mode)52				

		3.2.1	Logging in to the Configuration Screen	52
		3.2.2	Creating RAID Arrays	53
		3.2.3	Configuring RAID Arrays	65
4	Ноч	v to Ins	stall Inspur SAS RAID Controller Card Driver	76
	4.1	Loadi	ing Driver during Windows Installation	76
	4.2	Loadi	ing Driver during Red Hat Linux Installation	93
	4.3	Loadi	ing Driver during SUSE Linux Installation	96
	4.4	Loadi	ing Driver during VMware Installation	99
5	Ноч	v to Ok	otain Help	100
	5.1	Prepa	arations Before Contacting Inspur	
		5.1.1	Collecting Troubleshooting Information	
		5.1.2	Making Preparations for Debugging	
	5.2	How	to Use Documents	
	5.3	How	to Contact Us	101
6	Арр	oendix.		

1 RAID Introduction

This chapter introduces the basic concepts and features of RAID.

1.1 RAID Functions

RAID is the abbreviation of "Redundant Array of Independent Disk". Simply put, RAID is a technology that combines multiple independent hard disks (physical hard disks) in different ways to form a group of hard disks (logical hard disks), thus providing higher storage performance than a single hard disk and providing data backup. Depending on the different combinations of disk displays, RAID can be classified into different RAID levels. With data backup, users can restore corrupted data from the backup to ensure data security. In addition, users can manage the drive group just like a single drive, and can also partition or format it. In brief, operations on a RAID array are the same as those on a single drive. The only difference lies in that a RAID array delivers a higher storage speed and enables automatic data redundancy backup.

RAID supports:

- Automatic detection of failed drives
- Rebuilding of data in bad sectors
- Drive backup
- Hot-swap drives
- Drive capacity expansion

1.2 RAID Levels

Various RAID levels are available to provide different data access speeds, security levels, and cost performances. Users can select appropriate RAID levels based on their actual needs in terms of availabilities, performances, and capacities of storage systems. The commonly used RAID levels include RAID 0, RAID 1, RAID 5, RAID 6, RAID 10, RAID 1E, RAID 50, and RAID 60.

1.2.1 RAID 0

Also known as striping, RAID 0 divides data into multiple data blocks with the same size and writes them into different drives in the array. With data distributed across multiple drives, data read/write is performed concurrently on these drives. Therefore, the capacity and data transfer rate of RAID 0 is theoretically N times of those of a single drive ("N" represents the total number of drives composing RAID 0). However, RAID 0 cannot ensure data security since it does not support data redundancy, and therefore is applicable only to scenarios that require high I/O but low data security.



Figure 1-1 RAID 0

1.2.2 RAID 1

RAID 1 is also referred to as mirroring. In a RAID 1 array, each data drive has a mirrored drive. Data is written to both data and mirrored drives simultaneously, and is read only from the data drive. If a data drive fails, data will be read from its mirrored drive. After the failed drive is replaced, data can be rebuilt from the mirrored drive. RAID 1 features high reliability but its effective capacity is half of the total drive capacity. It applies to scenarios where high fault tolerance is required, such as finance, banking, etc.

Figure 1-2 RAID 1



1.2.3 RAID 5

RAID 5 consists of rotating parity and independent access. The parity information is

evenly distributed to all drives in the array by certain rules instead of being written to a fixed drive. Therefore, each drive contains both data information and parity information. If any drive fails, data on the failed drive can be rebuilt from the parity bit data on other drives in the array. RAID 5 requires at least 3 drives. The advantages are better utilization of the capacity of all redundant drives configured in the array and excellent read/write performance. Note that drive failures will affect the throughput rate. This means a longer time is required to rebuild data than it takes in RAID 1 configuration.

Figure 1-3 RAID 5



1.2.4 RAID 6

Compared with RAID 5, RAID 6 adds a second independent parity block for double parity. The two independent parity systems use different algorithms to ensure high data reliability. Data processing is not affected even if 2 drives fail at the same time. However, RAID 6 requires larger drive space for storing parity information and has a higher "write penalty" compared with RAID 5. Therefore, RAID 6 provides lower write performance than RAID 5.

Figure 1-4 RAID 6



1.2.5 RAID 10

RAID 10 is a combination of RAID 1 and RAID 0. RAID 10 requires at least 4 drives. It delivers the best performance, protection, and capacity among all RAID levels. In RAID 10, mirrored drives are in pairs, and their data is stripped on the entire array. In most cases, RAID 10 can resist failures of multiple drives at the same time, and is able to better ensure stable running of the system. Data loss is least likely to happen in RAID 10. RAID 10 is a perfect choice for data protection because of the same redundancy feature as RAID 1 (mirroring).



Figure 1-5 RAID 10

1.2.6 RAID 1E

RAID 1E is the enhanced version of RAID 1, which integrates data striping and mirroring to enhance the data recovery capability. However, since all data gets written at least twice, the load is increased in the RAID processor, thereby lowering read/write speed of drives. Like RAID 1, RAID 1E data is mirrored, so the logical drive capacity is half the total capacity of all member drives. RAID 1E requires at least 3 drives.

Figure 1-6 RAID 1E



1.2.7 RAID 50

RAID 50 or RAID 5+0 is a combination of RAID 5 (distributed parity) and RAID 0 (striping). RAID 0 allows data to be striped and written to multiple drives simultaneously, and RAID 5 ensures data security by using parity bits evenly distributed on drives. Therefore, RAID 50 delivers higher data security than RAID 0 and better read/write performance than RAID 5.

HDD 1	HDD 2	HDD 3	HDD 4	HDD 5	HDD 6
A	B	Parity	C	D	Parity
E	Parity	F	G	Parity	H
Parity	I	J	Parity	K	L
M	N	Parity	O	P	Parity

Figure 1-7 RAID 50

1.2.8 RAID 60

RAID 60 or RAID 6+0 is a combination of RAID 6 and RAID 0. RAID 0 allows data to be striped and written to multiple drives simultaneously. RAID 6 ensures data security by using 2 parity blocks distributed evenly on drives.

Figure 1-8 RAID 60

		<u>/Ik</u>					
HDD 1	HDD 2	HDD 3	HDD 4	HDD 5	HDD 6	HDD 7	HDD 8
	29						09
Parity	A	В	Parity	Parity	C	D	Parity
Parity	Parity	E	F	Parity	Parity	G	н
	Parity	Parity	J	K	Panty	Parity	L
M	N	Parity	Parity	0	P	Parity	Parity

1.3 SAS RAID Controller Card Parameters

This section describes the general technical parameters and environmental parameters of SAS RAID controller cards.

The following table lists the performance and drive space utilization of different RAID levels supported by the RAID controller.

	Poliphility	Read	Write	Drive Space	
KAID Level	Reliability	Performance	Performance	Utilization	
RAID 0	Low	High	High	100%	
RAID 1	High	Low	Low	50%	
RAID 5	Relatively high	High	Medium	(N - 1)/N	
RAID 6	Relatively high	High	Medium	(N - 2)/N	
RAID 10	High	Medium	Medium	50%	
RAID 1E	High	Medium	Medium	(N + 1)/2N	
RAID 50	High	High	Relatively high	(N - M)/N	
RAID 60	High	High	Relatively high	(N - M × 2)/N	
Note: "N" is the	ne total number of	drives in a RAID a	array and "M" is th	e number of	
sub-arrays in	the BAID array				

Table 1-1 Performance and Drive Space Utilization of Different RAID Levels

1.4 Recommended RAID Configurations



- The following policy settings apply to Broadcom and Microsemi RAID controller cards. Recommended configurations for HDDs and SSDs are provided respectively with performance or data security prioritized.
- The configurations are for reference only. You can adjust them according to your actual application.

The detailed configurations are described below.

1.4.1 With a Super-Capacitor

- 1 Optimal Performance Settings for HDDs
- Broadcom RAID controller card:
 - Read Policy = Read Ahead

- Write Policy = Write Back
- IO Policy = Direct
- Disk Cache = Enable
- Microsemi RAID controller card:
 - Read Caching/Write Caching = Controller Cache
 - Drive Write Cache = Enable

2 Optimal Performance Settings for SSDs

RAID levels without parity (RAID 0/RAID 1/RAID 10)

- Broadcom RAID controller card:
 - Read Policy = Normal (No Read Ahead)
 - Write Policy = Write Through
 - IO Policy = Direct
 - Disk Cache = Unchanged (not changeable)
- Microsemi RAID controller card:
 - Read Caching/Write Caching = SSD IO bypass
 - Drive Write Cache = Enable

RAID levels with parity (RAID 5/RAID 6/RAID 50/RAID 60)

- 1. Small block random read and write:
- Broadcom RAID controller card:
 - Read Policy = Normal (No Read Ahead)
 - Write Policy = Write Through
 - IO Policy = Direct
 - Disk Cache = Unchanged (not changeable)
- Microsemi RAID controller card:
 - Read Caching/Write Caching = SSD IO bypass
 - Drive Write Cache = Enable
- 2. Large block sequential read and write:
- Broadcom RAID controller card:

- Read Policy = Normal (No Read Ahead)
- Write Policy = Write Back
- IO Policy = Direct
- Disk Cache = Unchanged (not changeable)
- Microsemi RAID controller card:
 - Read Caching/Write Caching = SSD IO bypass
 - Drive Write Cache = Enable

3 Recommended Data Security Settings

Security Settings for HDDs:

- Broadcom RAID controller card:
 - Read Policy = Read Ahead
 - Write Policy = Write Back
 - IO Policy = Direct
 - Disk Cache = Disable
- Microsemi RAID controller card:
 - Use the default settings.

Security Settings for SSDs:

- Same as the performance settings for SSDs.

1.4.2 Without a Super-Capacitor



If no super capacitor module is used, we assume that data security is not considered and the optimal performance settings are provided by default.

1 Optimal Performance Settings for HDDs

- Broadcom RAID controller card:
 - Read Policy = Read Ahead
 - Write Policy = Always Write Back

- IO Policy = Direct
- Disk Cache = Enable
- Microsemi RAID controller card:
 - Use the default settings.

2 Optimal Performance Settings for SSDs

Same as the optimal performance settings for SSD with a super-capacitor.

2 Introduction

This chapter describes the appearance, features, and functions of Inspur 12 G SAS RAID controller cards. For information about 9300/9305 series, refer to the datasheet on Broadcom website.

2.1 About Inspur SAS3008IR/IT

Inspur SAS3008 SAS controller card is a cost-effective SAS solution designed specifically to provide external disk storage and JBOD expansion capabilities for servers. Refer to the figure below for its appearance.



Figure 2-1 SAS3008 SAS Controller Card

Inspur SAS3008 is an 8-port 12 G SAS controller based on Fusion-MPT[™] (Message Passing Technology) architecture with PCIe x8 interfaces and a powerful I/O storage engine. It can transparently execute all data verification and recovery tasks.

Moreover, Inspur SAS3008IT/IR SAS controller card supports SAS data transfer at 3 Gbit/s, 6 Gbit/s and 12 Gbit/s, and each port supports SSP, SMP, STP, and other protocols.

Inspur SAS3008IT/IR SAS controller card features:

- None of the RAID levels (Inspur SAS3008IT)
- RAID 0, 1, 1E, and 10 (Inspur SAS3008IR)
- PCIe 3.0 x8 interfaces to deliver a bandwidth rate up to 8 Gbit/s

- Eight SAS/SATA ports for disk storage
- Connection to a maximum of 256 extended devices
- Support for SAS/SATA disks and SSDs
- Support for hot-swap drives
- Drive sleep mode

2.2 Technical Limitations of SAS3008IR

The technical limitations on Inspur 3008IR:

- 1. Limitation of RAID arrays on drive number:
 - RAID 1: A maximum of 2 disks are allowed to create a RAID 1 array, and a maximum of 2 global hot spare (HS) disks can be configured.
 - RAID 1E/RAID 10: 3 10 disks are required, and a maximum of 2 global HS disks can be configured.
 - RAID 0: 2 10 disks are allowed for RAID 10 creation, but no global HS disk can be configured.
- 2. Limitation on creating RAID arrays:
 - A single SAS controller card allows configuration of 2 global HS disks at most.
 - A single SAS controller card allows creation of a maximum of 2 RAID arrays with no more than 14 disks (including HS drives).

(For example, to create 2 RAID 1 arrays, you need 4 disks and cannot create other RAID arrays.)

- While creating a RAID array, you cannot manually partition RAID or define parameters such as Stripe Size. (For example, if RAID 0 is created with two 2 T drives, the partition size can only be 4 T).
- Linux OS with disk partitions in Ext3, Ext2 and other formats cannot be installed when the capacity of a single disk or RAID array is greater than 2 T.
- When you install Linux OS for drives connected directly to SAS3008IR, the drive letter (Sda, Sdb...) under the OS may not correspond to the physical slot ID on the drive backplane.
- RAID arrays cannot be created by mixed use of drives such as SAS+SATA, SSD+SATA/SAS, or 4 K+512 e.

- 3. The order of RAID array creation:
 - To create 2 RAID arrays, start from the disk with a larger slot ID, so as not to reverse the order after creating 2 RAID arrays in sequence.

(For example, a SAS controller card connects 6 drives, namely drives in Slot 0, 1, 2, 3, 4, and 5. It is planned to create a RAID 1 array with drives in Slot 0 and 1 and a RAID 10 array with drives in Slot 2, 3, 4, and 5. Specifically, select drives in Slot 2, 3, 4, and 5 to create the RAID 10 array first, and then select drives Slot 0 and 1 to create the RAID 1 array. Thus, Slot 0 and 1 precede Slot 2, 3, 4, and 5.)

2.3 Environmental Parameters of SAS RAID Controller Cards

This section describes the environmental parameters of SAS RAID controller cards.

The environmental parameters of Inspur SAS RAID controller are shown below.

Specification	12 G SAS
МТВБ	> 2,000,000 hours
Operating Voltage	+12 V ± 8%; 3.3 V ± 8%
Operating Temperature	0°C - 55°C (32°F) - 131°F)
Storage Temperature	-45°C - 105°C (-49°F - 221°F)
Relative Humidity	5% - 90% (non-condensing)
Form Factor	Low Profile (2.6" × 6.6")

Table 2-1 Environmental Parameters

3 Configuring Inspur SAS3008IT/IR

3.1 Initial Configuration (Legacy Mode)

This section describes how to configure Inspur SAS3008IT/IR, which is also applicable to Broadcom 9300 series.

3.1.1 Logging in to the CU Screen

This section demonstrates with Inspur SAS3008IR to introduce how to log in to the CU configuration screen and the key functions on the CU screen.

3.1.2 Creating RAID Arrays

Introduces how to create RAID arrays on Inspur SAS3008IR.

3.1.3 Configuring RAID Arrays

Introduces how to configure Inspur SAS3008IR.



- The operating procedures described in this section are also applicable to Inspur SAS3008IT.
- The main difference between SAS3008IT and SAS3008IR is that the former cannot be configured to any RAID level.

3.1.1 Logging in to the CU Screen

This section details how to log in to the Configuration Utility (CU) screen of Inspur SAS3008IR and the key functions on the CU screen.

Scenario:

Inspur SAS3008IR MPT3BIOS CU is a tool for configuring and managing the Inspur SAS3008IR controller. The CU is embedded in the controller MPT3BIOS and runs independently of the operating system, making it simple and easy for RAID configuration and management.

This section guides installation and debugging engineers on how to log in to the CU screen of Inspur SAS3008IR controller.



Logging in to the CU screen requires a server restart, which will cause system service interruption.

Procedures:

1. Hard reset the server

Log in to the target server remotely via BMC and click **Hard Reset** in the remote console, as shown below.

Figure 3-1 Hard Resetting the Server

Inspur Management System & admin		A OverView	C Refresh	UID:OFF	POWER:ON -	① Language(语言) •	? Help	A Logout
Information	Server Power Control							
Storage								
📮 Remote Control	Virtual Power Button Power Restore Setting							
O Power and Fan	Server Power Control							
Power Supply Monitor	Current Power Status		ON					
Power Supply Configure			Power On					
Server Power Control	Control Ontions	0	Power Cycle	DIL				
Power Consumption	Control Options	0	Hard Reset	>				
Fan Speed Control		0	Soft Shutdown	1				
BMC Settings								
Logs							Perfo	orm Action
▲ Fault Diagnosis								
S Administration								

 During POST, when the prompt Press <Ctrl><C> to Start AVAGO Config Utility appears, press <Ctrl> and <C> to enter the SAS3008IR MPT3BIOS Config Utility screen, as shown below.

Figure 3-2 Prompt on How to Start Config Utility



The Inspur SAS3008IR POST screen is shown below.

Figure 3-3 SAS3008IR POST Screen

Avago Technologies MPT SAS3 BIOS MPT3BIOS-8.17.00.00 (2015.02.05) Copyright 2000-2015 Avago Technologies. All rights reserved									
ENCL	LUN	VENDOR	PRODUCT	PRODUCT	SIZE N				
SLOT	NUM	NAME	IDENTIFIER	REVISION	NVDATA				
		LSI	SAS3008-IR	8.00.00.00	07:01:00:06				
0	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
1	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
2	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
3	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
4	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
5	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
6	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
7	0	HITACHI	HUC109030CSS600	A440	279.3 GiB				
pporta	able	devices	are presented for	system boot	selection!				
Avago MPT3 boot ROM successfully installed!									
	o Tec) BIOS-6 right ENCL SLOT 0 1 2 3 4 5 6 7 pporta 0 0 MPT3	o Technold BIOS-8.17 right 2000 ENCL LUN SLOT NUM 0 0 1 0 2 0 1 0 2 0 3 0 4 0 5 0 5 0 7 0 pportable o MPT3 boo	o Technologies MP1 BIOS-8.17.00.00 (2 right 2000-2015 Av SLOT NUM NAME 	o Technologies MPT SAS3 BIOS BIOS-8.17.00.00 (2015.02.05) right 2000-2015 Avago Technologies. ENCL LUN VENDOR PRODUCT SLOT NUM NAME IDENTIFIER LSI SAS3008-IR 0 HITACHI HUC109030CSS600 1 0 HITACHI HUC109030CSS600 2 0 HITACHI HUC109030CSS600 3 0 HITACHI HUC109030CSS600 4 0 HITACHI HUC109030CSS600 5 0 HITACHI HUC109030CSS600 6 0 HITACHI HUC109030CSS600 7 0 HITACHI HUC109030CSS600	o Technologies MPT SAS3 BIOS BIOS-8.17.00.00 (2015.02.05) right 2000-2015 Avago Technologies. All rights r ENCL LUN VENDOR PRODUCT PRODUCT SLOT NUM NAME IDENTIFIER REVISION LSI SAS3008-IR 8.00.00.00 0 0 HITACHI HUC109030CSS600 A440 1 0 HITACHI HUC109030CSS600 A440 2 0 HITACHI HUC109030CSS600 A440 3 0 HITACHI HUC109030CSS600 A440 4 0 HITACHI HUC109030CSS600 A440 5 0 HITACHI HUC109030CSS600 A440 6 0 HITACHI HUC109030CSS600 A440 7 0 HITACHI HUC109030CSS600 A440 6 0 HITACHI HUC109030CSS600 A440 5 0 HITACHI HUC109030CSS600 A440 5 0 HITACHI HUC109030CSS600 A440 6 0 HITACHI HUC109030CSS600 A440 5 0 HITACHI HUC109030CSS600 A440 6 0 HITACHI HUC109030CSS600 A440 5 0 HITACHI HUC109030CSS600 A440 6 0 HITACHI HUC109030CSS600 A440 5 0 HITACHI HUC109030CSS600 A440				

Enter the CU screen of SAS3008IR, which is shown below:

Figure 3-4 CU Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Adapter List Global Properties								
Adapter	PCI PC Bus De	I PCI v Fnc	PCI Slot	FW Revision	Status	Boot Order		
INSPUR 3008IR	08 00	00	09	8.00.00.00-IR	Enabled	0		
							Ŧ	
Esc = Exit Menu	F1/Sh	ift+1 =	Heln					
Alt+N = Global Prop	erties	-/+ = A	lter B	oot Order Ins/	Del = Alter	Boot Lis	t	

Press <Alt> and <N> under the screen to view the global properties of the existing RAID controller card. The screen is shown below:

Figure 3-5 Global Properties



3.1.2 Creating RAID Arrays

This section describes how to create RAID arrays after entering the CU screen of Inspur SAS3008IR.



- To create a RAID array, the drives in the same RAID array shall be of the same type and specifications.
- Inspur SAS3008IT cannot be configured to any RAID level.

1 Creating RAID 0

Scenario:

This section guides installation and debugging engineers on how to create RAID 0 arrays with Inspur SAS3008IR controller.

Procedures:

1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-6 CU Screen

Avago Technologies Adanter List Globa	Config U	tility ties	v8.17.00.00 (2015.02.05)				
Adapter List Globa Adapter INSPUR 3008IR	l Proper PCI PC Bus De 08 00	ties I PCI J Fnc 00	PCI Slot Ø9	FW Revision 8.00.00.00-	n Status -IR Enabled	Boot Order 0	
Esc = Exit Menu Alt+N = Global Pron	F1/Sh erties	ift+1 = -/+ = f	= Help Alter B	oot Order 1	InszDel = Alter	Boot List	

2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter the **Adapter Properties** screen, as shown below.

Figure 3-7 Adapter Properties Screen

Avago Technologies Config Utility v Adapter Properties SAS3008	8.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support RAID Properties SAS Topology Advanced Adapter Properties	INSPUR 3008IR 09 08:00 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEmabled BIOS & OSJ
Esc = Exit Menu F1/Shift+1 = Help Enter = Select Item -/+/Enter = Change	Item

3. Select **RAID Properties** and press <Enter> to enter the **Select New Volume Type** screen, as shown below.

Figure 3-8 Select New Volume Type Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Select New Volume Type SAS3008						
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!					
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!					
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!					
Esc = Exit Menu F1/Shift+1 Enter = Choose volume type to cr	eate					

 Select Create RAID 0 Volume and press <Enter> to enter the Create New Volume screen which lists all the disks that can be added to the new RAID array, as shown below.

Figure 3-9 Create New Volume Screen

Avago Technologies Config Utility Create New Volume SAS3008	j vł	B.17.00.00 (2	2015.0	2.05)		
Volume Type: Holume Size:	RAID	0				
	DATE	Destaur	D	D 1 - 1.		
Slot Device Identifier	RHID	Urive Status	Pred E-11	JISK Sime		
	DISK	Status	rall	51ZC	_	
0 HITHCHI HUC109030C55600 H44	IN LNOI		NO	279.3 618		
1 HITACHI HUC109030CSS600 A44	LINO I		No	279.3 G1B	_	
2 HITACHI HUC109030CSS600 A44	IN LNO J		No	279.3 GiB		
3 HITACHI HUC109030CSS600 A44	10 [No]		No	279.3 GiB		
4 HITACHI HUC109030CSS600 A44	0 [No]		No	279.3 GiB		
5 HITACHI HUC109030CSS600 A44	0 [No]		No	279.3 GiB		
6 HITACHI HUC109030CSS600 A44	0 [No]		No	279.3 GiB		
7 HITACHI HUC109030CSS600 A44	0 [No]		No	279.3 GiB		
					.	
Esc = Exit Menu F1/Shift+1 = Help Space/+/- = Select disk for volume C = Create volume						

5. To add a disk to the RAID array, press <->, <+> or the space key in the RAID Disk column to mark whether the disk needs to be added to the existing RAID array. It will be prompted that the data on the disk to be added to the RAID array will be lost, if any. Press <C> to continue adding the disk to the RAID array. RAID Disk will be marked as Yes or No, indicating whether the disk has been added to the existing RAID array, as shown below.

Figure 3-10 Adding a Drive

Avago Technologies Config Utility Create New Volume SAS3008	v8	.17.00.00 (2015.0	2.05)	
Volume Type:	RAID	0			
Volume Size:	1.630	TiB			
Slot Device Identifier	RAID	Drive	Pred	Disk	
Num	Disk	Status	Fail	Size	
0 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3 GiB	
1 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3 GiB	
2 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3 GiB	
3 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3 GiB	
4 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3 GiB	
5 HITACHI HUC109030CSS600 A440			No	279.3 GiB	
6 HITACHI HUC109030CSS600 A440	[No]		No	279.3 GiB	
7 HITACHI HUC109030CSS600 A440	[No]		No	279.3 GiB	
$F_{SC} = F_{Xit} Menu F_{1/Shift+1} =$	Heln				M
Space/+/- = Select disk for volume	nerp	C = Create	volume	1	

 Press <C> to enter the RAID array creation confirmation screen, select Save changes then exit this menu, and press <Enter> to save the changes, as shown below.

Figure 3-11 Saving Changes

Avago	Technologies	Config Utility	v8.17.00.00 (2015.02.05)	
Fee	Fyit Manu	Create and sav Cancel Exit Save changes Discard chang Exit the Conf	e new volume? then exit this menu es then exit this menu iguration Utility and Reboot	
F2C -	Exit nenu	F1/3011 t+1 =	nerp	

7. After the setting is completed, you will be automatically redirected back to the **Adapter Properties** screen, as shown below.

Avago Technologies Config Utility Adapter Properties SAS3008	v8.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support	INSPUR 3008IR 09 08:00 8.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 [Enabled BIOS & OS]
RAID Properties	
SAS Topology	
Advanced Adapter Properties	5
Esc = Exit Menu F1/Shift+1 = He Enter = Select Item -/+/Enter = Cha	elp ange Item

Figure 3-12 Adapter Properties Screen

 To view the RAID array created, select RAID Properties, press <Enter> to enter Select New Volume Type screen, and View Existing Volume will appear at the top, as shown below.

Figure 3-13 RAID Properties Menu

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Select New Volume Type SAS3008							
View Existing Volume	View the existing configuration.						
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!						
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!						
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!						
Esc = Exit Menu F1/Shift+1 = Help Enter = Choose volume type to create							

9. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) View Volume SAS3008							
Volume Identifier Type Size Status Task Hanage Holume	1 of 1 LSI Logical Volume 3000 RAID 0 1.630 TiB Optimal None						
Slot Device Identifier Num 0 HITACHI HUC109030CSS600 1 HITACHI HUC109030CSS600 2 HITACHI HUC109030CSS600 3 HITACHI HUC109030CSS600 4 HITACHI HUC109030CSS600 5 HITACHI HUC109030CSS600	RAID Disk A440 Yes A440 Yes A440 Yes A440 Yes A440 Yes A440 Yes A440 Yes	Hot Spr No No No No No	Drive Status Ok Ok Ok Ok Ok Ok Ok	Pred Fail No No No No No	Disk Size 278.4 GiB 278.4 GiB 278.4 GiB 278.4 GiB 278.4 GiB 278.4 GiB		
Esc = Exit Menu F1/Shif Enter=Select Item Alt+N=Next	t+1 = Help Volume						

10. RAID 0 array creation has been completed. Press <Esc> to exit.

2 Creating RAID 1

Scenario:

This section guides installation and debugging engineers on how to create RAID 1 arrays with Inspur SAS3008IR controller.

Procedures:

1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-15 CU Screen

Avago Technologies Adapter List Globa	Config 1 Prop	Utili erties	ity s	γ	3.17.00.00	(2015.	02.05)		
Adapter	PCI Bus	PCI F Dev F	PCI Fnc	PCI Slot	FW Revisio		Status	Boot Order	
INSPUR 30081R	08	00 0	30	09	8.00.00.00	-IR	Enabled	0	
Esc = Exit Menu	F1/3	Shift+	+1 =	Help	at Orlar	I	1 - 414	D = - 4 T	
Alt+N = Global Prop	erties	-/+	= A]	lter Bo	ot Urder	Ins/De	I = Alter	Boot I	ist

2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter the **Adapter Properties** screen, as shown below.

Figure 3-16 Adapter Properties Screen

Avago Technologies Config Utility v Adapter Properties SAS3008	8.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support RAID Properties SAS Topology Advanced Adapter Properties	INSPUR 3008IR 09 08:00 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEnabled BIOS & OSI
Esc = Exit Menu F1/Shift+1 = Help Enter = Select Item -/+/Enter = Change	Item

3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Avago Technologies Config Utilit Select New Volume Type SAS300	y v8.17.00.00 (2015.02.05) 8
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!
Esc = Exit Menu F1/Shift+1 Enter = Choose volume type to cr	= Help eate

Figure 3-17 Select New Volume Type Screen

4. Select **Create RAID 1 Volume** and press <Enter> to enter **Create New Volume** screen which lists all the disks that can be added to the new RAID array, as shown below.

Figure 3-18 Create New Volume Screen

Avago Technologies Config Utility Create New Volume SAS3008	٧Đ	3.17.00.00 G	2015.0	2.05)	
Volume Type:	RAID	1			
Volume Size:					
Slot Device Identifier	RAID	Drive	Pred	Disk	
	U1SK	Status	Fall	51ZC 279 2 CHR	
1 HITACHI HUC109030CSS600 A440	[No]		No	279.3 GiB	
2 HITACHI HUC109030CSS600 A440	[No]		No	279.3 GiB	
3 HITACHI HUC109030CSS600 A440	[No]		No	279.3 GiB	
4 HITACHI HUC109030CSS600 A440	[No]		No	279.3 GiB	
5 HIIHUHI HUU109030055600 H440 6 HITACHI HUC109030055600 A440			No	279.3 61B 279 3 61B	
7 HITACHI HUC109030CSS600 A440	[No]		No	279.3 GiB	
Esc = Exit Menu F1/Shift+1 = Help Space/+/- = Select disk for volume C = Create volume					

5. To add a disk to the RAID array, press <->, <+> or the space key in the RAID Disk column to mark whether the disk needs to be added to the existing RAID array. It will be prompted that the data on the disk to be added to the RAID array will be lost, if any. Press <C> to continue adding the disk to the RAID array. RAID Disk will be marked as Yes or No, indicating whether the disk has been added to the existing RAID array. The disk added first is the master drive, and the disks added later are the slave drives. Slave disks will synchronize the contents of the master drive, as shown below.

Figure 3-19 Adding a Drive

Avago Technologies Config Utility Create New Volume SAS3008	v8	.17.00.00 (2015.0	2.05)	
Volume Type:	RAID	1			
Volume Size:	278.4	GiB			
Slot Device Identifier Num Ø HITACHI HUC109030CSS600 A440 1 HITACHI HUC109030CSS600 A440 2 HITACHI HUC109030CSS600 A440 3 HITACHI HUC109030CSS600 A440 4 HITACHI HUC109030CSS600 A440 5 HITACHI HUC109030CSS600 A440 6 HITACHI HUC109030CSS600 A440 7 HITACHI HUC109030CSS600 A440	RAID Disk [Yes] [No] [No] [No] [No] [No] [No]	Drive Status Primary Secondary Max Dsks Max Dsks Max Dsks Max Dsks Max Dsks Max Dsks	Pred Fail No No No No No No	Disk Size 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB	
Esc = Exit Menu F1/Shift+1 = Space/+/- = Select disk for volume	Help	C = Create	volume		

Press <C> to enter the RAID array creation confirmation screen, select Save changes then exit this menu, and press <Enter> to save the changes, as shown below.

Figure 3-20 Saving Changes

Avago	Technologies	Config Utility	v8.17.00.00 (2015.02.05)	
Fsc =	Fyit Menu	Create and sa Cancel Exit Save changes Discard chan Exit the Con	ve new volume? then exit this menu ges then exit this menu figuration Utility and Reboot	
ESC =	Exit nenu	f 1/3n11 t+1	- uerb	

7. After the setting is completed, you will be automatically redirected back to the **Adapter Properties** screen, as shown below.

Figure 3-21 Adapter Properties Screen

Avago Technologies Config Utility v8 Adapter Properties SAS3008	3.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NUDATA Version Status Boot Order Boot Support RAID Properties SAS Topology Advanced Adapter Properties	INSPUR 3008IR 09 08:00 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 [Enabled BIOS & OS]
Esc = Exit Menu Enter = Select Item -/+/Enter = Change	Item

 To view the RAID array created, select RAID Properties, press <Enter> to enter Select New Volume Type screen, and View Existing Volume will appear at the top, as shown below.

Avago Technologies Config Utilit Select New Volume Type SAS300	y v8.17.00.00 (2015.02.05) 8
View Existing Volume	View the existing configuration.
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!
Esc = Exit Menu F1/Shift+1 Enter = Choose volume type to cr	= Help eate

9. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.

Avago Technologies Config Uti View Volume SAS3008	ility v8.17.00.00 (2015.02.05)
Volume	1 of 1
Identifier	LSI Logical Volume 3000
Type	RAID 1
Size	278.4 GiB
Status	Optimal
Task	3% Initialized
Manage Volume Slot Device Identifier Num Ø HITACHI HUC109030CSS600 1 HITACHI HUC109030CSS600	RAID Hot Drive Pred Disk Disk Spr Status Fail Size A440 Yes No Primary No 278.4 GiB A440 Yes No Secondary No 278.4 GiB
Esc = Exit Menu F1/Shif	ft+1 = Help
Enter=Select Item Alt+N=Next	t Volume

Figure 3-23 RAID Array Screen

10. RAID 1 array creation has been completed. Press <Esc> to exit.

3 Creating RAID 10/1E

Scenario:

This section guides installation and debugging engineers on how to create RAID 10/1E arrays with Inspur SAS3008IR controller.

Procedures:

1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-24 CU Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Adapter List Global Properties							
Adapter	PCI PCI Bus Dev	PC I Fnc	PCI Slot	FW Revision	Status	Boot Order	
INSPUR 30081R	08 00	00	09	8.00.00.00-IR	Enabled	0	
							Ţ
Esc = Exit Menu	F1/Shi	ft+1 =	Help				
Alt+N = Global Prop	erties -	∕+ = A	lter B	oot Order Ins	∕Del = Alter	Boot L	ist

2. Select the Inspur 3008IR on the main screen of CU, and press <Enter> to enter Adapter Properties screen, as shown below.

Avago Technologies Config Utility v Adapter Properties SAS3008	3.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support RAID Properties SAS Topology	INSPUR 3008IR 09 08:00 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEnabled BIOS & OSI
Advanced Adapter Properties	
Esc = Exit Menu F1/Shift+1 = Help Enter = Select Item -/+/Enter = Change	Item

Figure 3-25 Adapter Properties Screen

3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-26 Select New Volume Type Screen

Avago Technologies Config Utilit Select New Volume Type SAS300	y v8.17.00.00 (2015.02.05) 8
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 1E/18 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!
Esc = Exit Menu F1/Shift+1 Enter = Choose volume type to cr	= Help eate

 Select Create RAID 1E/10 Volume and press <Enter> to enter Create New Volume screen which lists all the disks that can be added to the new RAID array, as shown below.

Figure 3-27	Create	New	Volume	Screen
-------------	--------	-----	--------	--------

Avago Technologies Config Utility Create New Volume SAS3008	v8.17.00.00 G	(2015.02.05)	
Volume Type: Volume Size:	RAID 1E		
Slot Device Identifier Num 0 1 HITACHI HUC109030CSS600 A440 2 HITACHI HUC109030CSS600 A440 3 HITACHI HUC109030CSS600 A440 3 HITACHI HUC109030CSS600 A440 4 HITACHI HUC109030CSS600 A440 5 HITACHI HUC109030CSS600 A440 6 HITACHI HUC109030CSS600 A440 7 HITACHI HUC109030CSS600 A440	RAID Drive Disk Status INol INol	Pred Disk Fail Size No 279.3 No 279.3	GiB GiB GiB GiB GiB GiB GiB GiB GiB
Esc = Exit Menu F1/Shift+1 = Space/+/- = Select disk for volume	Help C = Create	volume	

5. To add a disk to the RAID array, press <->, <+> or the space key in the RAID Disk column to mark whether the disk needs to be added to the existing RAID array. It will be prompted that the data on the disk to be added to the RAID array will be lost, if any. Press <C> to continue adding the disk to the RAID array. RAID Disk will be marked as Yes or No, indicating whether the disk has been added to the existing RAID array, as shown below.

Note: RAID 1E arrays can be created with an odd number (> 2) of disks and RAID 10 arrays with an even number (> 3) of disks.

Figure 3-28 Adding a Drive

Avago Technologies Config Utility Create New Volume SAS3008	v8.17	7.00.00 (2	015.02	.05)	
Volume Tupe:	RAID 1E				
Volume Size:	696.1 Gi	i B			
Slot Device Identifier	RAID Dr	rive	Pred	Disk	
Num	Disk St	tatus	Fail	Size	_
0 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3	GiB 🔷
1 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3	GiB
2 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3	GiB
3 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3	GiB
4 HITACHI HUC109030CSS600 A440	[Yes]		No	279.3	GiB
5 HITACHI HUC109030CSS600 A440	[No]		No	279.3	GiB
6 HITACHI HUC109030CSS600 A440	[No]		No	279.3	GiB
7 HITACHI HUC109030CSS600 A440	[No]		No	279.3	GiB
Esc = Exit Menu F1/Shift+1 = Help					
Space/+/- = Select disk for volume	C =	= Create v	olume		

Press <C> to enter the RAID array creation confirmation screen, select Save changes then exit this menu, and press <Enter> to save the changes, as shown below.

Figure 3-29 Saving Changes

Avago Technologies	Config Utility	v8.17.00.00 (2015.02.05)	
	Create and save	new volume?	_
	Cancel Exit	hen evit this menu	
	Discard change	s then exit this menu	
	Exit the Confi	guration Utility and Reboot	
Esc = Exit Menu	F1/Shift+1 =	Help	

7. After the setting is completed, you will be automatically redirected back to the Adapter Properties screen, as shown below.

Figure 3-30 Adapter Properties Screen

Avago Technologies Config Utility v Adapter Properties SAS3008	8.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support RAID Properties SAS Topology Advanced Adapter Properties	INSPUR 3008IR 09 08:00 8:00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 [Enabled BIOS & OS]
Esc = Exit Menu F1/Shift+1 = Help Enter = Select Item -/+/Enter = Change	Item

 To view the RAID array created, select RAID Properties, press <Enter> to enter Select New Volume Type screen, and View Existing Volume will appear at the top, as shown below.

Figure 3-31 RAID Properties Menu

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Select New Volume Type SAS3008			
View Existing Volume	View the existing configuration.		
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!		
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!		
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!		
Esc = Exit Menu F1/Shift+1 = Help Enter = Choose volume type to create			

9. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.
Figure 3-32 RAID Array Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) View Volume SAS3008					
Volume Identifier Type Size Status Task Manage Volume	1 of 1 LSI RAID 1E 696.1 Gi Optimal 0% Initi	Logical B alized	Volume	3000	
Slot Device Identifier Num 0 HITACHI HUC109030CSS600 1 HITACHI HUC109030CSS600 2 HITACHI HUC109030CSS600 3 HITACHI HUC109030CSS600 4 HITACHI HUC109030CSS600	RAID Disk A440 Yes A440 Yes A440 Yes A440 Yes A440 Yes A440 Yes	Hot Spr No No No No	Drive Status Ok Ok Ok Ok Ok Ok	Pred Fail No No No No	Disk Size 278.4 GiB 278.4 GiB 278.4 GiB 278.4 GiB 278.4 GiB
Esc = Exit Menu F1/Shift+1 = Help Enter=Select Item Alt+N=Next Volume					

10. RAID 10/1E array creation has been completed. Press <Esc> to exit.

3.1.3 Configuring RAID Arrays

This section introduces how to configure Inspur SAS3008IR.

1 Configuring Global HS Drives

A maximum of 2 global HS disks can be created for higher data security after creation of RAID 1/1E/10 arrays on Inspur SAS3008IR. Taking RAID 1 as an example, this section guides installation and debugging engineers on how to configure global HS drives.

(i) IMPORTANT

- The server must have unconfigured drives, and drives already added to a RAID array cannot be configured as HS drives.
- An HS drive must be a SATA or SAS drive with its capacity not smaller than the maximum capacity of a drive in any RAID array.
- RAID arrays (RAID 0, 1, 1E, and 10) support HS drives except RAID 0.

Procedures:

 During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-33 CU Screen

Avago Technologies Adapter List Globa	Config 1 Prope	Utility erties	vł	3.17.00.00 (20	015.02.05)	
Adapter	PCI P Bus D	PCI PCI Dev Fnc	PCI Slot	FW Revision	Status	Boot Order
INSPUR 30081R	08 0	00 00	09	8.00.00.00-11	Enabled	0
Esc = Exit Menu Alt+N = Global Prop	F1∕S erties	Shift+1 = -/+ = A	Help Iter Bo	oot Order Ins	s∕Del = Alter	Boot List

2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter the **Adapter Properties** screen, as shown below.

Figure 3-34 Adapter Properties Screen

Avago Technologies Confi Adapter Properties SA	ig Utility v8 NS3008	.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bu MPT Firmware R SAS Address NVDATA Version Status Boot Order Boot Support RAID Propertie SAS Topology Advanced Adapt	(s/Dev) Revision 1 S Ser Properties	INSPUR 3008IR 09 08:00 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEnabled BIOS & OSI
Esc = Exit Menu F1 Enter = Select Item -/	/Shift+1 = Help /+/Enter = Change	Item

3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-35 Select New Volume Type Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Select New Volume Type SAS3008					
View Existing Volume	View the existing configuration.				
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!				
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!				
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!				
Esc = Exit Menu F1/Shift+1 = Help Enter = Choose volume type to create					

4. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.



- On this screen, move the cursor to **Volume** and press <Enter> to turn on the LED of RAID member drive.
- For multiple RAID arrays, press <Alt> and <N> to switch among them.

Figure 3-36 RAID Array Screen

Avag View	Avago Technologies Config Utility v8.17.00.00 (2015.02.05) View Volume SAS3008						
	Volume Identifier Type Size Status Task Manage Volume	1 LS RA 273 0p 8%	of 1 I I I B.4 GiE timal Initia	ogical lized	Volume 30	00	
Slot Num Ø 1	Device Identifier HITACHI HUC109030CSS600 HITACHI HUC109030CSS600	A440 A440	RAID Disk Yes Yes	Hot Spr No No	Drive Status Primary Secondary	Pred Fail No No	Disk Size 278.4 GiB 278.4 GiB
Esc Ente	= Exit Menu F1/Shif r=Select Item Alt+N=Next	t+1 = Volu	Help me				

5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-37 Manage Volume Screen

Avago Technologies Config U Manage Volume SAS3008	tility v8.17.00.00 (2015.02.05)
Identifier Type Size Status Task	LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 10% Initialized
Manage Hot Spares	
Activate Volume	
Delete Volume	
Online Capacity Expans	ion
Esc = Exit Ménu F1/Sh Enter = Select Item	ift+1 = Help

6. Select **Manage Hot Spares** and press <Enter> to enter the **Manage Hot Spares** screen, as shown below.

Figure 3-38 Manage Hot Spares Screen

Avago	Avago Technologies Config Utility v8.17.00.00 (2015.02.05)					
Manag	Manage Hot Spares SAS3008					
	Identifier Type Size Status Task	LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 13% Initialized				
Slot Num 8 1 2 3 4 5 6 7	Device Identifier HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600	Hot Spr A440 [No] A440 [No] A440 [No] A440 [No] A440 [No] A440 [No] A440 [No] A440 [No]	Drive Status RAID 	Pred Fail No No No No No No	Disk Size 278.4 GiB 278.4 GiB 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB 279.3 GiB	
Esc	Esc = Exit Menu F1/Shift+1 = Help					
Space	Space/+/- = Change Item C = Commit Changes					

 Press <->, <+>, or the space key in the Hot SPR column to mark the HS drive. If Hot Spr is marked as Yes, the disk has been configured as an HS drive; if No, the disk has not been configured as an HS drive, as shown below.

Figure 3-39 Marking Hot Spares

Avago	Avago Technologies Config Utility v8.17.00.00 (2015.02.05)					
Manag	Manage Hot Spares SAS3008					
	Identifier Type Size Status Task	LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 19% Initialized				
Slot Num 0 1 2 3 4 5 6 7	Device Identifier HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600	Hot Spr A440 [No] A440 [No] A440 [No] A440 [No] A440 [No] A440 [No] A440 [No] A440 [No]	Drive Status RAID RAID	Pred Fail No No No No No No No	Disk Size 278.4 G 279.3 G 279.3 G 279.3 G 279.3 G 279.3 G 279.3 G 279.3 G	iB ▲ iB iB iB iB iB iB iB
Esc :	Esc = Exit Menu F1/Shift+1 = Help					
Space	Space/+/- = Change Item C = Commit Changes					

 Press <C> to enter the configuration confirmation screen, select Save changes then exit this menu, and press <Enter> to save the changes, as shown below.

Figure 3-40 Saving Changes

Avago	Technologies	Conf ig	Utility	v8.17.00.00 (2015.02.05)
Esc =	Exit Menu	Perfor Canc Save Disc Exit	cm Hot Spa: el Exit changes L ard change the Config Shift+1 =	re update to existing volume? hen exit this menu s then exit this menu guration Utility and Reboot Help
				1

9. After the setting is completed, you will be automatically redirected back to **Manage Volume** screen, as shown below.

Figure 3-41 Manage Volume Screen

Avago Technologies Config U Manage Volume SAS3008	tility v8.17.00.00 (2015.02.05)
Identifier Type Size Status Task Manage Hot Spares Consistency Check	LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 27% Initialized
Activate Volume Delete Volume	
Online Capacity Expans	ion
Esc = Exit Menu F1/Sh Enter = Select Item	ift+1 = Help

10. The setting is completed.

2 Importing a Foreign Configuration

Scenario:

A RAID may have been configured for a physical disk newly installed in the server. Import this foreign configuration for it to become effective in the existing controller card. This section guides installation and debugging engineers on how to import a foreign configuration.

Procedures:

1. During POST, press <Ctrl> and <C> to log in to CU screen of Inspur SAS3008IR, as shown below.

Avago Technologies Config Utility Adapter List Global Properties v8.17.00.00 (2015.02.05) PCI FW Revision Adapter PCI PCI Boot Bus Dev Order 08 00 00 09 8.00.00.00-IR Enabled 0 F1/Shift+1 = Help ;ies -/+ = Alter Boot Order Esc = Exit Menu Alt+N = Global Properties Ins/Del = Alter Boot List

Figure 3-42 CU Screen

2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.



Avago Technologies Config Utility Adapter Properties SAS3008	v8.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support RAID Properties SAS Topology Advanced Adapter Propert	INSPUR 3008IR 09 08:80 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEmabled BIOS & OSJ
Esc = Exit Menu F1/Shift+1 = Enter = Select Item -/+/Enter = (Help Change Item

3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-44 Select New Volume Type Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Select New Volume Type SAS3008					
View Existing Volume	View the existing configuration.				
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!				
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!				
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!				
Esc = Exit Menu F1/Shift+1 = Help Enter = Choose volume type to create					

4. Select **View Existing Volume** and press <Enter> to display the RAID array screen.

Figure 3-45 RAID Array Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) View Volume SAS3008									
	Volume Identifier	1 (LS	of 1 I I	ogical	Volume 30	00			
	Type Size	RAID 1 278 4 GiB							
	Status Task	Optimal							
	Nanaga Halung	67.	1111010	11260					
	nanaye volume								
Slot Num	Device Identifier		RAID Disk	Hot Spr	Drive Status	Pred Fail	Disk Size		
0 1	HITACHI HUC109030CSS600 HITACHI HUC109030CSS600	A440 A440	Yes Yes	No No	Primary Secondary	No No	278.4 GiB 278.4 GiB		
Esc Ente	Esc = Exit Menu F1/Shift+1 = Help Enter=Select Item Alt+N=Next Volume								

5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-46 Manage Volume Screen

Avago Technologies Config U Manage Volume SAS3008	ltility v8.17.00.00 (2015.02.05)
Identifier Type Size Status Task Manage Hot Spares Consistency Check Activate Volume Delete Volume Online Capacity Expans	LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 5% Initialized
Esc = Exit Menu F1/Sh Enter = Select Item	aift+1 = Help

 Select Activate Volume and press <Enter> to enter the RAID activation confirmation screen. Press <Y> to confirm the activation and <Esc> to exit the configuration screen. The Activate Volume screen is shown as follows. Figure 3-47 RAID Activation Confirmation Screen



3 Deleting a RAID Array

Scenario:

When the server does not require a RAID array, delete the RAID array to free up the disk space. This section guides installation and debugging engineers on how to delete a RAID array.

Procedures:

1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-48 CU Screen

Avago Technologies	Conf i	q Uti	lity	Ų	8.17.00.00	(2015.0	12.05)		
Adapter List Globa	l Pro	perti	es						
Adapter	PCI	PCI	PCI	PCI	FW Revisi	on S	Status	Boot	
	Bus	Dev	Fnc	Slot				Order	
INSPUR 3008IR	08	00	00	09	8.00.00.0	9–IR E	Inabled	0	
									V
Esc = Exit Menu	F1.	∕Shif	t+1 =	= Help					
Alt+N = Global Prop	ertie	s -/	+ = f	lter B	oot Order	Ins/Del	= Alter	Boot	List

2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.

Figure 3-49 Adapter Properties Screen

Avago Technolo Adapter Prope	ogies Config Utility v rties SAS3008	8.17.00.00 (2015.02.05)
Ada PCI PCI MPT SAS NVDI Sta Boo Boo Boo Boo Adu	pter Slot Address(Bus/Dev) Firmware Revision Address ATA Version tus t Order t Support D Properties Topology anced Adapter Properties	INSPUR 3008IR 09 08:00 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEnabled BIOS & OS J
Esc = Exit Mer Enter = Selec	nu F1/Shift+1 = Help t Item -/+/Enter = Change	Item

3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-50 Select New Volume Type Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Select New Volume Type SAS3008							
View Existing Volume	View the existing configuration.						
Create RAID 1 Volume	Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!						
Create RAID 1E/10 Volume	Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!						
Create RAID 0 Volume	Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!						
Esc = Exit Menu F1/Shift+1 Enter = Choose volume type to cr	= Help eate						

4. Select **View Existing Volume** and press <Enter> to display the RAID array screen, as shown below.

Figure 3-51 RAID Array Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) View Volume SAS3008								
Volume Identifier Type Size Status Task	1 o LSI RAI 278 Opt 2%	1 of 1 LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 2% Initialized						
Manage Volume Slot Device Identifier Num Ø HITACHI HUC109030 1 HITACHI HUC109030	9CSS600 A440 9CSS600 A440	RAID Disk Yes Yes	Hot Spr No No	Drive Status Primary Secondary	Pred Fail No No	Disk Size 278.4 GiB 278.4 GiB		
Esc = Exit Menu F1/Shift+1 = Help Enter=Select Item Alt+N=Next Volume								

5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-52 Manage Volume Screen

Avago Technologies Config U Manage Volume SAS3008	tility v8.17.00.00 (2015.02.05)
Identifier Type Size Status Task Manage Hot Spares Consistency Check Activate Volume Delete Volume Online Capacity Expans	LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 20% Initialized
Esc = Exit Menu F1/Sh Enter = Select Item	ift+1 = Help

 Select Delete Volume, press <Enter> to enter the deletion confirmation screen, and press <Y> to confirm the deletion. The previous data will be deleted together with the array, as shown below.

Figure 3-53 Deletion Confirmation Screen



4 Consistency Check

Scenario:

For a fault-tolerant virtual drive, regular consistency checks are required. A

consistency check aims to inspect the correctness and validity of the redundant data in RAID 1/10/1E arrays. This section guides installation and debugging engineers on how to perform a consistency check.

Procedures:

1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-54 CU Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Adapter List Global Properties									
Adapter	PCI PC Bus De	CI PCI ev Fnc	PCI Slot	FW Revisio	on S [.]	tatus	Boot Order		
INSPUR 3008IR	08 00	00 6	09	8.00.00.00	J-IR E	nabled	0		
								V	
Esc = Exit Menu Alt+N = Global Prop	F1∕S} erties	nift+1 = -∕+ = A	Help lter B	oot Order	Ins/Del	= Alter	Boot Lis	t	

2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.

Figure 3-55 Adapter Properties Screen

Avago Technologies Config Utility va Adapter Properties SAS3008	3.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support RAID Properties	INSPUR 3008IR 09 08:00 8.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEnabled BIOS & OSJ
SAS Topology Advanced Adapter Properties	
Esc = Exit Menu F1/Shift+1 = Help Enter = Select Item -/+/Enter = Change	Item

3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

 Avago Technologies Config Utility Select New Volume Type -- SAS3008
 v8.17.00.00 (2015.02.05)

 View Existing Volume
 View the existing configuration.

 Create RAID 1 Volume
 Create a RAID 1 volume consisting of 2 disks plus up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!

 Create RAID 1E/10 Volume
 Create a RAID 1E or RAID 10 volume consisting of 3 to 10 disks including up to 2 optional hot spares. ALL DATA on volume disks will be DELETED!

 Create RAID 0 Volume
 Create a RAID 0 volume consisting of 2 to 10 disks. ALL DATA on volume disks will be DELETED!

 Esc = Exit Menu
 F1/Shift+1 = Help Enter = Choose volume type to create

Figure 3-56 Select New Volume Type Screen

4. Select **View Existing Volume** and press <Enter> to display the RAID array screen, as shown below.

Figure 3-57 RAID Array Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) View Volume SAS3008							
Volume Identifier Type Size Status Task	1 of 1 LSI 1 RAID 1 278.4 Gil Optimal 2% Initia	Cogical 3 alized	Volume 30	00			
Slot Device Identifier Num Ø HITACHI HUC109030CSS600 1 HITACHI HUC109030CSS600	RAID Disk A440 Yes A440 Yes	Hot Spr No No	Drive Status Primary Secondary	Pred Fail No No	Disk Size 278.4 GiB 278.4 GiB		
Esc = Exit Menu F1/Shift+1 = Help Enter=Select Item Alt+N=Next Volume							

5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-58 Manage Volume Screen

Avago Technologies Config U Manage Volume SAS3008	ltility v8.17.00.00 (2015.02.05)
Identifier Type Size Status Task Manage Hot Spares Consistency Check Activate Volume Delete Volume	LSI Logical Volume 3000 RAID 1 278.4 GiB Optimal 8% Initialized
Online Capacity Expans	sion
Esc = Exit Menu F1/Sh Enter = Select Item	nift+1 = Help

 Select Consistency Check, press <Enter> to enter the consistency check confirmation screen, and press <Y> to start checking. After the check is completed, you will be automatically redirected back to Manage Volume screen, as shown below.

Figure 3-59 Consistency Check Confirmation Screen



5 Viewing a Topology

Scenario:

This section guides installation and debugging engineers on how to view the topology of disks controlled by Inspur SAS3008IR controller.

Procedures:

1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-60 CU Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Adapter List Global Properties									
Adapter	PCI Bus	PCI Dev	PCI Fnc	PCI Slot	FW Revisio	n S	tatus	Boot Order	
INSPUR 30081R	08	00	00	09	8.00.00.00	-IR E	nabled	0	
		01 . 0 (
Alt+N = Global Prop	r1/2 erties	5h1ft -/+	;+1 = + = A	Help lter B	oot Order	Ins∕Del	= Alter	Boot	List

2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.

Figure 3-61 Adapter Properties Screen

Avago Technologies Config Utility Adapter Properties SAS3008	8.17.00.00 (2015.02.05)
Adapter PCI Slot PCI Address(Bus/Dev) MPT Firmware Revision SAS Address NVDATA Version Status Boot Order Boot Support RAID Properties SAS Topology Advanced Adapter Properties	INSPUR 3008IR 09 08:00 8.00.00.00-IR 56C92BF0:00004546 07.01.00.06 Enabled 0 IEnabled BIOS & OSI
Esc = Exit Menu F1/Shift+1 = Help Enter = Select Item -/+/Enter = Chang	e Item

3. Select **SAS Topology** and press <Enter> to enter **SAS Topology** screen, as shown below.

INSPUR 3008IR(08:00) L Controller L RAID1 VOL L Controller L RAID1 VOL L Controller L RAID1 VOL L Controller L Controlle
Esc = Exit F1/Shift+1 = Help

4. Select the item to be viewed and press <Enter> to view the topology of disks on the screen controlled by LSI SAS3008 controller, as shown below.

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) SAS Topology SAS3008				
INSPUR 3008 IR(08:00) Controller - Slot 0 - Slot 1 - Slot 2 - Slot 3 - Slot 4 - Slot 5 - Slot 6 - Slot 7 CRAID1 VOL - Bay 0 - Bay 1 Esc = Exit F1/Shift+1	Device Identifier Direct Attach Devices RAID Physical Disk RAID Physical Disk HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600	A440 A440 A440 A440 A440 A440 A440 A440	Device Info Controller SAS SAS SAS SAS SAS SAS SAS SAS RAID RAID	
Alt+D = Device Properties Alt+M = More Keys				

5. Select a single disk or RAID array and perform the following operations:

 Press <ALT> and <D> to view the properties of the selected device and provide an interface for disk formatting and verification, as shown below.

Format: Format the drive.

Verify: Check and verify the drive.

Figure 3-64 Device Properties Screen

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) Device Properties SAS3008			
Device Identifier H Scan Order 1 Phy Number 2 Slot Number 8 RAID Member 9 Device Information S Neg Link Speed 6 Disk Capacity 2 SAS Address 5 Serial Number 8 Format Verify	HITACHI HUC109030CSS600 A440 11 2 3 4 4 es 5 8 5 8 5 8 5 8 5 8 7 8 4 6 1 8 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9		
Alt+N = Next Device Alt+P = P	Previous Device Enter = Select Item		

b. Press <ALT> and to set the selected device as the first boot device.
 After the setting is completed, **Boot** will be shown in **Device Info**, as shown below.

Figure 3-65 Setting as the First Boot Device

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) SAS Topology SAS3008				
	Device Identifier		Device	
INSPUR 3008IR(08:00)			Info	
L Controller	Direct Attach Devices		Controller	
Slot 0	RAID Physical Disk		SAS	
-Slot 1	RAID Physical Disk		SAS	
-Slot 2	HITACHI HUC109030CSS600	A440	SAS,Boot	
- Slot 3	HITACHI HUC109030CSS600	A440	SAS	
-Slot 4	HITACHI HUC109030CSS600	A440	SAS	
-Slot 5	HITACHI HUC109030CSS600	A440	SAS	
-Slot 6	HITACHI HUC109030CSS600	A440	SAS	
L Slot 7	HITACHI HUC109030CSS600	A440	SAS	
L RAID1 VOL	LSI Logical Volume	3000		
- Bau Ø	HITACHI HUC109030CSS600	A440	RAID	
L Bau 1	HITACHI HUC109030CSS600	A440	RAID	
2				
Esc = Frit F1/Shift+1	= Heln			
Alt+D = Denice Properties $Alt+M$ = More Keus				
	s micon - nore keys			

c. Press <ALT> and <A> to set the selected device as the second boot device. After the setting is completed, **Alt** will be shown in **Device Info**, as shown below.

Figure 3-66 Setting as the Second Boot Device

Avago Technologies Config Utility v8.17.00.00 (2015.02.05) SAS Topology SAS3008				
INSPUR 3008IR(08:00) Controller Slot 0 Slot 1 Slot 2	Device Identifier Direct Attach Devices RAID Physical Disk RAID Physical Disk HITACHI HUC109030CSS600	A440	Device Info Controller SAS SAS SAS, Boot	
- Slot 3 - Slot 4 - Slot 5 - Slot 6 Slot 7 L RAID1 VOL - Bay 0 Bay 1	HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 HITACHI HUC109030CSS600 LITACHI HUC109030CSS600 LSI Logical Volume HITACHI HUC109030CSS600 LSI Logical Volume HITACHI HUC109030CSS600	A440 A440 A440 A440 A440 3000 A440 A440	SAS,AIt SAS SAS SAS SAS RAID RAID	
Esc = Exit F1/Shift+1 = Help Alt+D = Device Properties Alt+M = More Keys				

d. Press <Enter> to turn on the locate LED (s) of the corresponding RAID array disks or a single drive. After viewing, press <Esc> consecutively to exit the query screen.

3.2 Initial Configuration (UEFI Mode)

This section introduces how to configure Inspur SAS3008IT/IR in the UEFI mode.



- The operating steps described in this chapter are also applicable to Inspur SAS3008IT.
- The main difference between SAS3008IT and SAS3008IR is that the former cannot be configured to any RAID level.

3.2.1 Logging in to the Configuration Screen

Procedures:

- 1. Log in to the real-time server desktop via the remote virtual console.
- Restart the server to enter BIOS configuration screen. The shortcut keys for entering different BIOS may vary. Please follow the prompt on the screen. When the blue progress bar appears as shown below, press <Delete> as prompted to enter BIOS main screen.

Figure 3-67 Prompt



 Go to BIOS > Advanced, select CSM Configuration, and press <Enter> as shown below. The BIOS screen may vary. Set Boot option filter to UEFI only in the BIOS.

Figure 3-68 Setting Boot option filter to UEFI Only

Aptio Setup Utility Advanced	– Copyright (C) 2017 America	an Megatrends, Inc.
Compatibility Support Module Conf	iguration	This option controls
CSM Support GateA20 Active	[Enabled] [Upon Request]	
Boot option filter	[UEFI only]	
Option ROM execution Network Storage Video Other PCI devices	(UEFI) (UEFI) (UEFI) (UEFI)	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>

4. Press <F10>. In the popup confirmation dialog box, select **Yes** and press <Enter> to save the settings and exit the BIOS configuration screen. The server restarts and logs you on the LSI SAS3008 management screen.

3.2.2 Creating RAID Arrays

- To create a RAID array, the disks in the same RAID array shall be of the same type and specifications.
- Inspur SAS3008IT cannot be configured to any RAID level.

1 Creating a RAID 0 Array in UEFI Mode

 Re-enter the BIOS configuration screen, switch to the Advanced tab, select the LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>. Figure 3-69 Selecting LSI SAS3008 Controller under Advanced Tab

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Main <mark>Advanced</mark> Chipset Processor Server Mgmt Security Boot		
 Trusted Computing Super IO Configuration Serial Port Console Redirection PCI Subsystem Settings Network Stack Configuration CSM Configuration PCH 10GBE PHY Card Configuration 	Select to enter Avago Technologies (LSI) SAS3 MPT Controller HII Configuration Application	
 iSCSI Configuration Intel(R) Virtual RAID on CPU LSI SAS3 MPT Controller SAS3008, (PCISubDeviceId: 0x8, PCIBus: 0x65, PCIDevice: 0x0, PCIFunc: 0x0, PCISlot: 0x23) 	<pre>→+: Select Screen f↓: Select Item Enter: Select</pre>	

2. On the popup screen, select LSI SAS3 MPT Controller Version 16.00.00.00 and press <Enter>.

Figure 3-70 Selecting LSI SAS3 MPT Controller Version 16.00.00.00



3. On the popup screen, select **Controller Management** and press < Enter>.

Figure 3-71 Selecting Controller Management

Aptio Setup Utility – Copyright Advanced	(C) 2017 American Megatrends, Inc.
 Controller Management Physical Disk Management 	Select to Manage Controller Properties,

4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-72 Selecting Create Configuration

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Advanced		
 View Controller Properties Change Controller Properties Create Configuration Save Controller Events Advanced Controller Properties 	Select to Create a RAID Virtual Disk	

5. On the popup screen, select **RAID 0** in **Select RAID Level** menu. Note: Select **Select Physical Disks** to select 2 disks and press <Enter> to create RAID 0.

Figure 3-73 Creating RAID 0

	Aptio Setup Ut Advanced	ility – Copyright (C) 201	7 American Megatrends, Inc.
Þ	Select RAID level Select Physical Disks	[RAID 0]	Create a Virtual Disk. RAID 0: 2 to 10 Disks, RAID 1: 2 Disks, RAID 1E: 3 to 9 Disks, RAID 10: 4 to 10 Disks. All data on selected Disks will be deleted!!

- 6. On the popup screen, configure the following settings:
 - a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for RAID array creation have SATA interfaces.
 - b. Set the disk status for RAID array creation to **Enabled**.
 - c. Select **Apply Changes** and press <Enter>.

Figure 3-74 Related Settings

Aptio Advanced	Setup Utility	– Copyright (C)	2017 American	Megatrends, Inc.
Selected RAID Level Select Interface Typ Select Media Type 0:1:2 SATA SSD-512e 0:1:3 SATA SSD-512e 0:1:4 SATA SSD-512e 0:1:5 SATA SSD-512e 0:1:5 SATA SSD-512e 0:1:7 SATA SSD-512e 0:1:7 SATA SSD-512e Check All Uncheck All	90 447 GB 447 GB 447 GB 447 GB 447 GB 447 GB 447 GB	RAID 0 [SATA] [SSD-512b] [Enabled] [Disabled] [Disabled] [Disabled] [Disabled]		Select to continue the creation of the Virtual Disk
				↔: Select Screen

7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press <Enter>.

Figure 3-75 Setting Confirm to Enabled

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Advanced			
Creating a Configuration (Virtual Disk) may take a few minutes to complete.		Select to continue with Yes	
Confirm	[Enabled]		
No			

8. On the popup screen, select **OK** and press <Enter>.

Figure 3-76 Selecting OK

Aptio Advanced	Setup Utility – Copyright	(C) 2017 American	Megatrends, Inc.
Operation completed ▶ OK	successfully		Press OK to continue

 To view the RAID array, go to LSI SAS3 MPT Controller Version 16.00.00.00 > Virtual Disk Management > Manage Virtual Disk Properties. You can view details on the popup screen and switch among multiple RAID arrays via Select Virtual Disk.

Figure 3-77 RAID Information

iew

2 Creating a RAID 1 Array in UEFI Mode

 Re-enter the BIOS configuration screen, switch to the Advanced tab, select LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>.

Figure 3-78 Selecting LSI SAS3008 Controller under Advanced Tab

Aptio Setup Utility – Copyright (C) 2017 Ameri	can Megatrends, Inc.
Main Advanced Chipset Processor Server Mgmt	Security Boot →
 Trusted Computing Super IO Configuration Serial Port Console Redirection PCI Subsystem Settings Network Stack Configuration CSM Configuration PCH 10GBE PHY Card Configuration 	Select to enter Avago Technologies (LSI) SAS3 MPT Controller HII Configuration Application
 iSCSI Configuration Intel(R) Virtual RAID on CPU LSI SAS3 MPT Controller SAS3008,	↔: Select Screen
(PCISubDeviceId: 0xB, PCIBus: 0x65, PCIDevice:	†↓: Select Item
0x0, PCIFunc: 0x0, PCISlot: 0x23)	Enter: Select

2. On the popup screen, select LSI SAS3 MPT Controller Version 16.00.00.00 and press <Enter>.

Figure 3-79 Selecting LSI SAS3 MPT Controller Version 16.00.00.00

Aptio Setup Utility – Copyright (C) 2017 Ame Advanced	erican Megatrends, Inc.
▶ LSI SAS3 MPT Controller Version 16.00.00.00	Select to continue with

3. On the popup screen, select Controller Management and press < Enter>.

Figure 3-80 Selecting Controller Management

Aptio Setup Utility – Copyright Advanced	(C) 2017 American Megatrends, Inc.
 Controller Management Physical Disk Management 	Select to Manage Controller Properties,

4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-81 Selecting Create Configuration

	Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Advanced		
V: Ct Ct Ct Sa Ac	iew Controller Properties hange Controller Properties reate Configuration ave Controller Events dvanced Controller Properties	Select to Create a RAID Virtual Disk	

 On the popup screen, select an appropriate option in Select RAID Level menu. Note: Select Select Physical Disks to select 2 disks and press <Enter> to create RAID 1

Figure 3-82 Selecting Select Physical Disks

Aptio Setup Utility Advanced	– Copyright (C) 2017 A	merican Megatrends, Inc.
Select RAID level ▶ Select Physical Disks	[RAID 1]	Select to continue the creation process

- 6. On the popup screen, configure the following settings:
 - a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for RAID array creation have SATA interfaces.
 - b. Set the disk status for RAID array creation to **Enabled**.
 - c. Select Apply Changes and press <Enter>.

Figure 3-83 Related Settings

Aptio Setup Utility	y – Copyright (C)) 2017 American	Megatrends, Inc.
Advanced			
Selected RAID Level	RAID 1		Select to continue the
Select Interface Type	[SATA]		creation of the Virtual Disk
Select Media Type	[SSD-512b]		
0:1:5 SATA SSD-512e 447 GB	[Enabled]		
0:1:6 SATA SSD-512e 447 GB	[Enabled]		
0:1:7 SATA SSD-512e 447 GB		-	
Check All			
Uncheck All			
▶ Apply Changes			

7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press <Enter>.

Figure 3-84 Setting Confirm to Enabled

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Advanced		
Select to continue with Yes		

8. On the popup screen, select **OK** and press <Enter>.

Figure 3-85 Selecting OK

Aptio Setup Utility – Copyright (C) 2017 Amer Advanced	rican Megatrends, Inc.
Operation completed successfully ▶ OK	Press OK to continue

 To view the RAID array, go to LSI SAS3 MPT Controller Version 16.00.00.00 > Virtual Disk Management > Manage Virtual Disk Properties. You can view details on the popup screen and switch among multiple RAID arrays via Select Virtual Disk.

Figure 3-86 RAID Information

Advanced	pyright (C) 2017 American	Megatrends, Inc.
Select Virtual Disk [Volume: 605]	Select a Virtual Disk to view its properties
Virtual Disk Properties		
Virtual Disk ID 6	05	
RAID Level R	AID 1	
Virtual Disk Status 0	ptimal	
Virtual Disk Capacity 4	46 GB	
Virtual Disk Policies 🛛 🛛 🛛 🛛	rite–Cache Disabled	
 View Associated Physical Disks Manage Global Hotspare Disks 		

3 Creating a RAID 1E Array in UEFI Mode

 Re-enter the BIOS configuration screen, switch to the Advanced tab, select LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>.

Figure 3-87 Selecting LSI SAS3008 Controller under Advanced Tab

Aptio Setup Utility – Copyright (C) 2017 Ame Main Advanced Chipset Processor Server Mgmt	rican Megatrends, Inc. Security Boot I
 Trusted Computing Super IO Configuration Serial Port Console Redirection PCI Subsystem Settings Network Stack Configuration CSM Configuration PCH 10GBE PHY Card Configuration 	Select to enter Avago Technologies (LSI) SAS3 MPT Controller HII Configuration Application
 iSCSI Configuration Intel(R) Virtual RAID on CPU LSI SAS3 MPT Controller SAS3008, (PCISubDeviceId: 0x8, PCIBus: 0x65, PCIDevice: 0x0, PCIFunc: 0x0, PCISlot: 0x23) 	<pre>++: Select Screen f↓: Select Item Enter: Select</pre>

2. On the popup screen, select LSI SAS3 MPT Controller Version 16.00.00.00 and press <Enter>.

Figure 3-88 Selecting LSI SAS3 MPT Controller Version 16.00.00.00

Aptio Setup Utility – Copyright (C) 2017 Ame Advanced	erican Megatrends, Inc.
▶ LSI SAS3 MPT Controller Version 16.00.00.00	Select to continue with

3. On the popup screen, select **Controller Management** and press < Enter>.

Figure 3-89 Selecting Controller Management

Aptio Setup Utility - Advanced	Copyright (C) 2017 American Megatrends, Inc.
 Controller Management Physical Disk Management 	Select to Manage Controller Properties,

4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-90 Selecting Create Configuration

	Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Advanced		
* * * * *	View Controller Properties Change Controller Properties Create Contiguration Save Controller Events Advanced Controller Properties	Select to Create a RAID Virtual Disk	

 On the popup screen, select an appropriate option in Select RAID level menu. Note: Select Select Physical Disks to select 3 disks and press <Enter> to create RAID 1E.

Figure 3-91 Selecting Select Physical Disks

Aptio Setup Utility – Advanced	Copyright (C) 2017 American	Megatrends, Inc.
Select RAID level Select Physical Disks	[RAID 1E]	Select to continue the creation process

- 6. On the popup screen, configure as follows:
 - a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for the RAID array creation have SATA interfaces.
 - b. Set the disk status for RAID array creation to **Enabled.**
 - c. Select **Apply Changes** and press <Enter>.

Figure 3-92 Related Settings

Aptio Setup Utilit Advanced	y – Copyright (C) 201	7 American Megatrends, Inc.
Selected RAID Level Select Interface Type Select Media Type 0:1:2 SATA SSD-512e 447 GB 0:1:3 SATA SSD-512e 447 GB 0:1:4 SATA SSD-512e 447 GB 0:1:5 SATA SSD-512e 447 GB 0:1:6 SATA SSD-512e 447 GB 0:1:7 SATA SSD-512e 447 GB 0:1:7 SATA SSD-512e 447 GB Check All Incheck All	RAID 1E [SATA] [SSD-512b] [Enabled] [Enabled] [Disabled] [Disabled] [Disabled]	Select to continue the creation of the Virtual Disk
		↔+: Select Screen

7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press < Enter>.

Figure 3-93 Setting Confirm to Enabled

Aptio Setup Util Advanced	ity – Copyright (C) 20	17 American Megatrends, Inc.
Creating a Configuration (Virtual Disk) may take a few minutes to complete.		Select to continue with Yes
Confirm	[Enabled]	
Yes		
▶ No		

8. On the popup screen, select **OK** and press <Enter>.

Figure 3-94 Selecting OK

Aptio Setup Utility – Copyright (C) 2017 Ame Advanced	rican Megatrends, Inc.
Operation completed successfully > OK	Press OK to continue

 To view the RAID array, go to LSI SAS3 MPT Controller Version 16.00.00.00 > Virtual Disk Management > Manage Virtual Disk Properties. You can view details on the popup screen and switch among multiple RAID arrays via Select Virtual Disk.

Figure 3-95 RAID information

Aptio Setup Utility - Advanced	· Copyright (C) 2017 Americar) Megatrends, Inc.
Select Virtual Disk	[Volume: 605]	Select a Virtual Disk to view its properties
Virtual Disk Properties		
Virtual Disk ID	605	
RAID Level	RAID 1E	
Virtual Disk Status	Optimal	
Virtual Disk Capacity	669 GB	
Virtual Disk Policies	Write-Cache Disabled	
 View Associated Physical Disks Manage Global Hotspare Disks 		

4 Creating a RAID 10 Array in UEFI Mode

 Re-enter the BIOS configuration screen, switch to the Advanced tab, select LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>.

Figure 3-96 Selecting LSI SAS3008 Controller under Advanced Tab

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Main Advanced Chipset Processor Server Mgmt Security Boot		
 Trusted Computing Super IO Configuration Serial Port Console Redirection PCI Subsystem Settings Network Stack Configuration CSM Configuration PCH 10GBE PHY Card Configuration 	Select to enter Avago Technologies (LSI) SAS3 MPT Controller HII Configuration Application	
 iSCSI Configuration Intel(R) Virtual RAID on CPU LSI SAS3 MPT Controller SAS3008, (PCISubDeviceId: 0xB, PCIBus: 0x65, PCIDevice: 0x0, PCIFunc: 0x0, PCISlot: 0x23) 	<pre>++: Select Screen 1↓: Select Item Enter: Select</pre>	

2. On the popup screen, select LSI SAS3 MPT Controller Version 16.00.00.00 and press <Enter>.

Figure 3-97 Selecting LSI SAS3 MPT Controller Version 16.00.00.00

Aptio Setup Utility – Copyright (C) 2017 Ame Advanced	erican Megatrends, Inc.
▶ LSI SAS3 MPT Controller Version 16.00.00.00	Select to continue with

3. On the popup screen, select **Controller Management** and press < Enter>.

Figure 3-98 Selecting Controller Management

Aptio Setup Utility – Copyright (C) Advanced	2017 American Megatrends, Inc.
 Controller Management Physical Disk Management 	Select to Manage Controller Properties,

4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-99 Selecting Create Configuration

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Advanced			
 View Controller Properties Change Controller Properties Create Contiguration Save Controller Events Advanced Controller Properties 	Select to Create a RAID Virtual Disk		

 On the popup screen, select appropriate settings in Select RAID Level menu. Note: Select Select Physical Disks to select 4 disks and press <Enter> to create RAID 10.

Figure 3-100 Selecting Select Physical Disks

	Advand	Aptio Setup ced	Utility – Copyright (C) 2017 American	Megatrends, Inc.
►	Select RAID Select Physi	level ical Disks	[RAID 10]]	Select to continue the creation process

- 6. On the popup screen, configure the following settings:
 - a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for the RAID array creation have SATA interfaces.
 - b. Set the disk status for RAID array creation to **Enabled**.
 - c. Select **Apply Changes** and press <Enter>.
- 7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press <Enter>.

Figure 3-101 Setting Confirm to Enabled

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc. Advanced			
Creating a Configuration (Virtual Disk) may take a few minutes to complete.		Select to continue with Yes	
Confirm	[Enabled]		
Ves No			

8. On the popup screen, select **OK** and press <Enter>.

Figure 3-102 Selecting OK



 To view the RAID array, go to LSI SAS3 MPT Controller Version 16.00.00.00 > Virtual Disk Management > Manage Virtual Disk Properties. You can view details on the popup screen and switch among multiple RAID arrays via Select Virtual Disk.

Figure 3-103 RAID Information



3.2.3 Configuring RAID Arrays

1 Configuring HS Drives

A maximum of 2 global HS disks can be created for higher data security after creation of RAID 10/1E arrays on LSI SAS3008 controller. No dedicated HS drives can be created on LSI SAS3008.

Impact on the system:

The data on the disk to be added to the RAID array will be lost. Please back up the disk data in advance.



• The server must have unconfigured drives, and disks already added to a RAID array cannot be configured as HS drives.

- An HS disk must be a SATA or SAS disk with its capacity not smaller than the maximum capacity of a disk in any RAID array.
- RAID 1, RAID 1E and RAID 10 support HS disks, but RAID 0 does not.

Data preparation is not required for the following operation.

Procedures:

- 1. Log in to the management screen.
- 2. Enter the Virtual Disk Management screen.
 - a. Select Virtual Disk Management on the main screen and press < Enter>.

Figure 3-104 Selecting Virtual Disk Management

	Aptio Setup Advanced	Utility – Copyright	(C) 2017 Amer	ican Megatrends, Inc.
► Co ► V: ► Ph	ontroller Management irtual Disk Management hysical Disk Management			Select to Manage Virtual Disk Properties, View Associated Physical Disks, Manage Global Hotspares, and Perform Operations on Virtual Disks ++: Select Screen fl: Select Item
				Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
	Version 2.1	.7.1254. Copyright (C	C) 2017 Americ	an Megatrends, Inc.

b. Select **Manage Virtual Disk Properties** and press <Enter> to enter the screen for management of virtual disk properties.



Figure 3-105 Selecting Manage Virtual Disk Properties

- 3. Configure HS drives.
 - a. Select **Manage Global Hotspare Disks** and press <Enter> to enter the screen for HS disk configuration.

Figure 3-106 Selecting Manage Global Hotspare Disks

Aptio Setup Utility - Advanced	Copyright (C) 2017 American	Megatrends, Inc.
Select Virtual Disk	[Volume: 605]	Select a Virtual Disk to view its properties
Virtual Disk Properties		
Virtual Disk ID	605	
RAID Level	RAID 1	
Virtual Disk Status	Optimal	
Virtual Disk Capacity	446 GB	
Virtual Disk Policies	Write-Cache Disabled	
 View Associated Physical Disks Manage Global Hotspare Disks 		
		++: Select Screen

b. Press $<\uparrow>$ or $<\downarrow>$ to select the disk to be configured and press <Enter>.
Figure 3-107 Selecting the Drive to be Configured

	Aptio Setup Utility - Advanced	Copyright (C) 2017 American Megatrends, Inc.
Γ	Selected Virtual Disk	Volume: 605
Þ	Compatible Bare Disks 0:1:4 SATA SSD-512e 447 GB 0:1:5 SATA SSD-512e 447 GB 0:1:6 SATA SSD-512e 447 GB 0:1:7 SATA SSD-512e 447 GB Assign Global Hotspare Disk	[Disabled] [Disabled] [Disabled] [Disabled]
Þ	Global Hotspare Disks – Unassign Global Hotspare Disk	

- c. Select **Enabled** in the popup list and press <Enter>.
- d. Select **Assign Global Hotspare Disk** by pressing $\langle \uparrow \rangle$ or $\langle \downarrow \rangle$ and press \langle Enter \rangle .

Figure 3-108 Selecting Assign Global Hotspare Disk

Aptio Setup Utility - (Advanced	Copyright (C) 2017 American	Megatrends, Inc. 🔶
Selected Virtual Disk	Volume: 605	Add selected Disk as a Global Hotspare
Compatible Bare Disks		
0:1:4 SATA SSD-512e 447 GB	[Enabled]	
0:1:5 SATA SSD-512e 447 GB		
0:1:6 SATA SSD-512e 447 GB		_
0:1:7 SATA SSD-512e 447 GB		
▶ Assign Global Hotspare Disk		
Global Hotspare Disks		
 Unassign Global Hotspare Disk 		

e. On the popup screen, **Operation completed successfully** appears. Select **OK** and press <Enter>.

Figure 3-109 Selecting OK



- f. Select Virtual Disk Management on the main screen and press < Enter>.
- g. Select Manage Virtual Disk Properties and press <Enter> to enter the Manage Virtual Disk Properties screen and check that the HS disk is configured successfully.

Figure 3-110 Manage Virtual Disk Properties Screen

	Aptio Setup Utility Advanced	– Copyright (C) 2017 American Megatrends, Inc.	
	Selected Virtual Disk	Volume: 605	
Þ	Compatible Bare Disks 0:1:5 SATA SSD-512e 447 GB 0:1:6 SATA SSD-512e 447 GB 0:1:7 SATA SSD-512e 447 GB Assign Global Hotspare Disk	[Disabled] [Disabled] [Disabled]	
Þ	Global Hotspare Disks O:1:4 (Compatible) Unassign Global Hotspare Disk	 [Disabled]	

h. The configuration is completed.

2 Deleting HS Drives

Procedures:

1. Select Virtual Disk Management on the main screen and press < Enter>.

Figure 3-111 Selecting Virtual Disk Management



2. Select Manage Virtual Disk Properties and press <Enter>.

Figure 3-112 Selecting Manage Virtual Disk Properties



3. Select **Manage Global Hotspare Disks** and press <Enter> to enter the screen for HS disk configuration.



Figure 3-113 Selecting Manage Global Hotspare Disks

4. Press $<\uparrow>$ or $<\downarrow>$ to select the HS disk to be deleted and press <Enter>.

Figure 3-114 Selecting the HS Drive to Be Deleted

Aptio Setup Utility Advanced	– Copyright (C) 2017 American	Megatrends, Inc.
Selected Virtual Disk	Volume: 605	
Compatible Bare Disks 0:1:5 SATA SSD-512e 447 GB 0:1:6 SATA SSD-512e 447 GB 0:1:7 SATA SSD-512e 447 GB ► Assign Global Hotspare Disk	[Disabled] [Disabled] [Disabled]	
Global Hotspare Disks O:1:4 (Compatible) ▶ Unassign Global Hotspare Disk	[Disabled]	

- 5. Select **Enabled** in the popup list and press <Enter>.
- 6. Select **Unassign Global Hotspare Disk** by pressing $\langle \uparrow \rangle$ or $\langle \downarrow \rangle$ and press <Enter>.

Figure 3-115 Selecting Unassign Global Hotspare Disk

	Aptio Setup Utility Advanced	– Copyright (C) 2017 American	Megatrends, Inc.
Γ	Selected Virtual Disk	Volume: 605	Select to delete Global Hotspare Disk
	Compatible Bare Disks 0:1:5 SATA SSD-512e 447 GB 0:1:6 SATA SSD-512e 447 GB 0:1:7 SATA SSD-512e 447 GB • Assign Global Hotspare Disk	[Disabled] [Disabled] [Disabled]	
	Global Hotspare Disks O:1:4 (Compatible) • Unassign Global Hotspare Disk	[Enabled]	

7. After **Operation completed successfully** appears, select **OK** in the popup list and press <Enter>.

Figure 3-116 Selecting OK

Aptio Setup Utility – Copyright (C) 2017 American Advanced	Megatrends, Inc.
Operation completed successfully ▶ OK	Press OK to continue

8. The configuration is completed.

3 Importing a Foreign Configuration

Scenario:

Storage may have been configured for physical disks newly installed in the server. Such foreign configurations can be imported to the current RAID controller card through Web BIOS. After replacing the server RAID controller card, users can import the original configuration into the new RAID controller card.

Procedures:

- 1. Log in to the management screen.
- 2. Enter the Manage Foreign Configuration screen.
 - a. Select **Controller Management** on the main screen and press < Enter>.

Figure 3-117 Selecting Controller Management

Aptio Setup Utility - Advanced	Copyright (C) 2	2017 American	Megatrends,	Inc.
 Controller Management Physical Disk Management 		Sel Con	ect to Manag troller Prop	e erties,

- b. Select Manage Foreign Configuration and press < Enter>.
- 3. Enter the Manage Foreign Configuration screen to import foreign configuration.
 - a. Select Select Foreign Configuration and press < Enter>.
 - b. Select the foreign configuration to be imported from the list and press <Enter>.
 - c. Select View Foreign Configuration and press <Enter>.
 - d. Select Import Foreign Configuration and press <Enter>.

Figure 3-118 View Foreign Configuration Screen

Aptio Setup Utility Advanced	– Copyright (C) 2015 Americ	can Megatrends, Inc.
Selected Foreign Configuration ▶ Import Foreign Configur ▶ Clear Foreign Configura	Volume 20548046962032963 ation tion	The State that is shown for a Foreign Volume is the Last Known State and may not be the Current State. Volumes
Last Known Volume State:	Degraded	with a Missing State cannot be imported.
		↔: Select Screen t∔: Select Item Enter: Select
		+/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.17.1245.	Copyright (C) 2015 America	n Kegatrends, Inc. AB

e. Enter the operation confirmation screen.

Aptio Setup Utility Advanced	– Copyright	(C) 2015 Americ	can Megatrends, Inc.
Importing a foreign configuration will cause the new disks to be merged with your existing configuration. Confirm Yes ► No	[Disabled]		<pre>++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</pre>
Version 2.17.1245.	Copyright (C)) 2015 American	n Megatrends, Inc. AB

Figure 3-119 Operation Confirmation Screen

- f. Press <Enter>, and a confirmation screen will pop up.
- g. Select **Enabled** and press <Enter>.
- h. Select Yes by pressing <↑> or <↓> and press <Enter>. Operation completed successfully appears.
- i. Press <Enter>.
- j. The configuration is completed.

4 Deleting a RAID Array

Scenario:

When the server does not require a RAID array, delete the RAID array to free up the disk space.

The RAID array cannot be restored after being deleted. Please proceed with caution.

Procedures:

- 1. Log in to the management screen.
- 2. Enter Select Virtual Disk Operations screen.
 - a. Select Virtual Disk Management on the main screen and press <Enter>.

Figure 3-120 Selecting Virtual Disk Management



b. Select Select Virtual Disk Operations and press <Enter>.

Figure 3-121 Selecting Select Virtual Disk Operations



3. Delete the specified RAID array.



Aptio Setup Utility – Advanced	Copyright (C) 2017 American	Megatrends, Inc.
Select Virtual Disk Start Locate / Blink Stop Locate / Unblink	[Volume: 605]	Select a Virtual Disk to manage
Legacy OpROM Boot Device	[No]	
▶ Delete Virtual Disk		
<pre>Virtual Disk Operations Operation in Progress Operation Pending Allowed Operations Operation Progress (%) Is Operation in Progress Start Operation Apply Changes</pre>	None None [Consistency Check] O No	★: Select Screen ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.17.1254. Co	opyright (C) 2017 American M	egatrends, Inc.

- a. Select Select Virtual Disk and press <Enter>.
- b. Select the RAID array to be deleted in the list and press <Enter>.
- c. Select **Delete Virtual Disk** by pressing $<\uparrow>$ or $<\downarrow>$ and press <Enter>.
- d. Enter the operation confirmation screen.
- e. Select **Confirm** by pressing $<\uparrow>$ and $<\downarrow>$ and press <Enter>.
- f. Select **Yes** by pressing $<\uparrow>$ or $<\downarrow>$ and press <Enter>.
- g. After **Operation completed successfully** appears, select **OK** and press <Enter>.
- h. The configuration is completed.

4 How to Install Inspur SAS RAID Controller Card Driver

This chapter guides you on how to load Inspur SAS RAID controller card drivers during Windows, Red Hat Linux and SUSE Linux installation. The method is also applicable to Broadcom 9300 and 9305 series.

4.1 Loading Driver during Windows Installation

This section demonstrates with Windows Server 2008 R2 OS to guide you on how to load the driver during Windows OS installation.

Scenario:

The driver needs to be loaded during Windows OS installation.

Procedures:

- 1. Copy the RAID controller driver from the driver disk to a USB flash drive.
- 2. Connect the USB flash drive to the USB port of the server, power on the server, and put the OS setup CD into the DVD/CD-ROM drive. Go to BIOS for setup to boot the system from the CD.
- 3. When **Press any key to boot from CD or DVD...** appears on the screen, press any key to continue, as shown below.

Figure 4-1 Pressing Any Key to Boot from CD or DVD



4. The prompt **Windows is loading files...** indicates the system files are being loaded, as shown below.





5. When **Install Windows** screen appears, configure **Language to install**, **Time and currency format** and **Keyboard or input method**, and click **Next**, as shown below. Figure 4-3 Install Windows Screen

🎸 Install Windows			
	Windows Serve	r 2008	
Language	to install: English		
Time and current	cy format: English (United States)		
 Kevboard or inpu	it method: IIS		
	05	1000	
			Next
			Next

6. Click **Install now** to install immediately, as shown below.

Figure 4-4 Clicking Install Now



7. Select the OS version to be installed. This section demonstrates with Windows Server 2008 Enterprise (Full Installation), as shown below.



Select the operating system you wa	nt to install.		
Operating System	Arch	itecture Date Mo	odified
Windows Server 2008 Standard (Full Ins	stallation) X86	1/19/200	08
Windows Server 2008 Enterprise (Full In	stallation) X86	1/19/200	08
Windows Server 2008 Datacenter (Full I	nstallation) X86	1/19/200	08
Windows Server 2008 Standard (Server	Core Installation) X86	1/19/200	08
Windows Server 2008 Enterprise (Server	r Core Installation) X86	1/19/200	08
Windows Server 2008 Datacenter (Serve	er Core Installation) X86	1/19/200	08
			Next

8. Check I accept the license terms and click Next, as shown below.

Figure 4-6 Checking I Accept the License Terms

MICRO	DSOFT SOFTWARE LICENSE TERMS	
MICRO	DSOFT WINDOWS SERVER 2008, ENTERPRISE	
These where softwa terms	license terms are an agreement between Microsoft Corporation (or based on you live, one of its affiliates) and you. Please read them. They apply to the re named above, which includes the media on which you received it, if any. The also apply to any Microsoft	
0	updates,	
0	supplements,	
0	Internet-based services, and	
0	support services	-
▼ I <u>a</u> cc	ept the license terms	
		Meet

9. Select **Custom (advanced)** and press <Enter>, as shown below.





10. On the screen shown, select **Load Driver** and press <Enter>.

Figure 4-8 Selecting Load Driver

Name		Total Size	Free Space	Туре
🌍 Disk 1 Pa	artition 1	111.5 GB	97.8 GB	Primary
Disk1 U	nallocated Space	1003.9 GB	1003.9 GB	
Refresh Load Driver	∑ <u>D</u> elete ⇒ E _x tend	✓ Format	₩ Ne <u>w</u>	

11. On the screen shown, click **Browse** and press <Enter>.

Figure 4-9 Clicking Browse

Selec	t the driver to be installed.
	Load Driver
	To install the device driver needed to access your hard drive, insert the installation media containing the driver files, and then click OK. Note: The installation media can be a floppy disk, CD, DVD, or USB flash drive.
Lin	Browse OK Cancel
Brg	wse <u>R</u> escan <u>N</u> ext

To install the driver:

1. Select **GHOST (C:)**, as shown below.

Figure 4-10 Selecting GHOST (C:)

	Browse for Folder		X	
	Browse to the driver(s), and the Computer	EN_DVD		
Hide drivers that a	Rescan	OK Cancel		Next

2. Scroll down to find the folder **srv_2008_x86** and click **OK** to load the RAID controller driver, as shown below.

Figure 4-11 Selecting the Driver

Select the dri	ver to be installed.	
	Browse for Folder	
	Browse to the driver(s), and then click OK	
	Burnin- III	
	Grantley-drivers	
	lsi CAE249	
	J Windbg	
	Windows_driver(6.706.06.00)	
	srv_2008_x64	
	🦉 win7_x64	
	win7_x86	
	wind. 1_x04	
I <u>⊢</u> ide drivers t	OK Cancel	
Br <u>o</u> wse	Rescan	Next

3. The system starts loading the driver, as shown below. Please wait patiently.

Figure 4-12 Loading the Driver

Select the driver to be installed.	
Hide drivers that are not compatible with hardware on this computer.	

4. On the screen shown, click **Next**.

Figure 4-13 Clicking Next

INSPUR3008 IMR (C:\Windows_driver(6.706.06.00)\srv_2008_x86\megasas2.inf)	
☑ Hide drivers that are not compatible with hardware on this computer.	
Br <u>o</u> wse Rescan Next	

5. After the driver is loaded, the system returns to the screen below. Select a system partition and click **Next**. If there is no partition, click **New** to create one.

Name	Total Size	Free Space	Туре
Disk 1 Partition 1	111.5 GB	97.8 GB	Primary
Disk1 Unallocated Space	1003.9 GB	1003.9 GB	
Image: Provide state state Image: Provide state Image: Provide state <	✓ Format	∦ Ne <u>w</u>	

Figure 4-14 Selecting a System Partition

6. Click **OK** to enter the OS installation screen, as shown below.

Figure 4-15 Clicking OK

	Name	Total Size	Free Space Type
-	Disk 1 Partition 1	111.5 GB	97.8 GB Primary
	Install Windows		X
∳ 9 <u>R</u> ef €9 <u>L</u> oa	a		OK Cancel

7. As shown below, the screen prompts **Installing Windows**. Your computer will restart several times during installation. Please do not perform any operation until the installation is completed.

Figure 4-16 Installing Windows



8. Create an administrator password and press <Enter> to enter the OS.





9. When the Windows Server 2008 desktop appears, Windows installation is completed.

Figure 4-18 Desktop



4.2 Loading Driver during Red Hat Linux Installation

This section demonstrates with Red Hat 6.2 OS to guide you on how to load the driver during Red Hat OS installation.

Scenario:

The driver needs to be loaded during Red Hat OS installation.

Procedures:

- 1. Copy the RAID controller driver to be loaded from the driver disk to the common partition of a USB flash drive.
- 2. Connect the USB flash drive to the USB port of the server, power on the server, and put the OS setup CD into the DVD/CD-ROM drive. Go to BIOS for setup to boot the system from the CD.
- 3. When **boot:** appears, type **linux dd** and press <Enter> to load the driver.
- 4. When the screen prompts **Do you have a driver disk?**, select **Yes** and press <Enter> to continue the loading.

Figure 4-19 Driver Disk Availability Confirmation



5. The system prompts you to select a driver disk source. Select **sda** and then **OK**.

Figure 4-20 Selecting a Driver Disk Source



6. In the popup window, select /dev/sda1 and then OK.

Figure 4-21 Selecting a Partition



 If there are multiple files in the USB flash drive, a driver selection screen will pop up. Select the desired driver file and then OK. Press <Enter> to load the driver. After loading, the following window will pop up, prompting Do you wish to load any more driver disks?.





 If you want to load more drivers, select Yes and follow the procedures above. Otherwise, select No, and follow the prompts to install Red Hat Linux OS. In the figure below, sdb 1907MB USB DISK Pro refers to the USB flash drive, which needs to be unchecked when you create a driver partition. Figure 4-23 Creating a Partition

		Add Partit	tion	
<u>M</u> ount Point:				•
File System Type:	ext3			
	🗹 sda	952714 MB	LSI MegaSR	
Allowable <u>D</u> rives:	sdb	1907 MB	USB DISK Pro	
		¥.		
Size (MB):	100			÷
Additional Size O	ptions			
Ixed size				
○ Fill all space <u>u</u>	ip to (MB)	:	1	A. 17
O Fill to maximu	um <u>a</u> llowa	ble size		
Force to be a p	rimary pa	ntition		
			X Cancel	Док

9. During partition creation for Red Hat Linux 6.x (x indicates 1, 2, 3, 4, 5, 6), the USB flash drive will be detected automatically. Uncheck the box in front of the USB flash drive so as not to create partitions on it.

4.3 Loading Driver during SUSE Linux Installation

This section demonstrates with SUSE 11.2 OS to guide you on how to load the driver during SUSE Linux installation.

Scenario:

The driver needs to be loaded during SUSE OS installation.

Procedures:

1. Copy the RAID controller driver to be loaded from the driver disk to the common partition of a USB flash drive.

- 2. Connect the USB flash drive to the USB port of the server, power on the server, and put the OS setup CD into the DVD/CD-ROM drive. Go to BIOS for setup to boot the system from the CD.
- 3. On the **Boot Options** screen, press <F6>. A window will pop up. Select **Yes** and press <Enter>. Select **Installation** and press <Enter> to load the driver. This may take a few minutes.



Figure 4-24 Selecting Installation

4. The driver loading screen appears, as shown below.

Figure 4-25 Driver Loading Screen

Please choose t	the Driver L	lpdate mediu	n.]
sr0: CD-ROM, C other device	Optiarc DVD	RW AD-7280S	
		Back	

- 5. After the driver is loaded, the name of the loaded driver will be displayed. Select **OK** to continue.
- 6. The following screen is displayed.

Figure 4-26 Selecting the Driver Update Medium

sdb:	USB Floppy
srØ:	CD-ROM, Optiarc DVD RW AD-7240S
sda1:	USB Partition, USB DISK Pro
sdc:	Disk, LSI MegaSR
other	device

7. Since the driver has been loaded automatically, select **Back** to continue.

8. Follow the prompts to install SUSE Linux OS.

During custom partitioning, distinguish between a hard disk and a USB flash drive. Do not partition, delete or format a USB flash drive.

4.4 Loading Driver during VMware Installation

Use a tool to merge the driver file (.vib) with the image file to generate a new installation image, and install the OS with the new image.

Note that you can directly install VMware 7 OS that already come with Inbox drivers.

5 How to Obtain Help

If a tough or critical problem persists in troubleshooting or routine maintenance, contact Inspur for technical support.

5.1 Preparations Before Contacting Inspur

To better solve the problem, we suggest you collect troubleshooting information and make debugging preparations before contacting Inspur.

5.1.1 Collecting Troubleshooting Information

You need to collect necessary information before troubleshooting, including:

- Name and address of the customer
- Contact person and telephone number
- Time when the fault occurred
- Fault description
- Device type and software version
- Measures taken after the fault occurred and the related results
- Troubleshooting level and required solution deadline

5.1.2 Making Preparations for Debugging

When you contact Inspur for help, our technical support engineer might assist you to do certain operations to collect information about the fault or rectify the fault directly.

Before contacting Inspur for help, you need to prepare the boards, port modules, screwdrivers, screws, cables for serial ports, network cables, and other required materials.

5.2 How to Use Documents

Inspur provides comprehensive guidance documents shipped with the devices to assist users in solving common problems encountered in troubleshooting or routine maintenance.

To better solve the problems, use the documents before you contact Inspur for technical support.

5.3 How to Contact Us

Go to Inspur official website <u>https://en.inspur.com/</u>, click **Support > Support Center > Warranty & Configuration** to learn about the product warranty service policy, including service offering, warranty period, service type, response time and disclaimer. You can also call Inspur at 1-844-860-0011/1-760-769-1847 to consult by providing product model or product serial number.

6 Appendix

6.1 Appendix A: Glossary

В

Backplane	A circuit board that connects devices in parallel with each other. It provides connectors for slots to support power distribution, management, and auxiliary signal connection. The slot ports are connected by high-speed twisted pairs.
BIOS	Basic input/output system

н

HDD	Hard disk drive
Hot-swap	In a running system, inserting or removing a board does
	not affect normal running of the system.

T

IOPS	Input/output operations per second (IOPS) refers to the
	maximum number of I/O operations the system can
	perform per second, which is the most important
	performance measurement to characterize the storage
	system.

Ρ

PCIe	Short for PCI Express. It is a new bus standard adopting
	peer-to-peer and bidirectional interconnection technology
	to replace PCI and AGP interface specifications. It supports
	serial data transmission rather than parallel data
	transmission of PCI or AGP. With PCIe, the data transmission
	speed between devices can be improved greatly.

R

RAID	A technology that combines multiple independent hard

	disks (physical hard disks) in different ways to form a group
	of hard disks (logical hard disks), thus providing higher
	storage performance than a single hard disk and providing
	data backup.
Redundancy	The ability of a system to keep functioning normally in the
	event of a device failure, by automatically having a backup
	device replace the faulty one.

S

SAS	Short for Serial Attached SCSI. It is a computer bus technology for
	data transmission between various devices, such as hard disks
	and DVD/CD-ROM drives.
SATA	Serial advanced technology attachment
SSD	A solid state disk (SSD) is a hard disk made with a solid-state
	electronic storage chip array, and is composed of a control unit
	and storage unit (FLASH chip). The specifications and definitions,
	functions and usage of the interface of the solid state disk are
	exactly the same as those of the hard disk drive.