

## **VANTAGEO Server**

## RAID User Guide (EagleStream)

Version: R1.1

VANTAGEO PRIVATE LIMITED Corporate Address: 617, Lodha Supremus II, Road No. 22, Wagle Estate, Thane - 400604 URL: https://vantageo.com E-mail: <u>support@vantageo.com</u> Helpdesk - +91 18002669898

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## **Revision History**

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# **About This Manual**

## Purpose

This manual describes the features of various RAID controller cards ("RAID cards" for short) installed on VANTAGEO servers, and the operations involved in initial configuration, common configuration and disk replacement.

### **Intended Audiences**

This manual is intended for:

- Network planning engineers
- Network management engineers
- Maintenance engineers

### What Is in This Manual

This manual contains the following chapters and appendixes.

Chapter 1, Basic RAID Concepts	Describes basic RAID-related concepts such as the RAID level, disk group, virtual disk, fault tolerance, and consistency check.
Chapter 2, Applicable Server Models	Describes the server models that this manual is applicable to.
Chapter 3, VT SmartIOC 2100 RAID Controller Card	Describes the capability features, initial configurations, common configurations, and typical disk replacement scenarios for a VT SmartIOC 2100 RAID controller card.
Chapter 4, VT SmartROC 3100 RAID Controller Card	Describes the capability features, initial configurations, common configurations, and typical disk replacement scenarios for a VT SmartROC 3100 RAID controller card.
Chapter 5, Appendixes	Describes the CLI tool ARCCONF for RAID controller cards, and VROC-based RAID configuration steps and common operations.

## Conventions

This manual uses the following conventions.

Notice: indicates equipment or environment safety information. Failure to comply can result in
equipment damage, data loss, equipment performance degradation, environmental contami-
nation, or other unpredictable results. Failure to comply will not result in personal injury.

Note: provides additional information about a topic.

# Chapter 1 Basic RAID Concepts

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## 1.1 RAID Levels

RAID refers to a disk array that combines multiple physical disks for the purpose of data redundancy.

It can provide higher storage performance, I/O performance and reliability than a single disk. Commonly used RAID levels include RAID 0, RAID 1, RAID 1E, RAID 5, RAID 6, RAID 10, RAID 50, and RAID 60.

## 1 1.1 RAID 0

RAID 0 is also called stripe or striping. Figure 1-1 shows its data storage principle.

### Figure 1-1 RAID 0 Data Storage Diagram



The storage principle of RAID 0 is to distribute sequential data (A0–A2, B0–B2, C0–C2, ...) to several member disks.

RAID 0 provides the highest storage performance among all RAID levels, because when the system receives a data request, multiple member disks in the RAID 0 array can concurrently execute the data request. This type of concurrent data operation can make full use of the bus bandwidth, remarkably boosting the overall disk read/write performance.

Because RAID 0 provides no data redundancy, data security cannot be guaranteed. Therefore, RAID 0 can only be used in scenarios where the requirements for I/O are high, but the requirements for data security are low.

RAID 0 requires at least one disk, and the data will be lost if the disk fails.

## 1.1.2 RAID 1

RAID 1 is also called mirror or mirroring, see Figure 1-2.



### Figure 1-2 RAID 1 Data Storage Diagram

Each working disk of the RAID 1 array has a corresponding mirrored disk, and a piece of sequential data (A0, A1, A2, ...) needs to be written into the working disk and the mirrored disk respectively, which is equivalent to automatic backup.

When the working disk of the RAID 1 array is faulty, the system automatically reads data from the mirrored disk.

RAID 1 requires at least two disks, and data is not lost if one disk fails.

RAID 1 provides high reliability but only a half of the total capacity. The disk usage is low.

Therefore, RAID 1 is applicable to the scenarios where high fault tolerance is required, such as finance.

## 1.1.3 RAID 1E

RAID 1E is an enhanced version of RAID 1, which integrates data mirroring and data striping, see Figure 1-3.



Data striping and data backup of RAID 1E spread across all the member disks. Take two stripe groups (for example, A0, A1, A2 and A2, A1 and A0) as one unit. In each unit, the data in the previous stripe group is arranged continuously, and the next stripe group is the striped mirror of the previous stripe group. That is, the data in each member disk of the previous stripe group is moved rightwards one disk and written into each member disk of the next stripe group. The data of the last member disk is written into the first member disk.

RAID 1E requires at least three disks, and data is not lost if one disk fails. When a member disk of the RAID 1E array fails, the system transfers the read/write requests to other normal member disks for processing.

Compared with RAID 1, RAID 1E also uses the mirroring mode to store data, so its effective capacity is half of the total hard disk capacity. Because RAID 1E allows access to more member disks, it has stronger data recovery capability. However, each piece of data must be written at least twice, which reduces the disk write capability.

## 1.1.4 RAID 5

RAID 5 is a solution that balances storage performance, data security and storage costs, see Figure 1-4.

### Figure 1-4 RAID 5 Data Storage Diagram



RAID 5 uses the CRC mode to distribute sequential data (A0–A2, B0–B2, C0–C2, D0–D2, ...) and the corresponding parity data (VA, VD, ...) to different member disks respectively. RAID 5 requires at least three disks, and data is not lost if one disk fails. If a member disk in the RAID 5 array is faulty, the data on the faulty member disk can be rebuilt from the data on other member disks in the array through the XOR operation.

## Note

For example, when the data block A0 is damaged, the recovery can be calculated with the following formula:

 $A0{=}A1{\oplus}A2{\oplus}VA$ 

RAID 5 can be used to process both a large or small amount of data. It features high speed, large capacity, and fault tolerance distribution. It is often used in various private NAS servers. RAID 5 can be regarded as a trade-off between RAID 0 and RAID 1.

## 1.1.5 RAID 6

On the basis of RAID, RAID 6 is formed to further enhance data protection, see Figure 1-5.



Figure 1-5 RAID 6 Data Storage Diagram

Like RAID 5, RAID 6 distributes sequential data (A0–A2, B0–B2, C0–C2, D0–D2, ...) and the corresponding parity data (VA, VD, ...) to different member disks respectively.

The difference is that on the basis of RAID 5, RAID 6 adds a second parity block (WA, WB, WC and WD, .....). The two independent check systems use different algorithms to implement double check and enhance fault tolerance. Therefore, when two member disks of the RAID 6 array are faulty, data security can also be guaranteed, achieving high reliability.

RAID 6 requires at least four disks, and data is not lost if two disks fail. If two member disks in a RAID 6 array is faulty, the data on the faulty member disks can be rebuilt from the data on other member disks in the array through the XOR (#) operation and the coefficient and XOR operation.

## Note

For example, when two data blocks A0 and A1 are damaged at the same time, you can recover them by using the following formula:

 $A0=A1\oplus A2\oplus VA$  $A1= (A0\times K0\oplus A2\times K2\oplus WA) / K1$ 

In the above formula, K0, K1 and K2 are polynomial values in the Galois domain, and are known coefficients.

The read performance and fault tolerance performance of RAID 6 are higher, but more disk space is allocated for parity data. Therefore, compared with RAID 5, it has greater write performance loss and higher implementation costs.

## 1.1.6 RAID 10

RAID 10 is a combination of RAID 1 and RAID 0, see Figure 1-6.



# RAID 10 can be regarded as: Two member disks in a pair (Disk 0 and Disk 1, Disk 2 and Disk 3, ...) form a multiple RAID 1 volume. Multiple RAID 1 volumes form a RAID 0 array, and data is distributed on each RAID 1 volume in the form of RAID 0.

After receiving the I/O data requests, the system distributes the sequential data (A0, A1, B0, B1, C0, C1, ...) to two RAID 1 volumes for concurrent processing in accordance with the working mode of RAID 0. That is, the data is stored in the working disks Disk 0 and Disk 2. At the same time, in the manner of RAID 1, the system automatically copies data to mirrored disk Disk 1 when writing data into Disk 0, and copies data to the mirrored disk Disk 3 when writing data into Disk 2.

RAID 10 requires at least four disks, and data is not lost if two disks fail.

RAID 10 balances storage performance and data security. It not only provides data security (same as RAID 1) but storage performance (similar to RAID 0).

## 1.1.7 RAID 50

RAID 50 is a combination of RAID 5 and RAID 0, see Figure 1-7.



One RAID 50 array consists of multiple RAID 5 volumes. At least six hard disks are required for RAID 50. Data is distributed on each RAID 5 volume in RAID 0 mode.

RAID 50 supports the features of both RAID 0 and RAID 5:

- Like RAID 0, data is partitioned into stripes and written into all the member disks at the same time.
- Like RAID 5, data security is guaranteed through parity bits that are evenly distributed on all the member disks.

With the redundancy function provided by RAID 5, if any disk in a RAID 5 volume is faulty, the array can operate properly and restore the data from the faulty disk. The replacement of the faulty disk does not affect services. Therefore, RAID 50 allows a single disk failure in multiple RAID 5 volumes at the same time, greatly improving the fault tolerance capability. At the same time, RAID 50 inherits the high storage performance of RAID 0, and stores the data ta distributed in multiple RAID 5 volumes. It can process data concurrently, thus providing better read/write performance.

## 1.1.8 RAID 60

RAID 60 is a combination of RAID 6 and RAID 0, see Figure 1-8.



One RAID 60 array consists of multiple RAID 6 volumes. At least eight hard disks are required for RAID 60. Data is distributed on each RAID 6 volume in RAID 0 mode.

RAID 60 supports the features of both RAID 0 and RAID 6:

- Like RAID 0, data is partitioned into stripes and written into all the member disks at the same time.
- Like RAID 6, RAID 60 ensures data security by using two parity blocks that are evenly distributed on all the member disks.

If two member disks of the RAID 6 array are faulty, with the redundancy provided by RAID 6, the array can operate properly and rebuild data of the faulty disk. The replacement of faulty disks does not affect services. Therefore, RAID 60 can maintain the security of data in the faulty disks when dual disks are faulty in multiple RAID 6 volumes at the same time. In addition, RAID 60 inherits the high storage performance of RAID 0, and stores the data distributed in multiple RAID 6 volumes. It can process data concurrently, thus providing better read/write performance.

## 1.2 RAID Performance Comparison

#### **Fault Tolerance Capabilities**

For a description of the fault tolerance capability comparison between the commonly used RAID levels, refer to Table 1-1. For the RAID containing multiple subgroups, RAID 10 and RAID 50 allow the number of faulty disks to be the same as the number of subgroups, but each subgroup must contain only one faulty disk. RAID 60 allows the number of faulty disks to be twice that of subgroups. Each subgroup can contain a maximum of two faulty disks.

RAID Level	Fault Tolerance Capacity Description
RAID 0	It does not support fault tolerance. A fault in any member disk will affect data security.
RAID 1	It supports fault tolerance through data redundancy. When a member disk is faulty, the data on the corresponding mirrored disk can be used to run the system and rebuild the faulty disk.
RAID 1E	It supports fault tolerance through data redundancy. When a member disk is faulty, nor- mal disks can be used to run the system and rebuild the faulty disk. If there are more than four member disks, two member disks are allowed to be faulty. However, the prerequisites are that the two faulty disks cannot be adjacent to each oth- er, and the two faulty disks cannot be the first member disk and the last member disk.
RAID 5	It supports fault tolerance through the distributed parity data. When a member disk is faulty, the RAID controller card uses parity data to rebuild all the lost data.
RAID 6	It supports fault tolerance through the distributed parity data. When two member disks are faulty, the data on the normal member disks and the corresponding two sets of parity data can be used to calculate and rebuild the faulty disk.
RAID 10	It supports fault tolerance through data redundancy. Each RAID 1 volume allows one member disk to be faulty. The data in the corresponding mirrored disk in the group can be used to run the system and rebuild the faulty disk.
RAID 50	It supports fault tolerance through the distributed parity data. Each RAID 5 volume al- lows one member disk to be faulty. The data on normal disks and the corresponding one set of parity data can be used to calculate and rebuild the faulty disk.
RAID 60	It supports fault tolerance through the distributed parity data. Each RAID 6 volume al- lows two member disks to be faulty. The data on normal disks and the corresponding two sets of parity data can be used to calculate and rebuild the faulty disks.

#### Table 1-1 Fault Tolerance Capability Comparison Between Commonly Used RAID Levels

### I/O Performance

A RAID array can be used as an independent storage unit or multiple virtual units by the system. Because multiple disks can be accessed at the same time, the I/O performance for a RAID array is higher than that for a common disk. For a description of the I/O performance comparison between the commonly used RAID levels, refer to Table 1-2.

Table 1-2 I/O Perfor	mance Comparison Between Commonly Used RAID Levels

I/O Performance Description
RAID 0 divides data into smaller data blocks and writes them into different disks. Be-
cause multiple disks can be read and written at the same time, RAID 0 improves the $\ensuremath{\text{I/O}}$
performance.

RAID Level	I/O Performance Description
RAID 1	Because the disks in a RAID group exist in pairs, data must be written in two copies at the same time, occupying longer time and resources. As a result, the performance deteriorates.
RAID 1E	Each piece of data must be written at least twice, which reduces the disk write capabili- ty.
RAID 5	Because both common data and parity data is kept on member disks, each member disk can be read and written separately. Therefore, RAID 5 provides high data through- put.
RAID 6	RAID 6 needs to write two sets of parity data across member disks, which causes per- formance deterioration during write operations. RAID 6 is ideal in scenarios where high reliability, high response rate and high transmission rate are required to provide high data throughput, high data redundancy and high I/O performance.
RAID 10	With the high data transmission rate provided by the RAID 0 subgroup, RAID 10 per- forms well in data storage. The I/O performance is improved as the number of sub- groups increases.
RAID 50	RAID 50 outperforms other RAID levels in the scenarios that require high reliability, high response rate and high transmission rate. The I/O performance is improved as the number of subgroups increases.
RAID 60	Its application scenarios are similar to those of RAID 50. However, because two sets of parity data need to be written into each member disk, its performance is deteriorated during write operations. Therefore, RAID 60 is not applicable to tasks that require writing massive data.

## **Available Capacity**

For a description of the storage capacity comparison between the commonly used RAID levels, refer to Table 1-3.

### Table 1-3 Storage Capacity Comparison Between Commonly Used RAID Levels

RAID Level	Storage Capacity Description
RAID 0	In all RAID levels, RAID 0 provides the maximum storage capacity. Available capacity = minimum capacity of a member disk x number of member disks
RAID 1	Data must be written in two copies, causing high storage space consumption. Available capacity = minimum capacity of a member disk x number of member disks ÷ 2
RAID 1E	Two stripe groups are used as one unit, and the next stripe group is the striped mirror of the last stripe group, causing high storage space consumption. Available capacity = minimum capacity of a member disk x number of member disks ÷ 2

RAID Level	Storage Capacity Description
RAID 5	Parity data blocks are isolated from common data blocks. In general, parity data occu- pies the capacity of one member disk. Available capacity = minimum capacity of a member disk x (number of member disks - 1)
RAID 6	Two independent parity data blocks are isolated from common data blocks. In general, the parity data occupies the capacity of two member disks. Available capacity = minimum capacity of a member disk x (number of member disks - 2)
RAID 10	It consists of multiple RAID 1 volumes and has the same capacity as RAID 1. Available capacity = minimum capacity of a member disk x number of member disks ÷ 2
RAID 50	It consists of multiple RAID 5 volumes. Its capacity is related to the number of RAID 5 volumes. Available capacity = total capacity of all the RAID 5 volumes
RAID 60	It consists of multiple RAID 6 volumes. Its capacity is related to the number of RAID 6 volumes. Available capacity = total capacity of all the RAID 6 volumes

### **Performance Comparison Summary**

Each RAID level has its advantages and disadvantages in terms of fault tolerance, I/O performance and available capacity. For the overall comparison of the performance indicators, refer to Table 1-4.

RAID Level	Fault Tol-	I/O Performance		Number of Required	Disk Usage
	erance Ca-	Read Per-	Write Per-	Disks	
	pability	formance	formance		
RAID 0	Low	High	High	N≥2	100%
RAID 1	High	High	Medium	2N (N≥1)	50%
RAID 1E	High	High	Medium	N≥3	50%
RAID 5	Medium	High	Medium	N≥3	(N-1)/N
RAID 6	High	High	Medium	N≥4	(N-2)/N
RAID 10	High	Medium	Medium	2N (N≥2)	50%
RAID 50	High	High	High	N≥n×M (n≥3, M≥2)	(N-M)/N
RAID 60	High	High	High	N≥n×M (n≥4, M≥2)	(N-2M)/N

#### **Table 1-4 Performance Comparison Summary**

- 1. N is the total number of RAID member disks.
- 2. M is the number of RAID volumes.
- 3. n is the number of member disks in each volume.

## **1.3 RAID-Related Features**

## 1.3.1 Disk Group and Virtual Disk

With the explosive growth of modern data centers, data service traffic is increasing day by day, resulting in higher requirements for data storage capacity and read/write speed of servers. As a result, common disks cannot meet these requirements. In this case, it is necessary to form multiple independent disks into a super-large disk group in a specific way to provide better storage performance, I/O performance and security.

A virtual disk is a continuous data storage unit divided based on an overall disk group. Virtual disks can be configured to have larger capacity, higher security, and more data redundancy than a single physical disk.

A virtual disk can be:

- A complete disk group
- Multiple complete disk groups
- Part of a disk group
- Parts of multiple disk groups (a part is divided from each disk group and they constitute a virtual disk)

Related conventions:

- A disk group (DG for short) is also called a drive group or array.
- A virtual disk is also called virtual drive (VD for short), volume or logical disk (LD for short).

## 1.3.2 Fault Tolerance

Fault tolerance means that data integrity and data processing capabilities are not affected when a disk error or disk fault occurs in a disk group.

Fault tolerance improves the disk system availability, guaranteeing system operation. Therefore, fault tolerance is a very important feature in the fault recovery procedure.

RAID can use redundant data to restore the data errors occurring during the calculation or transmission to achieve fault tolerance. RAID 1, RAID 1E, RAID 5, RAID 6, RAID 10, RAID 50 and RAID 60 provide the fault tolerance capability. For the fault tolerance description at each level, refer to "Fault Tolerance Capabilities".



RAID 0 does not provide fault tolerance. Once a disk fails, its data is lost.

## 1.3.3 Consistency Check

For RAID 1, RAID 5, RAID 6, RAID 10, RAID 50 and RAID 60 with the redundancy function, the RAID controller card calculates the data stored on the disks, and compares these data with the corresponding redundant data. If any inconsistency is found, an attempt is made to automatically fix the inconsistency and save the error information. It is recommended that a consistency check be performed at least once a month.

## **11** N

Because RAID 0 does not provide the redundancy function, it does not support the consistency check.

## 1.3.4 Hot Spare

#### **Hot Spare**

Hot spare refers to the backup performed when the system is operating properly. The hot spare feature of the RAID controller card is implemented by hot spare and emergency spare.

#### **Hot Spare Disk**

A hot spare disk is an independent disk in the disk system. When a disk in a RAID group is faulty, the hot spare disk is automatically added to the RAID group to replace the faulty disk for rebuilding data and providing fault tolerance.

On RAID controller card management screens or CLI, an idle disk whose capacity is greater than or equal to that of a member disk in a RAID group and whose media type and interface are the same as those of the member disk can be specified as the hot spare disk of the RAID group.

The RAID controller card supports the following two types of hot spare disks:

- Global hot spare disk, which is shared by all the configured RAID groups of a RAID controller card. One RAID controller card can be configured with one or more global hot spare disks. If a member disk in any RAID group fails, the global hot spare disk can automatically replace the faulty disk.
- Dedicated hot spare disk, which is exclusive to a specific RAID group of a RAID controller card. Each RAID group can be configured with one or more dedicated hot spare disks. If a member disk in the specified RAID group fails, the dedicated hot spare disk can automatically replace the faulty disk.

A hot spare disk has the following features:

- The hot spare disk is only used for the RAID groups with redundancy, including RAID 1, RAID 1E, RAID 5, RAID 6, RAID 10, RAID 50 and RAID 60.
- The hot spare disk is only used to replace a faulty disk managed by the same RAID controller card.

### **Emergency Spare**

The emergency spare function means that if a member disk in any RAID group with the redundancy function is faulty and no hot spare disk is specified, an idle disk managed by the RAID controller card automatically replaces the faulty member disk and rebuilds the data to avoid data loss.

Emergency spare requires that the capacity of the idle disk must be greater than or equal to that of the member disk, and the media type and interface of the idle disk must be the same as that of the member disk.

## 1.3.5 Data Rebuild

### Description

If a faulty disk exists in a RAID group, you can use the data rebuild function of the RAID controller card to rebuild data in the faulty disk for a new disk. The data rebuild function is only used for the RAID arrays with redundancy, including RAID 1, RAID 5, RAID 6, RAID 10, RAID 50 and RAID 60.

The RAID controller card supports automatic data rebuild:

- If an available hot spare disk is specified for a RAID group, when a member disk is faulty, the hot spare disk automatically replaces the faulty disk and rebuilds the data.
- If no available hot spare disk is specified for a RAID group, when a member disk is faulty, an idle disk in the RAID group automatically replaces the faulty disk and rebuilds the data.

## III Note

The hot spare disk and idle disk used for data rebuild must meet the following requirements:

- The capacity is larger than or equal to the RAID member disk.
- The media type and interface are the same as those of the member disk.

If no hot spare disk is specified for a RAID group and no idle disk meets requirements, data can be rebuilt only after the faulty disk is replaced with a new one.

After the hot spare disk begins data rebuild, the faulty member disk is marked as removable. If the system is powered off during the data rebuild process, the RAID controller card continues the data rebuild task after the system is restarted.

### **Rebuild Rate**

The rebuild rate is the proportion of CPU resources occupied by a data rebuild task to the overall CPU resources during the system operation. It can be set to 0%–100%.

- The value **0%** indicates that the data rebuild task is started only when there is no other task running in the system.
- The value 100% indicates that the data rebuild task occupies all CPU resources.

## Note

The rebuild rate can be set as required. It is recommended that you set a proper value based on the actual system conditions.

## 1.3.6 Disk Status

### **Physical Disk Status**

For a description of the possible status of a physical disk managed by a RAID controller card, refer to Table 1-5.

Status	Description
Online	Indicates that the disk is a member disk of a virtual disk and is online and can be used properly.
Unconfigured Good	Indicates that the disk is in normal status, but is not a member disk or a hot spare disk of a virtual disk.
Hot Spare	Indicates that the disk is set as a hot spare disk.
Failed	This status appears when an unrecoverable error occurs on a disk in <b>Online</b> or <b>Hot Spare</b> status.
Rebuild/Rebuilding	Indicates that the disk is rebuilding data to ensure the data redundancy and integrity of the virtual disk. In this case, the performance of the virtual disk is affected.
Unconfigured Bad	This status appears when an uninitialized disk or a disk in <b>Unconfigured</b> <b>Good</b> status has an unrecoverable error.
Missing	This status appears after the disk in the <b>Online</b> status is removed.
Offline	Indicates that the disk is a member disk of a virtual disk and is offline and can be used properly.
Shield State	Indicates the temporary status in which the physical disk is performing a di- agnosis operation.
Copyback	Indicates that a new disk is replacing the hot spare disk.

### **Table 1-5 Physical Disk Status**

Status	Description
Unsupport	Indicates that the specification of the disk exceeds the current specification of the RAID controller card.
Raw (Pass Through)	Indicates that the disk is a pass-through disk in HBA mode. For the concept of pass-through, refer to "1.3.13 Disk Pass-Through".
Ready	<ul> <li>Indicates that the disk in this status can be used to configure a RAID volume, which is applicable to the RAID mode and Mixed mode of the RAID controller card.</li> <li>In RAID mode, the connected disks can be used in the system only after they form a RAID volume, and the disks in Ready status are not reported to the OS.</li> <li>In Mixed mode, the connected disks can be used directly or form a RAID volume, and the disks in Ready status are reported to the OS.</li> </ul>
Predictive Failure	Indicates that the disk is about to change to the <b>Failed</b> status. The data on the disk needs to be backed up and the disk needs to be replaced.

## **Virtual Disk Status**

For a description of the possible status of a virtual disk created under a RAID controller card, refer to Table 1-6.

Status	Description
Optimal	Indicates that the virtual disk is in good condition and all member disks are online.
Degraded	Indicates that the virtual disk is available but abnormal, and some member disks are faulty or offline.
Failed	Indicates that the virtual disk is faulty.
Partial Degraded	This status appears when the number of faulty or offline disks in the RAID group does not exceed the maximum number of faulty disks supported by the RAID array.
Offline	This status appears when the number of faulty or offline disks in the RAID group exceeds the maximum number of faulty disks supported by the RAID array.

#### **Table 1-6 Virtual Disk Status**

## **1.3.7 Read/Write Policy for Virtual Disks**

### Overview

When creating a virtual disk, you need to define the data read/write policies to standardize subsequent data read and write operations on it.

#### **Data Read Policy**

"**Read Policy**" is generally displayed on the configuration screen. The RAID controller card supports the following two types of data read policies:

• Read-ahead mode: When a RAID controller card reads the required data from the virtual disk, it simultaneously reads the subsequent data and writes it into the cache. If a user needs to access the data, the data can be directly read from the cache to reduce the track seeking operation, save the response time, and improve the data read speed.

## Notice

To use this policy, the RAID controller card must support data protection against a power supply failure. However, if the super capacitor is abnormal at this time, the data may be lost.

 Non-read-ahead mode: The RAID controller card reads data from the virtual disk only after receiving a data read command. It does not perform the read-ahead operation.

### **Data Write Policy**

"Write Policy" is generally displayed on the configuration screen. The RAID controller card supports the following three types of data write policies:

• Write back: If this policy is used, when data needs to be written to a virtual disk, it is directly written into the cache. The RAID controller card refreshes the data to the virtual disk only when the written data is accumulated to a certain extent, achieving batch data write and improving the data write speed. After receiving all the transmitted data, the cache returns the data transmission completion signal to the host.

## Notice

To use this policy, the RAID controller card must support data protection against a power supply failure. However, if the super capacitor is abnormal at this time, the data may be lost.

• Direct write: The RAID controller card directly writes data to the virtual disk without being cached. However, the write speed is low. After the virtual receives all the transmitted data, the RAID controller card returns the data transmission completion signal to the host.

## Note

This policy does not require the RAID controller card to support data protection against a power supply failure. Even if the super capacitor fails, there is no impact.

• BBU-related write-back:

- → When the BBU of the RAID controller card is present and operates properly, the write operation from the RAID controller card to the virtual disk is transited through the cache (write-back mode).
- → When the BBU of the RAID controller card is not present or the BBU is faulty, the write operation from the RAID controller card to the virtual disk is automatically switched to the direct write mode without being cached.

## 1.3.8 Data Protection Against a Power Supply Failure

### **Protection Principle**

The speed of writing data into the high-speed cache of a RAID controller card is greater than that of writing data into a disk. When the server writes a large amount of data, the high-speed cache of the RAID controller card can be used to improve system performance. After the high-speed cache is enabled, the advantages and disadvantages are as follows:

- The write performance of the server is improved. When the write pressure on the server is reduced or the high-speed cache of the RAID controller card is to be full, data is written into a disk from the high-speed cache.
- The risk of data loss increases. When the server is powered off accidentally, the data in the high-speed cache of the RAID controller card will be lost.

To improve the high read/write performance of the server and ensure the data security in the high-speed cache of the RAID controller card, you can configure a super capacitor for the RAID controller card. In case of unexpected power failure of the server, the super capacitor is used to supply power to the RAID controller card, and data in the high-speed cache is written into the NAND flash in the super capacitor for storage.

### **Super Capacitor Power Calibration**

Because protection against a power supply failure requires a super capacitor, the RAID controller card needs to record the discharge curve and the maximum power of the super capacitor to learn about the status of the super capacitor. In addition, to extend the lifespan of the super capacitor, the automatic calibration mode of the super capacitor is enabled on the RAID controller card by default.

The RAID controller card needs to keep the battery level of the super capacitor at a relatively stable value. Therefore, the battery level of the super capacitor is calibrated through the three -phase charging/discharging operations. The three-phase charging/discharging operations are as follows:

- 1. Charges the super capacitor with maximum power.
- 2. Automatically starts the calibration process to completely discharge the super capacitor.
- 3. Recharges the super capacitor to the maximum power.

The super capacitor has the following characteristics during the calibration process:

- The write policy of the RAID controller card is automatically adjusted to direct write mode to ensure data security.
- The write performance of the RAID controller card is low.
- The power calibration period depends on the charging and discharging speeds of the super capacitor.

## 1.3.9 Disk Striping

#### **Basic Concepts**

Disk striping means that the disk space is divided into multiple stripes in accordance with the specified size and data blocks are also divided in accordance with the stripe size when data is written. The specific concepts include the following:

- Stripe width: number of disks used in a disk group for striping.
- Stripe size of a disk group: total amount of data written at the same time on all member disks in the disk group by the RAID controller card.
- Stripe size of a disk: amount of data written into a single disk.

For example, a RAID 0 group composed of four member disks divides the sequential data into 12 data blocks and writes them to each member disk in the way shown in Figure 1-9.

#### Figure 1-9 Disk Striping Example

Segment 1	Segment 2	Segment 3	Segment 4
Segment 5	Segment 6	Segment 7	Segment 8
Segment 9	Segment 10	Segment 11	Segment 12

In the example RAID 0, suppose the size of each data block is 2 KB:

- The stripe width is the number of member disks, that is, 4.
- The stripe size of the disk group is the sum of 12 data blocks, that is, 24 KB.
- The stripe size of each disk is the sum of three data blocks, that is, 6 KB.

#### Feature

Because most disks have restrictions on the number of accesses (I/O operation per second) and data transmission rate (data volume per second), when multiple processes access a disk at the same time, the disk restriction may be triggered. Subsequent processes are suspended.

Striping is a technology used to automatically balance the I/O load across multiple physical disks. By dividing a piece of sequential data into multiple data blocks and writing them into different disks, multiple processes can access different parts of the data at the same time. In addition, when a disk needs sequential access to data, it can obtain the maximum I/O parallel capability.



This feature does not ensure data redundancy.

## 1.3.10 Disk Mirroring

Disk mirroring means that the same data is written into two disks at the same time when a data write task is executed, thus achieving 100% data redundancy. Because the data on the two disks is exactly the same, when one disk is faulty, the data will not be lost, and the system automatically switches from the faulty disk to the mirrored disk for data read and write. Disk mirroring is applicable to RAID 1 and RAID 10. It brings a complete redundancy of 100%, but it is costly and the actual disk usage is only 50%, because each disk needs a backup disk during the mirroring process, see Figure 1-10.

### Figure 1-10 Disk Mirroring Example

Segment 1	Segment 1 Duplicated
Segment 2	Segment 2 Duplicated
Segment 3	Segment 3 Duplicated
Segment 4	Segment 4 Duplicated

## **1.3.11 Foreign Configuration**

The foreign configuration is different from the configuration of the current **RAID** controller card, and is usually displayed as **Foreign Configuration** on the configuration screen. In the following cases, the foreign configuration exists:

- The RAID configuration information exists in a physical disk newly installed on a server, and the RAID controller card identifies such information as a foreign configuration.
- After the RAID controller card of a server is replaced, the new RAID controller card identifies the existing RAID information as foreign configuration.
- After a member disk of a RAID group is hot swapped, the member disk is marked as carrying foreign configuration.

The detected foreign configuration can be processed in accordance with the actual server conditions:

- If the RAID information carried by the newly inserted disk does not meet the requirements of the current scenario, the configuration can be deleted.
- After the RAID controller card is replaced, if you want to use the previous configuration, you can import that configuration to apply it on the new RAID controller card.

## 1.3.12 Disk Energy Saving

A RAID controller card has the disk energy saving function, and can control disk rotation in accordance with the disk configurations and I/O activities. All rotary SAS and SATA disks support this function.

When the disk energy saving function is enabled, both idle disks and idle hot spare disks mounted under the RAID controller card are in energy saving status. When related operations (for example, creating a RAID volume, creating a hot spare disk, expanding a disk dynamically, and rebuilding a hot spare disk) are performed, the disk in energy saving status can be woken up.

## 1.3.13 Disk Pass-Through

Disk pass-through, namely, the JBOD function, also called transparent command transmission, is a data transmission mode that only ensures transmission quality without processing the command by the transmission device.

After the disk pass-through function is enabled, the RAID controller card can transparently transmit commands to the connected disk. If no RAID group is configured, user commands can be transparently transmitted to a disk, so that upper-layer service software or management software can access the disk.

For example, during the installation of the server operating system:

- For a RAID controller card that supports the disk pass-through function, you can use a disk mounted under the RAID controller card as the installation disk.
- For a RAID controller card that does not support the disk pass-through function, you can use only the virtual disk configured under the RAID controller card as the installation disk.

# **Chapter 2 Applicable Server Models**

This document is applicable to VANTAGEO rack servers based on the **Eagle Stream** platform, including:

- 1240-RE
- 2240-RE
- 4440-RE

# Chapter 3 VT SmartIOC 2100 RAID Controller Card

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A VT SmartROC 2100 RAID controller card is integrated with the BIOS configuration utility. By using the program, you can configure the disks that are supported by the VT SmartROC 2100 RAID controller card to a RAID volume of a specific level.



The operation screens of the BIOS configuration utility displayed in this chapter are for reference only, and may not be the same as the actual ones.

## 3.1 Capability Features

For a description of the capabilities of a VT SmartIOC 2100 RAID controller card, refer to Table 3-1.

Capability Item	Capability Parameter
Product form	Mezz card
Controller chip	PMC PM8238
Host interface	PCIe 3.0x8
SAS interface	12 Gb SAS

### Table 3-1 Descriptions of the Capabilities of a VT SmartIOC 2100 RAID Controller Card

Capability Item	Capability Parameter
Number of ports	16+2
Drive interface	SAS and SATA
Drive type	HDD and SSD
Whether drives are hot swappable	Supported
Maximum number of RAID groups	8
Number of drives	238
RAID level	RAID 0, RAID 1, RAID 10, RAID 5
JBOD mode	Supported
Cache	None
Cache protection	None
Out-of-band management	Supported
Consistency check/verification and fix	Supported
Online capacity expansion	Supported
Online RAID level migration	Supported
Automatic rebuild	Supported
Manufacturer tool support	arcconf

## 3.2 Initial Configuration (Legacy Mode)

Figure 3-1 shows the initial configuration flow of a VT SmartIOC 2100 RAID controller card.





## 3.2.1 Starting the Configuration Utility

### Abstract

This procedure describes how to start the BIOS configuration utility of a VT SmartIOC 2100 RAID controller card to log in to the management screen and complete the subsequent initial and common configurations.

#### Prerequisite

The boot mode is already set to **Legacy** in BIOS. For details, refer to "5.3.1 Setting the Boot Mode to Legacy".

### Steps

- 1. Start the server system.
- During the POST process, press Ctrl+A to start the BIOS configuration utility of the VT SmartIOC 2100 RAID controller card. The screen as shown in Figure 3-2 is displayed.



In the Options area, use the arrow keys to select Array Configuration, and then press Enter. The Configuration Menu screen is displayed, see Figure 3-3.



#### Figure 3-3 Configuration Menu Screen

## 3.2.2 Creating a RAID Volume

## Abstract

You can create RAID volumes at different levels as required.

The procedures for creating RAID volumes at different levels are similar. This procedure uses a RAID 0 volume in legacy mode as an example.

### Prerequisite

Sufficient SATA and SAS disks are installed on the server.

### Context

For a description of the number of disks required to create a RAID volume, refer to Table 3-2.

RAID Level	Description				
RAID 0	RAID 0 requires at least one disks.				
RAID 1	RAID 1 requires at least two disks. Disks with different capacities can be used in a RAID 1 volume, but the logi- cal capacity of each member disk depends on the space of the disk with the smallest capacity.				
RAID 5	RAID 5 requires at least three disks.				
RAID 6	RAID 6 requires at least four disks.				
RAID 10	RAID 10 requires at least four disks. A RAID 10 volume consists of at least two RAID 1 volumes. For example, if there are four disks to be used in RAID 10 mode, you need to add them to two drive groups, each of which is mounted with two disks in RAID 1 mode.				
RAID 50	RAID 50 requires at least six disks. A RAID 50 volume consists of at least two RAID 5 volumes. For example, if there are six disks to be used in RAID 50 mode, you need to add them to two drive groups, each of which is mounted with three disks in RAID 5 mode.				
RAID 60	RAID 60 requires at least eight disks. A RAID 60 volume consists of at least two RAID 6 volumes. For example, if there are eight disks to be used in RAID 60 mode, you need to add them to two drive groups, each of which is mounted with four disks in RAID 6 mode.				

 Table 3-2 Number of Disks Required for Creating a RAID Volume

#### Steps

 On the Configuration Menu screen, use the arrow keys to select Create Array, and then press Enter. On the displayed Select drives to create Array screen, all the disks that can be used to create a RAID volume are displayed, see Figure 3-4.

		— Conf igur	ation —
Select dr CN1:01:04 A CN1:01:05 A CN1:01:06 A CN1:01:07 A CN2:01:08 A CN2:01:09 A	ives to create TA SAMSUNG TA SAMSUNG TA SAMSUNG TA SAMSUNG TA SAMSUNG TA SAMSUNG	Array 1788.4GiB 1788.4GiB 1788.4GiB 1788.4GiB 1788.4GiB 1788.4GiB	Selected Drives
(PgUp/PgDn> Pri (14> Mave Cursi	ev∕Next page of or, <ims>/<spa(< td=""><td>Selected D ceBar≻ Selec</td><td>rives(Port:Box:Bay) t, <del> Deselect</del></td></spa(<></ims>	Selected D ceBar≻ Selec	rives(Port:Box:Bay) t, <del> Deselect</del>
(Enter> Submit	, (Esc) Cancel		

#### Figure 3-4 Select Drives to Create Array Screen

 Use the arrow keys to select the disks to be used to create a RAID volume, and then press Insert to add these disks to the Selected Drives list, see Figure 3-5.

Configuration -										
Select	drives	to create	Array	ה ור		=Selected	l Drives=			
CN1:01:04	ATA	SAMSUNG	1788.4GiB		CN1:01:05	ATA	SAMSUNG	1788.4GiB		
CN1:01:05	ATA	SAMSUNG	1788.4GiB							
CN1:01:06	ATA	SAMSUNG	1788.4GiB							
CN1:01:07	ATA	SAMSUNG	1788.4GiB							
CN2:01:08	ATA	SAMSUNG	1788.4GiB							
CN2:01:09	ATA	SAMSUNG	1788.4GiB							
0110-01-03	100000	Uningente								
(Palln/Palln)	PreuzN	ext name of	Selected	Day	iues(Port:R	ox:Rau)				
(1) Nove Cursor, (INS)/(SnaceBar) Select, (DEL) Deselect										
(Enter) Subm	it. (F	sc) Cancel	COLORING COLORING	10	a sense rees	activity of the				
CHILDER > CHIDI	14 6 J 8 6 8	ser odneer								

#### **Figure 3-5 Selected Drives List**

## Note

- The disks for creating a RAID volume must be of the same type. It is forbidden to select disks with interface types such as SATA and SAS at the same time.
- Press the Delete key to delete the selected disk from the Selected Drives list.
3. Press Enter. The Create Logical Drive screen is displayed, see Figure 3-6.

	Create Logical Drive				
	RAID Level	: RAID Ø(Stripe)			
	Logical Drive Name				
	Strip/Full Stripe Size	: 256KiB/256KiB			
	Parity Group Count	: Not Applicable			
	Build Method	: Not Applicable			
	Size	: 1.746 TiB			
	SSD OverProvisioning	: Perform SSD OPO			
	Acceleration Method	: SSD I/O Bypass			
		[Done]			
<1	(1) Moves Curson (Ecc) Cancel Selection (Enter) Accent Selection				

#### Figure 3-6 Create Logical Drive Screen

4. Use Tab/Tab+Shift to select the parameters that you want to modify. In the displayed operation box, use the arrow keys to select the related parameters, and then press Enter for confirmation. For a description of the parameters on the Create Logical Drive screen, refer to Table 3-3.

Tuble o o Descriptions of Furtheters on the oreate Eogloar Drive ooreen	Table 3-3 Descri	ptions of Param	eters on the Crea	te Logical Dri	ve Screen
---	------------------	-----------------	-------------------	----------------	-----------

Parameter	Description	
RAID Level	Sets a RAID standard, for example, <b>RAID 0(Stripe)</b> .	
Logical Drive Name	Sets the RAID volume name, for example, "0".	
Strip/Full Stripe Size	<ul> <li>The stripe size should be equal to the size of average disk IO requests generated by server applications. In the optimum status, only one IO operation is executed for each IO request. The recommended stripe size configurations are as follows:</li> <li>For a Web server, 8 KB is recommended.</li> <li>For a groupware server (such as an email server), 16 KB is recommended.</li> <li>For a database server, 16 KB or 32 KB is recommended.</li> <li>For a file server, 32 KB or 64 KB is recommended.</li> <li>For a video file server, 64 KB, 128 KB, or 256 KB is recommended.</li> </ul>	
Parity Group Count	Configures logical-device parity groups in accordance with the number of physical devices in the array. It is not applicable to all RAID levels.	

Parameter	Description		
Build Method	<ul> <li>Sets the RAID initialization method, which is used to determine how the logical devices prepare for read and write, and how long the initialization takes.</li> <li>default: When the logical devices can be accessed by the operating system, parity blocks are initialized at the back end. A lower RAID level can achieve faster parity initialization.</li> <li>RPI: The data and parity blocks at the front end are overwritten. Before the parity initialization procedure is completed, logical devices remain invisible and unavailable to the operating system. All parity groups are initialized in parallel, but the initialization of a single parity group (RAID 5) is faster. The RAID level does not affect the performance during the RAID initialization.</li> <li>Not Applicable: unavailable.</li> <li>Keep the default configuration unless otherwise specified.</li> </ul>		
Size	Displays the storage size of the disk array in accordance with the total storage space of the disks added to the disk array. By default, the RAID created uses all the available disk space.		
SSD Over Provisioning Opti- mization	Sets whether to enable the SSD over-provisioning function to perform excessive-configuration optimization on the RAID group when creating a RAID volume composed of SSDs.		
Acceleration Method	<ul> <li>Sets the caching mode for the RAID volume.</li> <li>IO Bypass: This option is valid only when the RAID logical volume is formed by SSDs.</li> <li>Controller Cache: enables controller cache optimization. The read cache and write cache are used at the same time.</li> <li>None: disables the controller cache. Neither IO Bypass nor Controller Cache is used.</li> <li>Keep the default configuration unless otherwise specified.</li> </ul>		

5. Use **Tab** to select **Done**, and then press **Enter** to create the RAID volume, see Figure 3-7.

#### Figure 3-7 Creating a RAID Volume

	Configuratio	m ———	
	7		
Creating Array			
	1		
Please wait			

 The RAID volume is created successfully, see Figure 3-8. Press any key to return to the Configuration Menu screen.

### Figure 3-8 RAID Volume Created Successfully

- Configuration	
Array/Logical Drive creation successful	

## 3.2.3 Configuring a Boot Device

#### Abstract

After a RAID volume is created, if you need to install an operating system on the RAID volume, and there are multiple RAID volumes on the RAID controller card, you must set the RAID volume as a boot device.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "3.2.2 Creating a RAID Volume".

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** page is displayed, see Figure 3-9.

#### Figure 3-9 List of Arrays Screen



 Use the arrow keys to select the array where the RAID volume to be set as a boot device is located, and then press Enter. The List of Logical Drives screen is displayed, see Figure 3-10.

#### Figure 3-10 List of Logical Drives Screen



3. Select the RAID volume to be booted first, and then press **Ctrl+P** to configure it as the first boot device, see Figure 3-11.



#### Figure 3-11 Configuring a Boot Device

## 3.3 Initial Configuration (UEFI Mode)

Figure 3-12 shows the initial configuration flow of a VT SmartIOC 2100 RAID controller card.



#### Figure 3-12 Initial Configuration Flow of a VT SmartIOC 2100 RAID Controller Card

- The SmartIOC 2100 RAID controller card does not support the boot disk configuration in UEFI mode.
- The SmartIOC 2100 RAID controller card does not support the co-existence of configurations in both UEFI and legacy modes. If the mode is switched from UEFI to legacy, the configuration in UEFI mode must be cleared. Otherwise, the normal operation of the RAID controller card is affected.

## 3.3.1 Starting the Configuration Utility

#### Abstract

This procedure describes how to start the BIOS configuration utility of a VT SmartIOC 2100 RAID controller card to log in to the management screen and complete the subsequent initial and common configurations.

#### Prerequisite

The boot mode is already set to UEFI in BIOS. For details, refer to "5.3.2 Setting the Boot Mode to UEFI".

#### Steps

- 1. Start the server system.
- During the POST process, press F2/DEL. The Aptio Setup screen is displayed, see Figure 3-13.

#### Figure 3-13 Aptio Setup Screen

Main Advanced	Aptio Setup – AMI Platform Configuration Socke	t Configuration Server Mgmt 🕨	
BIOS Version Build Date Product Name Serial Number Asset Tag Access Level Platform Informa Platform	09.00.00.01 07/12/2022 N/A N/A N/A Administrator tion TypeArcherCityRP		
Processor PCH RC Revision	806F3 - SPR-SP Dx EBG A0/A1/B0/B1 SKU - B0 80.D21	<pre>++: Select Screen  f↓: Select Item Enter: Select +/-: Change Opt.</pre>	
BIOS ACM SINIT ACM Memory Informati	1.0.A 1.0.A	<ul> <li>K/M: Scroll Help Area</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>▼ F3: Optimized Defaults</li> <li>E4: Save &amp; Evit</li> </ul>	
Version 2.22.1285 Copyright (C) 2022 AMI AB			

3. Use the arrow keys to select **Advanced**, and then press **Enter**. The **Advanced** screen is displayed, see Figure 3-14.

#### Figure 3-14 Advanced Screen



4. Use the arrow keys to select VT SmartIOC2100 RM24x V2.54, and press Enter. The controller management screen is displayed, see Figure 3-15.

#### Figure 3-15 Controller Management Screen

Aptio Setup – AMI Advanced			
<ul> <li>Controller Information</li> <li>Configure Controller Settings</li> <li>Array Configuration</li> <li>Disk Utilities</li> <li>Set Bootable Device(s) for Legacy Boot Mode</li> <li>Administration</li> </ul>	Provides the information of the controller like PCI Bus:Device:Function, Firmware Revision, UEFI Driver Version, Controller Temperature etc. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1285 Copyright (C) 2022 AMI AB			

For a description of the functions of the menus on the controller management screen, refer to Table 3-4.

Menu	Function Description	
Controller Information	Displays the basic information, firmware, current temperature, and port configuration of the controller.	
Configure Controller Settings	Provides advanced configuration options for the controller.	
Array Configuration	Creates an array or RAID.	
Disk Utilities	Displays the list of disk devices mounted under the controller as well as the basic disk information. It allows you to turn on the disk location indica- tor, erase disk data and upgrade the firmware.	
Set Bootable Device(s) for Legacy Boot Mode	Configures, or clears the primary and secondary boot disks.	
Administration	Allows the controller administrator to perform operations, such as upgrad- ing the firmware and restoring factory defaults.	

#### Table 3-4 Functions of Menus on the Controller Management Screen

## 3.3.2 Creating a RAID Volume

#### Abstract

You can create RAID volumes at different levels as required.

The procedures for creating RAID volumes at different levels are similar. This procedure uses a RAID 1 volume in UEFI mode as an example.

#### Prerequisite

- Sufficient SATA and SAS disks are installed on the server.
- The port mode for the disks to be connected is already set. For details, refer to "3.5.1 Setting the Mode of a Port".

#### Context

For a description of the number of disks required to create a RAID volume, refer to Table 3-5.

RAID Level	Description
RAID 0	RAID 0 requires at least one disks.
RAID 1	RAID 1 requires at least two disks. Disks with different capacities can be used in a RAID 1 volume, but the logical capaci- ty of each member disk depends on the space of the disk with the smallest capacity.
RAID 5	RAID 5 requires at least three disks.
RAID 6	RAID 6 requires at least four disks.
RAID 1+0	RAID 1+0 requires at least four disks. A RAID 1+0 volume consists of at least two RAID 1 volumes. For example, if there are four disks to be used in RAID 1 +0 mode, you need to add them to two drive groups, each of which is mounted with two disks in RAID 1 mode.
RAID 50	RAID 50 requires at least six disks. A RAID 50 volume consists of at least two RAID 5 volumes. For example, if there are six disks to be used in RAID 50 mode, you need to add them to two drive groups, each of which is mounted with three disks in RAID 5 mode.
RAID 60	RAID 60 requires at least eight disks. A RAID 60 volume consists of at least two RAID 6 volumes. For example, if there are eight disks to be used in RAID 60 mode, you need to add them to two drive groups, each of which is mounted with four disks in RAID 6 mode.

#### Table 3-5 Number of Disks Required for Creating a RAID Volume

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 3-16.

#### Figure 3-16 Array Configuration Screen

Aptio Setu Advanced	p — AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Creates an array from the group of selected physical drives of same type. Once an array is created, the unused space is available for creating logical drives. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Cop	yright (C) 2022 AMI AB

2. Use the arrow keys to select **Create Array**, and then press **Enter**. In the displayed disk list, all the disks that can be used to create a RAID volume are displayed, see Figure 3-17.

#### Figure 3-17 Viewing the Disk List

Aptio Setup – AMI Advanced				
Port:CNO Box:1 Bay:1 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Size:3.6 TiB(4 TB) Port:CNO Box:1 Bay:1 Device Type:SAS Logical		
Port:CNO Box:1 Bay:2 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Sector Size:512 Model:SEAGATE ST4000NM003A Serial		
Port:CNO Box:1 Bay:3 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Number:WS23MQK30000E2307 500 Negotiated Link 🔍		
Port:CN1 Box:1 Bay:4 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	++: Select Screen ↑↓: Select Item		
Port:CN1 Box:1 Bay:6 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Enter: Select +/–: Change Opt. K/M: Scroll Help Area		
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1285 Copyright (C) 2022 AMI				
		AB		

3. Select the disk to be added to the Array disk group, and then press **Enter** to set the disk port to **Enabled** status, see Figure 3-18.

#### Figure 3-18 Confirming the Configuration

Advanced	Aptio Setup –	AMI		
Port:CN1 Box:1 Bay:4 Size:4 TB SAS SEAGATE ST4000NM003A	[Enabled]	<ul> <li>Size:3.6 TiB(4 TB)</li> <li>Port:CN1 Box:1 Bay:6</li> <li>Device Type:SAS Logical</li> </ul>		
Port:CN1 Box:1 Bay:6 Size:4 TB SAS SEAGATE ST4000NM003A	[Enabled]	Sector Size:512 Model:SEAGATE ST4000NM003A Serial		
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Number:WS23NLKA0000E2308 9S9 Negotiated Link ▼		
Port:CN2 Box:1 Bay:9 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	++: Select Screen ↑↓: Select Item		
Port:CN2 Box:1 Bay:10 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Enter: Select +/–: Change Opt. K/M: Scroll Help Area		
[Proceed to next Form]		F1: General Help F2: Previous Values ▼ F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1285 Copyright (C) 2022 AMI AB				

# Note

The disks for creating a RAID volume must be of the same type. It is forbidden to select disks with interface types such as SATA and SAS at the same time.

4. Use the arrow keys to select **Proceed to Next Form**, and then press **Enter**. The screen for creating RAID is displayed, see Figure 3-19.

Figure 3-19 Creating RAID

Advanced	Aptio Setup – AMI	
RAID Level ▶ [Proceed to next Form]	[RAIDO]	RAID Level ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version	2.22.1285 Copyright (C) 2	022 AMI AB

5. Use the arrow keys to select **RAID Level**, and then press **Enter**. From the displayed shortcut menu, select the desired RAID level, see Figure 3-20.

#### Figure 3-20 Selecting a RAID Level



6. Use the arrow keys to select **Proceed to Next Form**, and press **Enter**. The screen for setting RAID logical volumes is displayed, see Figure 3-21.

#### Figure 3-21 Setting RAID Logical Volumes

Advanced	Aptio Setup — AMI				
Logical Drive Label Strip Size / Full Stripe Size Size Unit Size Acceleration Method • [Submit Changes]	Logical Drive 1 [256 KiB / 256 KiB] 3.638 [TiB] [None]	Enter a label for this logical drive. The label is displayed in the Logical Drive Details section ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit			
Version 2.22.1285 Copyright (C) 2022 AMI AB					

7. Use the arrow keys to select the parameters that you want to modify. In the displayed operation boxes, configure the related parameters. For a description of the parameters for setting a logical volume, refer to Table 3-6.

Parameter	Description
Logical Drive Label	Sets the name of the RAID logical volume, for example, "Logical Drive 1".
Strip Size/Full Strip Size	<ul> <li>Strip Size indicates the size of the current stripe. The stripe size should be equal to the size of average disk IO requests generated by server applications. In the optimum status, only one IO operation is executed for each IO request. The size can be 16 KiB, 32 KiB, 64 KiB, 128KiB, 512 KiB, or 1024 KiB. The default value is 256 KiB. The recommended stripe size configurations are as follows:</li> <li>For a Web server, 8 KiB is recommended.</li> <li>For a groupware server (such as an email server), 16 KiB is recommended.</li> <li>For a database server, 16 KiB or 32 KiB is recommended.</li> <li>For a file server, 32 KiB or 64 KiB, is recommended.</li> <li>For a video file server, 64 KiB, 128 KiB, or 256 KiB is recommended.</li> </ul>

#### Table 3-6 Parameter Descriptions for Logical Volume Configuration

Parameter	Description			
	Full Strip Size indicates the total size of all stripes. When you set     Strip Size, the system automatically calculates Full Stripe Size			
Size	Displays the storage size of the RAID volume in accordance with the total			
	storage space of the disks added to the RAID volume.			
	By default, all available space is used to create a RAID logical volume.			
	To create multiple RAID logical volumes, you can define the size of the			
	volumes.			
Unit Size	Select the unit (MiB/GiB/TiB) of the logical drive.			
Acceleration Method	Sets the caching mode for the RAID volume.			
	• IO Bypass: This option is valid only when the RAID logical volume is			
	formed by SSDs.			
	Controller Cache: enables controller cache optimization. The read			
	cache and write cache are used at the same time.			
	• None: disables the controller cache. Neither <b>IO Bypass</b> nor <b>Con-</b>			
	troller Cache is used.			
	Keep the default configuration unless otherwise specified.			

8. Use the arrow keys to select **Submit Changes**, and press **Enter**. The RAID volume is created successfully, see Figure 3-22.

## Aptio Setup - AMI Advanced Logical Drive Creation Successful Navigate back to Main Menu ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-22 RAID Volume Created Successfully

9. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 3.4 Common Configurations (Legacy Mode)

By using the BIOS configuration utility, you can configure and maintain a created RAID volume. For a description of the common operations on a SmartIOC 2100 RAID controller card in legacy mode, refer to Table 3-7.

Common Operation	Description
Querying RAID volume infor- mation	Refer to "3.4.1 Querying RAID Volume Information".
Creating a hot spare disk	Refer to "3.4.2 Creating a Hot Spare Disk".
Deleting a RAID volume	Refer to "3.4.3 Deleting a RAID Volume".
Deleting a hot spare disk	Refer to "3.4.4 Deleting a Hot Spare Disk".
Locating a disk	Refer to "3.4.5 Locating a Disk".

#### Table 3-7 Common Operations on a SmartIOC 2100 RAID Controller Card

Common Operation	Description
Configuring a pass-through disk	Refer to "3.4.6 Configuring a Pass-Through Disk".

## 3.4.1 Querying RAID Volume Information

#### Abstract

This procedure describes how to query the RAID information created on a SmartIOC 2100 RAID controller card, such as the RAID volume status and member disk status.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "3.2.2 Creating a RAID Volume".

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 3-23.





 Select the RAID volume whose properties you want to view, and then press Enter. The List of Logical Drives screen is displayed, see Figure 3-24.

#### Figure 3-24 List of Logical Drives Screen

Configuration -				
List of Logical Drives (Page 1 of 1) 01 Logical Drive 1 RAID0 1788.4GiB				
<pre><enter> Display Logical Drive Details, <del> Delete Logical Device</del></enter></pre>				
(Utri+r) Set as Frimary Boot LD, (Utri+a) Set as Secondary Boot LD (CTRL+R) Delete Rootable Logical Drive (CTRL+F)Rooce Online 10				
<14> Moves Cursor				

3. Press Enter. In the displayed Logical Drive Details dialog box, view the property information about the RAID volume, see Figure 3-25.

Logic	cal Drive Details
Array Name	: Array-A
Status	: Ok
Drive Type	: Data
Size	: 1788.4GiB
RAID Level	: RAID0
Legacy Disk Geometry(C/H/S)	: 65535/255/32
Strip Size/Full Stripe size	: 256KiB/256KiB
Drive Unique ID	: 600508b1001cc017f48a1c0f825bd725
Logical Drive Label	: Logical Drive 1
Acceleration Method	: SSD I/O Bypass

#### Figure 3-25 Logical Drive Details Dialog Box

4. (Optional) To view the member disk information, press **Ctrl+D**. The **Array Member Drives** dialog box is displayed, see Figure 3-26.

#### Figure 3-26 Array Member Drives Dialog Box

91 La	ogical Drive	-List of 1	Logical RAIDO	Drives ( 1788.4Gi	Page 1 of B	1)		
					*****			
-			=Logical	Drive De	tails——			-1
Ar	rray Name			Array-A				
S1	tatus			Ok				
Dr	rive Type			Data				
S i	ize			1788.4Gi	В			
RF	AID Level			RAIDO				
Le	egacy Disk Ge	bmetry(C	/H/S) :	65535/2	55/32			
51	trip Size/ful	l Stripe	size :	256K1B/2	56K1B			
U Dr	rive Unique I	0		60020801	UNICCU17f	48a1c0f82	25bd725	
	bgical Drive	Label		Logical	Drive 1			
HC	$\mathbf{C}$	ethod		550 1/0	Bypass		5- <b>3</b> -	
	ON4 - 04 - 04	Hrray M	ember Dri	IVES TRAG	e 1 01 1)	01		
	CU1:01:04	HIH	SHITSUNG	1700.561	Б	UK		
	ack to provin		CTPLADA	Dicplau	Annau Man	hans		
1 . 8	Dioplau Spa	as menu	COTHE-DA	bispiag	minay new	Ders		

## 3.4.2 Creating a Hot Spare Disk

#### Abstract

A hot spare disk improves the data security of a RAID array. For a description of the hot spare disk types supported by a SmartIOC 2100 RAID controller card, refer to Table 3-8.

#### Table 3-8 Hot Spare Disk Types

Туре	Description
Dedicated	<ul> <li>This type of hot spare disks is exclusive to the specified one or more disk groups of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a dedicated hot spare disk temporarily takes over the faulty disk.</li> </ul>
Auto Replace	<ul> <li>This type of hot spare disks provides the hot standby function for a disk group of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a hot spare disk of this type automatically replaces the faulty disk.</li> </ul>

#### Prerequisite

There are sufficient idle disks on the server.

#### Context

When creating a hot spare disk, pay attention to the following points:

- Multiple hot spare disks can be created for a disk group, but only one type of hot spare disk can be set at a time. That is, either **Dedicated** or **Auto Replace** is specified.
- An idle disk can be set as a hot spare disk. The disk that has been used to create a RAID volume cannot be set as a hot spare disk.
- The hot spare disk must be of the same type as that of any member disk in the corresponding disk group. That is, all of them are SATA disks or SAS disks, and the hot spare disk's capacity must not be less than the maximum capacity of the member disks.
- Disk groups at all levels except RAID 0 support hot spare disks.

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 3-27.



#### Figure 3-27 List of Arrays Screen

2. Use the arrow keys to select the RAID volume for which you want to configure a hot spare disk, and press **Ctrl+S**. The **Select Hotspare Drives** screen is displayed, see Figure 3-28.

	— Conf igur	ation ————————
Select Hotspare driv	es	Selected Drives
CN1:01:04 ATA SAMSUNG	1788.5GiB	
CN1:01:05 ATA SAMSUNG	1788.5GiB	
CN1:01:06 ATA SAMSUNG	1788.5GiB	
CN1:01:07 ATA SAMSUNG	1788.5GiB	
CN2:01:08 ATA SAMSUNG	1788.5GiB	
CN2:01:09 ATA SAMSUNG	1788 5GiB	
which by the states	110010010	
ergup/rgun> Prev/Mext page of	Selected D	rivestrort:Box:Bay)
<14> Move Cursor, <1MS>/ <spac< td=""><td>eBar&gt; Selec</td><td>t, <del> Deselect</del></td></spac<>	eBar> Selec	t, <del> Deselect</del>
(Enter) Submit, (Esc) Cancel		

#### Figure 3-28 Select Hotspare Drives Screen

3. Use the arrow keys to select the idle disk to be set as a hot spare disk, and then press **Insert** to add the disk to the **Selected Drives** list, see Figure 3-29.

			— Configur	ation ———			
Se 1	ect Hots	pare driv	es 🦳 🔤 🔤		=Selected	l Drives=	
CN1:01:04	ATA	SAMSUNG	1788.5GiB	CN1:01:06	ATA	SAMSUNG	1788.5GiB
CN1:01:05	ATA	SAMSUNG	1788.5GiB				
CN1:01:06	ATA	SAMSUNG	1788.5GiB				
CN1:01:07	ATA	SAMSUNG	1788.5GiB				
CN2:01:08	ATA	SAMSUNG	1788 56iB				
CN2-01-09	ATA	SAMSUNG	1788 56 iB				
012-01-03	1111	annauna	1100.3010				
<pgup pgdn=""></pgup>	Prev/Nex	t page of	Selected D	rives(Port:B	ox (Bay)		
<11> Mave Cu	rsor, <	NS>/ <spac< th=""><th>eBar&gt; Selec</th><th>t, <del> Des</del></th><th>elect</th><th></th><th></th></spac<>	eBar> Selec	t, <del> Des</del>	elect		
<enter> Subm</enter>	it, <esc< th=""><th>&gt; Cancel</th><th></th><th></th><th></th><th></th><th></th></esc<>	> Cancel					
	1 C 2 C 1 C 1 C 1 C 2 C						

#### Figure 3-29 Selected Drives Screen



Press the **Delete** key to delete the selected disk from the **Selected Drives** list.

4. Press **Enter**. A confirmation dialog box is displayed, see Figure 3-30.

#### Figure 3-30 Confirmation Dialog Box

	——— Configur	ation ———		
Select Hotspare	drives	(	-Selected Drives=	
CN1:01:04 ATA SAM	SUNG 1788.5GiB	CN1:01:06	ATA SAMSUNG	1788.5GiB
CN1:01:05 ATA SAM	SUNG 1788 5GiB			
CN1:01:06 ATA SAM	SUNG 1788 561B			
CN1+01+07 ATA SAM	SUNC 1709 5CTP			
	SUNG 1788.5G1B			
CM2:01:09 ATA 2AM	SUMG 1788.5G1B			
🛛 Do you want to	o submit the cha	nges made ?		
L				
Y - save changes and ret	urn to main menu	, M - contin	ue	

5. At the cursor in the confirmation dialog box, enter **Y**. The **Select Spare Type** screen is displayed, see Figure 3-31.

#### Figure 3-31 Select Spare Type Screen

	- Configuration -
ſ	Select Spare Type
	Select Spare Type Dedicated Spare Drive Auto replace drives
	[Done ]
<11	Moves Cursor, <esc> Cancel Selection, <enter> Accept Selection</enter></esc>

6. Use the arrow keys to select the type of hot spare disk to be created, and then press **Enter** for confirmation, see Figure 3-32.

#### Figure 3-32 Select Spare Type Screen

	Configuration
	Select Spare Type Dedicated Spare Drive
	[Done]
<ta <ei< th=""><th>ub&gt; Next Field, <shift+tab> Previous Field Iter&gt; Accept Value, <esc> Cancel Dialog Box</esc></shift+tab></th></ei<></ta 	ub> Next Field, <shift+tab> Previous Field Iter&gt; Accept Value, <esc> Cancel Dialog Box</esc></shift+tab>

7. Use Tab to select Done, and then press Enter to create the hot spare disk, see Figure 3-33.

#### Figure 3-33 Creating a Hot Spare Disk

Configuration	
Creating Spare Drive	

## 3.4.3 Deleting a RAID Volume

#### Abstract

When a server no longer needs a RAID volume, you can delete the RAID volume to release the disk space.

Notice

The data that is lost during deletion of the RAID volume cannot be restored. Therefore, you must make sure that you have backed up important data before deleting the volume.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "3.2.2 Creating a RAID Volume".

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 3-34.

#### Figure 3-34 List of Arrays Screen



2. Use the arrow keys to select the array where the RAID volume to be deleted is located, and then press **Enter**. The **List of Logical Drives** screen is displayed, see Figure 3-35.

#### Figure 3-35 List of Logical Drives Screen



3. Use the arrow keys to select the RAID volume to be deleted, and press **Delete**. A warning dialog box is displayed, see Figure 3-36.



#### Figure 3-36 Warning Dialog Box

4. At the cursor in the warning dialog box, enter **Y** to delete the selected hot spare disk, see Figure 3-37.

#### Figure 3-37 Deleting a RAID Volume



## 3.4.4 Deleting a Hot Spare Disk

### Abstract

When the number of disks of a server cannot meet the requirements, you can delete an existing hot spare disk and restore it to a common disk.

#### Prerequisite

A hot spare disk is already created. For details, refer to "3.4.2 Creating a Hot Spare Disk".

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 3-38.

Figure 3-38 List of Arrays Screen

Configuration
List of Arrays (Page 1 of 1) ARRAY-A = 002-PD(s), 01-LD(s) ARRAY-B = 001-PD(s), 01-LD(s)
<pre><enter>List Logical Drives, <ctrl+c>Create Logical Drives, <ctrl+d>Delete Array</ctrl+d></ctrl+c></enter></pre>
<pre><ctrl+s>Add Spare drives, <del>Delete Spare Drive, <esc>Cancel.</esc></del></ctrl+s></pre>
<pre><ctrl+e>Enable&gt;Disable SSD 1/0 Bupass.<ctrl+f>Identifu Device.</ctrl+f></ctrl+e></pre>

2. Use the arrow keys to select the array where the hot spare disk to be deleted is located, and press **Delete**. The **Select Hotspare drives** screen is displayed, see Figure 3-39.

			— Conf igur	ation
Se Se	lect Ho	tspare driv	es	Selected Drives
CN1:01:04	ATA	SAMSUNG	1788.5GiB	
CN1:01:05	ATA	SAMSUNG	1788.5GiB	
CN1:01:06	ATA	SAMSUNG	1788.5GiB	
CN1:01:07	ATA	SAMSUNG	1788.5GiB	
CN2:01:08	ATA	SAMSUNG	1788 56iB	
CN2 .01 .09	ATA	SAMSUNG	1788 56 iB	
0112.01.03	mm	onnoono	1100.3010	
<pgup pgdn=""></pgup>	Preu/N	ext page of	Selected I	rives(Port:Box:Bay)
<11> Move Ci	arsor,	<ins>/<spac< th=""><th>eBar&gt; Selec</th><th>t, <del> Deselect</del></th></spac<></ins>	eBar> Selec	t, <del> Deselect</del>
(Enter) Sub	wit /F	se) Cancel		

#### Figure 3-39 Select Hotspare Drives Screen

3. Use the arrow keys to select the hot spare disk to be deleted, and then press **Insert** to add the disk to the **Selected Drives** list, see Figure 3-40.

#### Figure 3-40 Selected Drives List

			— Conf ig	ure	ution ———			
Se 1	ect Hots	pare driv	es	-11		=Selected	d Drives=	
CN1:01:04	ATA	SAMSUNG	1788.5Gi	B	CN1:01:06	ATA	SAMSUNG	1788.5GiB
CN1:01:05	ATA	SAMSUNG	1788.5Gi	B	CONTRACTOR CONTRACTOR CONTRACTOR			<ul> <li>Production and the second s</li></ul>
CN1:01:06	ATA	SAMSUNG	1788 561	R				
CN1 .01 .07	ATA	SAMSUNG	1788 561	R				
CN2:01:00	070	COMPLINC	1700 501	D I				
CH2.01.00	HIH ATA	annaung	1700.301	<u>р</u>				
CUS:01:02	нтн	SHUZONG	1788.561	в				
				_"				
<pallp padn=""></pallp>	Preu/Nex	t nave of	Selected	Dr	ives(Port:B	ox:Bau)		
(11) Moue Co	rsor (I	NSX/(Spar	eBar) Sel	ect	(DEL) Des	elect		
(Entan) Subm	it /Fee	> Cancel	annes nes	-	a sector pos			
Zrucers anom	ILC SESE	/ cancer						

# Note

Press the **Delete** key to delete the selected disk from the **Selected Drives** list.

4. Press Enter. A confirmation dialog box is displayed, see Figure 3-41.

Configu	ration —
Select Hotspare drives	Selected Drives
CN1:01:04 ATA SAMSUNG 1788.5GIB	CN1:01:06 ATA SAMSUNG 1788.5GiB
CN1:01:05 ATA SAMSUNG 1788.5GiB	
CN1:01:06 ATA SAMSUNG 1788.5GIB	
CN1:01:07 ATA SAMSUNG 1788.5GIB	
CN2:01:08 ATA SAMSUNG 1288.5GIE	
CN2:01:09 ATA SAMSUNG 1288 5618	
Do you want to submit the ch	anges made ?
- cause changes and noturn to main man	u N - continue

#### Figure 3-41 Confirmation Dialog Box

5. At the cursor in the confirmation dialog box, enter **Y** to delete the selected hot spare disk, see Figure 3-42.

#### Figure 3-42 Deleting a Hot Spare Disk

Conf	iguration		
Deleting Snare Drive			
Deleting opare prive			
Please nait			

## 3.4.5 Locating a Disk

### Abstract

After the indicator of a disk is lit, you can locate the disk so that you can easily replace or maintain it.

#### Steps

 In the Options area on the BIOS configuration utility screen, use the arrow keys to select Disk Utilities, and then press Enter. The Select Disks and press <Enter> screen is displayed, see Figure 3-43.

Select Disk	and press <enter> —</enter>			
Port# Box# Bay	# Model	Rev#	Speed	Size
: 00 :	VT Smart Adapter	3.22		
CN1: 01 :004	ATA SAMSUNG M27LH1	HXT7904Q	6.0G	1.7TiB
CN1: 01 :005	ATA SAMSUNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
CN1: 01 :006	ATA SAMSUNG M27LH1	HXT7904Q	6.0G	1.7TiB
CN1: 01 :007	ATA SAMSUNG M27LH1	HXT7904Q	6.0G	1.7TiB
CN2: 01 :008	ATA SAMSUNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
CN2: 01 :009	ATA SAMSUNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
: :	No device			
: :	No device			
: :	No device			
	No device			
	No device			
	No device			
: :	No device			
: :	No device			
	No device			
lise Page IIn or	Page Down keys to mo	ue to nev	t narre	

2. Use the arrow keys to select the disk to be located, and then press **Enter**. A function menu is displayed, see Figure 3-44.



Port# Box# Bay#	Model J	Rev#	Speed	Size
: 00 :	VT Smart Adapter	3.22		
CN1: 01 :004	ATA SAMSUNG M27LH1 H	IXT7904Q	6.0G	1.7TiB
CN1: 01 :005	ATA SAMSUNG M27LH1 H	IXT7904Q	6.0G	1.7TiB
CN1: 01 :006	ATA SAMSUNG MZ7LH1 H	1XT7904Q	6.0G	1.7TiB
CN1: 01 :007	ATA SAMSUNG MZ7LH1 H	IXT7904Q	6.0G	1.7TiB
CN2: 01 :008	ATA SAMSUNG MZ7LH1 H	IXT7904Q	6.0G	1.7TiB
CN2: 01 :009		Q	6.0G	1.7TiB
: :	Device Informati	ion		
:::	Identify Device			
:	Secure Erase			
: :				
: :	No device			
: :	No device			
	No device			
: :	No device			
: :	No device			
Has Base Ha an B	Davis Davis to save		-	

3. Use the arrow keys to select **Identify Device**, and then press **Enter**. A prompt message is displayed, see Figure 3-45. At this time, the red indicator of the corresponding disk is lit and flashes continuously.

Figure 3-45 Disk Indicator Lit

Port# Bo	ox# Bay#	Model		Rev#	Speed	Size
: 8	: 06	VT Smar	t Adapter	3.22		
CN1: 0	31 :004	ATA SAMS	UNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
CN1: 0	01:005	ATA SAMS	UNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
CN1: 0	01 :006	ATA SAMS	UNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
CN1: 8	1 :007	ATA SAMS	UNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
CN2: 0	1 :008	ATA SAMS	UNG MZ7LH1	HXT7904Q	6.0G	1.7TiB
CN2:						.7TiB
:	Turr	ied on dev	ice identi	fication	LED	
:	Pres	sing any	key will t	urn off t	he	
	ider	tificatio	n LED.			
:						
: -	*	No d	evice			
	:	No d	evice			
	:	No d	evice			
:		No d	evice			
		No d	evice			
Ilma Barro	Un on I	age Dour	kaus to me	un to your		

4. Press any key to go out the disk indicator. The disk locating ends.

## 3.4.6 Configuring a Pass-Through Disk

#### Abstract

In accordance with the actual RAID configuration, you can configure a pass-through disk in either of the following ways:

• Setting the mode of all ports in batches:

If the disks connected to all ports are not used to create a RAID volume, the mode of these ports can be set to HBA in a unified manner.

• Setting the mode of ports separately:

If the disks connected to some ports have been used to create a RAID volume, the mode of these ports can be set to Mixed and that of other ports can be set to HBA.

#### Context

Port modes include RAID, HBA and Mixed, which are described as follows:

- In RAID mode, the connected disks can be used only after they form a RAID volume.
- In HBA mode, the connected disks are pass-through disks and cannot be used to create a RAID volume. Instead, they can only be used directly.
- In Mixed mode, the connected disks support both RAID and HBA mode.
  - → The RAID mode is applicable to the disks that have been used to create a RAID volume.
  - → The HBA mode (pass-through) is applicable to the disks that are not used to create a RAID volume.

#### Steps

 In the Options area on the BIOS configuration utility screen, use the arrow keys to select Controller Details, and then press Enter. The controller details are displayed. The value of Controller Mode is MIXED, see Figure 3-46.

#### Figure 3-46 Controller Details

VT Smart10C219 Controller Information Product Name PCI Slot Number PCI (Bus:Device:Function) Hardware Revision Serial Number WWN Number Firmware Version Controller Temperature Supported Features Controller Memory Size Controller Mode Number of OS bootable drive	8 Fa	Amily Controller #0         VT SmartIOC2100 RM24x         000         4B:00:0         A         731427900009         50015EBE02484E3F         4.11-0         0047 C         RAID/HBA/MIXED         4096 MiB         MIXED         2	
<pre> <esc> - To Exit    keus to move cursor. <enter> t.</enter></esc></pre>	n si	elect oution. <esc> to exit (*=def</esc>	

 Press ESC to return to the BIOS configuration screen. Use the arrow keys to select Configure Controller Settings and press Enter. The Configure Controller Settings screen is displayed, see Figure 3-48.



 Use the arrow keys to select Configure Controller Port Mode, and then press Enter. The Configure Controller Port Mode screen is displayed, see Figure 3-48.



Figure 3-48 Configure Controller Port Mode Screen

Use the arrow keys to select the port whose connected disk is not used to create a RAID volume, and press Enter. In the displayed dialog box, set the port mode to HBA, see Figure 3-50.

#### Figure 3-49 Setting the Port Mode to HBA

Port CN3 Port CN4	RAID MIXED HIXED HBA	
<esc> - To</esc>	Exit	

5. (Optional) If the connected disk is already used to create a RAID volume, set the port mode to **MIXED**, see Figure 3-50.

#### Figure 3-50 Setting the Port Mode to MIXED



# Note

The mode of the ports whose connected disks are already used to create a RAID volume cannot be set to HBA.
Set the port mode as required, and then press Esc to exit. In the displayed dialog box, select Yes to save the configuration, see Figure 3-51.



Figure 3-51 Saving the Configuration

7. Wait until a configuration success message is displayed, see Figure 3-52.

#### Figure 3-52 Successful Configuration



8. Press Esc multiple times until the Exit Utility dialog box is displayed, see Figure 3-53.



9. In the **Exit Utility** dialog box, select **NO**, and then press **Enter**. The BIOS configuration utility screen is displayed, see Figure 3-54.



#### Figure 3-54 BIOS Configuration Utility Screen

10. Use the arrow keys to select **Controller Details**, and then press **Enter**. The controller details are displayed, see Figure 3-55. The value of **Controller Mode** is **HBA**.

Image: Controller Information         Product Name         PCI Slot Number         PCI (Bus:Device:Function)         Hardware Revision         Serial Number         WWN Number         Firmware Version         Controller Temperature         Supported Features         Controller Memory Size         Controller Mode         Number of OS bootable driv	gur 8 F : : : : : : : : : : : : : : : : : : :	ation Utility IBuild 0 J>>> amily Controller #0 VT SmartIOC2100 RM24x 000 4B:00:0 A 7314279000009 50015EBE02484E3F 4.11-0 0047 C RAID/HBA/MIXED 4096 MiB HBA 2	
<esc> - To Exit</esc>			

# 3.5 Common Configurations (UEFI Mode)

By using the BIOS configuration utility, you can configure and maintain a created RAID volume. For a description of the common operations on a SmartIOC 2100 RAID controller card in UEFI mode, refer to Table 3-9.

Common Operation	Description	
Setting a port mode	Refer to "3.5.1 Setting the Mode of a Port".	
Locating a disk	Refer to "3.5.2 Locating a Disk".	
Creating a hot spare disk	Refer to "3.5.3 Creating a Hot Spare Disk".	
Changing a hot spare disk	Refer to "3.5.4 Changing a Hot Spare Disk".	
Deleting a hot spare disk	Refer to "3.5.5 Deleting a Hot Spare Disk".	
Configuring the power mode	Refer to "3.5.6 Configuring the Performance or Power Mode".	
Deleting a RAID volume	Refer to "3.5.7 Deleting a RAID volume".	
Deleting a disk group	Refer to "3.5.8 Deleting a Disk Group".	
Clearing RAID configuration in-	Refer to "3.5.9 Clearing RAID Configuration Information".	
Configuring a pass-through disk	Refer to "3.5.10 Configuring a Pass-Through Disk".	

Table 3-9 Common Operations on a	a SmartIOC 2100 RAID	<b>Controller Card</b>
----------------------------------	----------------------	------------------------

# 3.5.1 Setting the Mode of a Port

#### Abstract

The ports of a SmartIOC 2100 RAID controller card, namely, the ports connected with a disk backplane and disk cables, support three modes: RAID, HBA and Mixed. Before adding the disk corresponding to a port to a RAID logical volume, you must check the port mode. The SmartIOC 2100 RAID controller card supports setting the port mode in the following two ways:

- Setting the mode of all ports in batches
- Setting the mode of a port separately

#### Context

Port modes include RAID, HBA and Mixed, which are described as follows:

- In RAID mode, the connected disks can be used only after they form a RAID volume.
- In HBA mode, the connected disks are pass-through disks and cannot be used to create a RAID volume. Instead, they can only be used directly.
- In Mixed mode, the connected disks support both RAID and HBA mode.
  - → The RAID mode is applicable to the disks that have been used to create a RAID volume.
  - → The HBA mode (pass-through) is applicable to the disks that are not used to create a RAID volume.

#### Steps

- Setting the Mode of All Ports in Batches
  - On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 3-56.

#### Figure 3-56 Configure Controller Settings Screen

Aptio Setup – AMI Advanced		
<ul> <li>Modify Controller Settings</li> <li>Advanced Controller Settings</li> <li>Clear Configuration</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configures the supported controller settings. Depending on the controller, these can include setting the cache ratio, transformation and rebuild priorities and • • • • • • • • • • • • • • • • • • •	
Version 2.22.1285 Copyright	t (C) 2022 AMI	

2. Use the arrow keys to select **Configure Controller Port Mode**, and then press **Enter**. The **Configure Controller Port Mode** screen is displayed, see Figure 3-57.

#### Aptio Setup - AMI Advanced Current Controller Mixed HBA mode allows Port Mode physical drives attached to the port to be directly accessible from the operating [Submit Changes] system. RAID mode reserves all physical drives for array ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-57 Configure Controller Port Mode Screen

3. Use the arrow keys to select **Set Controller Port Mode**, and then press **Enter**. The **Set Controller Port Mode** dialog box is displayed, see Figure 3-58.

# Figure 3-58 Set Controller Port Mode Dialog Box

Advanced	Aptio Setup -	- AMI	
Current Controller Port Mode	Mixed	HBA mode allows A physical drives	
Set Controller Port Mode ▶ [Submit Changes]	[Mi×ed]	be directly accessible from the operating system. RAID mode reserves all physical	
RAID Mixed Relect Screen elect Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit			
Versi	ion 2.22.1285 Copyr.	ight (C) 2022 AMI AB	

4. Use the arrow keys to select the port mode to be set, and then press **Enter**, see Figure 3-59.

#### Figure 3-59 Selecting a Port Mode

Advanced	Aptio Setup	- AMI
Current Controller Port Mode	Mixed	HBA mode allows A physical drives
Set Controller Port Mode ▶ [Submit Changes]	[RAID]	be directly accessible from the operating system. RAID mode reserves all physical drives for array ▼
		<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Versi	on 2.22.1285 Copyr	ight (C) 2022 AMI AB

5. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 3-60.

Figure 3-60 Successful Setting

Aptio Setup – AMI Advanced			
Controller Port Mode changes applied successfully	Navigate back to Main Menu		
▶ [Back to Main Menu]	++: Select Screen †1: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1285 Copyright (C) 2022 AMI			

- 6. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.
- Setting the Mode of a Port Separately
  - On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 3-61.

#### Figure 3-61 Configure Controller Settings Screen

Aptio Setup – AMI Advanced		
<ul> <li>Modify Controller Settings</li> <li>Advanced Controller Settings</li> <li>Clear Configuration</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configures the supported controller settings. Depending on the controller, these can include setting the cache ratio, transformation and rebuild priorities and • • • • • • • • • • • • • • • • • • •	
Version 2.22.1285 Copyright	t (C) 2022 AMI	

2. Use the arrow keys to select **Modify Controller Settings**, and then press **Enter**. The **Modify Controller Settings** screen is displayed, see Figure 3-62.

#### Figure 3-62 Modify Controller Settings Screen

Aptio Setup — AMI Advanced				
Transformation Priority Rebuild Priority Surface Scan Analysis Priority Current Parallel Surface Scan Count Spare Activation Mode	[Medium] [High] 3 1 [Failure Spare	<ul> <li>Transformation</li> <li>Priority: Refers to the priority given to Array</li> <li>Expansion, Logical</li> <li>Drive Extension,</li> <li>Logical Drive</li> <li>Migrations and Array</li> <li>shrink/move operations.</li> </ul>		
Unconfigured Physical Drive Write Cache State	Activation] [Default]	++: Select Screen ↑↓: Select Item		
HBA Physical Drive Write Cache State	[Default]	Enter: Select +/-: Change Opt.		
Configured Physical Drive Write Cache State	[Default]	K/M: Scroll Help Area F1: General Help F2: Previous Values		
Port CNO Mode	[RAID]	▼ F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1285 Copyright (C) 2022 AMI AB				

 Use the arrow keys to select Port CN0 Mode, and then press Enter. The Port CN0 Mode dialog box is displayed, see Figure 3-63.

#### Figure 3-63 Port CNO Mode Dialog Box

Aptio Setup – AMI Advanced			
Advanced Current Parallel Surface Scan Count Spare Activation Mode Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CNO Mode Port CN1 Mode Port CN2 Mode Port CN3 Mode Port CN4 Mode	1 [Failure Spare Activation] [Default] Port CNO Mode RAID HBA Mixed [RAID] [RAID] [RAID] [RAID] [RAID] [RAID] [RAID] [RAID]	<ul> <li>Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device.</li> <li>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values</li> </ul>	
▶ [Submit Changes]		▼ F3: Optimized Defaults F4: Save & Exit	
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4. Use the arrow keys to select the port mode to be set, and then press **Enter**, see Figure 3-64.

### Figure 3-64 Setting the Port Mode

Current Parallel	1	▲ Connector Mode: For
Surface Scan Count		Multiple domain
Spare Activation Mode	[Failure Spare Activation]	connections, Connector mode has to be changed
Unconfigured Physical Drive Write Cache State	[Default]	to the same mode for all connectors connected to the Multi
HBA Physical Drive Write Cache State	[Default]	domain device.
Configured Physical Drive Write Cache State	[Default]	++: Select Screen ↑↓: Select Item
Port CN0 Mode	[Mixed]	Enter: Select
Port CN1 Mode	[RAID]	+/-: Change Opt.
Port CN2 Mode	[RAID]	K/M: Scroll Help Area
Port CN3 Mode	[RAID]	F1: General Help
Port CN4 Mode	[RAID]	F2: Previous Values
[Submit Changes]		<ul> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> </ul>

5. Repeat Step 3 and Step 4 to set the mode of another port, see Figure 3-65.

#### Figure 3-65 Setting the Port Mode

Aptio Setup – AMI Advanced				
Current Parallel	1	Connector Mode: For		
Surface Scan Count		Multiple domain		
Spare Activation Mode	[Failure Spare Activation]	connections, Connector mode has to be changed		
Unconfigured Physical	[Default]	to the same mode for		
State		connected to the Multi		
HBA Physical Drive	[Default]	domain device.		
Configured Physical	[Default]			
Drive Write Cache		→+: Select Screen		
State		<b>↑↓:</b> Select Item		
Port CNO Mode	[Mixed]	Enter: Select		
Port CN1 Mode	[Mixed]	+/-: Change Opt.		
Port CN2 Mode	[HBA]	K/M: Scroll Help Area		
Port CN3 Mode	[HBA]	F1: General Help		
Port CN4 Mode	[RAID]	F2: Previous Values		
[Submit Changes]		▼ F3: Optimized Defaults		
		F4: Save & Exit		
Versi	on 2.22.1285 Copyright	(C) 2022 AMI		

6. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 3-66.

#### Figure 3-66 Port Mode Set Successfully

Advanced	Aptio Setup – AMI	
Controller Settings Applied	Successfully	Navigate back to Main Menu ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.	22.1285 Copyright (C) 20	D22 AMI AB

7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 3.5.2 Locating a Disk

#### Abstract

After the indicator of a disk is lit, you can locate the disk so that you can easily replace or maintain it. You can locate a physical disk or multiple disks in a disk group.

#### Steps

- Locating a Single Physical Disk
  - On the controller management screen, use the arrow keys to select **Disk Utilities**, and then press **Enter**. The screen for the list of physical disks mounted on the RAID controller card is displayed, see Figure 3-67.

#### Figure 3-67 Screen for the List of Disks Mounted on the RAID Controller Card

Aptio : Advanced	Setup — AMI	
<ul> <li>Port:CNO Box:1 Bay:1 Size:4 TB SAS ST4000NM003A</li> <li>Port:CNO Box:1 Bay:2 Size:4 TB SAS</li> </ul>	SEAGATE Size:3.6 TiB(4 TB) Port:CN0 Box:1 Bay:1 SEAGATE Device Type:SAS Logical	
ST4000NM003A ▶ Port:CNO Box:1 Bay:3 Size:4 TB SAS ST4000NM003A	Sector Size:512 SEAGATE Model:SEAGATE ST4000NM003A Serial	
<ul> <li>Port:CN1 Box:1 Bay:4 Size:4 TB SAS ST4000NM003A</li> </ul>	SEAGATE Number:WS23MQK30000E2307 500 Negotiated Link V	
<ul> <li>Port:CN1 Box:1 Bay:6 Size:4 TB SAS ST4000NM003A</li> </ul>	SEAGATE	
<ul> <li>Port:CN1 Box:1 Bay:7 Size:4 TB SAS ST4000NM003A</li> </ul>	SEAGATE ++: Select Screen 14: Select Item	
<ul> <li>Port:CN2 Box:1 Bay:9 Size:4 TB SAS ST4000NM003A</li> </ul>	SEAGATE Enter: Select +/-: Change Opt.	
Port:CN2 Box:1 Bay:10 Size:4 TB SAS ST4000NM003A	S SEAGATE K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
Version 2.22.1285 Copyright (C) 2022 AMI AB		

2. Use the arrow keys to select the disk to be located, and then press **Enter**. The screen for setting a disk is displayed, see Figure 3-68.

#### Figure 3-68 Setting a Disk

Advanced	otio Setup — AMI	
Port:CN1 Box:1 Bay:4 Size:4 TE ST4000NM003A Device Information Identify Device Update Device Firmware	3 SAS SEAGATE	E Turn On/Off the device identification LED. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area
Vaccion 2, 22	1295 Conuciabt (C) 20	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.	.1203 COPYFINIL (C) 20	AB

3. Use the arrow keys to select **Identify Device**, and then press **Enter**. The **Identify De**vice screen is displayed, see Figure 3-69.

#### Figure 3-69 Identify Device Screen

Aptio Setup – AMI Advanced	
Port:CN1 Box:1 Bay:4 Size:4 TB SAS SEAGATE ST4000NM003A Turn On/Off the device identification LED. Identification Duration (seconds) > Start > Stop	Device LED Identification Duration in seconds: 1–86400: Input range. 86400: Default
	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
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4. Next to **Identification Duration (seconds)**, enter the time of the lighting delay (unit: seconds), select **Yes**, and press **Enter** for confirmation, see Figure 3-70.

Figure 3-70 Lighting Delay

Aptio Setup – AMI Advanced		
Port:CN1 Box:1 Bay:4 Size:4 TB SAS SEAGATE ST4000NM003A Turn On/Off the device identification LED. Identification 5000 Duration (seconds) ▶ Start ▶ Stop	Device LED Identification Duration in seconds: 1–86400: Input range. 86400: Default	
	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
Version 2.22.1285 Copyright (C) 2022 AMI AB		

5. Use the arrow keys to select **Start**, and then press **Enter**. The red indicator of the corresponding disk is lit and continuously flashes, see Figure 3-71.

#### Figure 3-71 Starting Locating a Disk

Port:CN1 Box:1 Bay:4 Size:4 TB SAS SEAGATE Navigate back to Main ST4000NM003A Menu		
Turned on device identification LED		
▶ [Back to Main Menu]		
++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1285 Copyright (C) 2022 AMI AB		

# Note

The indicator flashing duration is the configured lighting delay. After the lighting delay is reached, the default value 86400 s (24 hours) is restored, and the indicator goes out.

6. (Optional) To go out the disk indicator and end the locating, press **Esc** to return to the locating screen, use the arrow keys to select **Stop**, and press **Enter**, see Figure 3-72.

#### Figure 3-72 Ending Disk Locating

Aptio Setup – AMI Advanced	
Port:CN1 Box:1 Bay:4 Size:4 TB SAS SEAGATE ST4000NM003A	Navigate back to Main Menu
Turned off device identification LED	
▶ [Back to Main Menu]	
	<pre>++: Select Screen t1: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Version 2.22.1285 Copyright (C) 2022 AMI	

- 7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.
- Locating Multiple Disks in a Disk Group
  - On the controller management screen, use the arrow keys to select Array Configuration, and then press Enter. The Array Configuration screen is displayed, see Figure 3-73.

#### Figure 3-73 Array Configuration Screen

Aptio Setu Advanced	p - AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an ++: Select Screen 1J: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Cop	yright (C) 2022 AMI AB

2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 3-74.

#### Figure 3-74 Managing Arrays Screen

Advanced	Aptio Setup – AMI
► Array A	Array A ++: Select Screen ++: Select Screen ++: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
version	.22.1205 CUP9M18NL (C) 2022 HM1

 Use the arrow keys to select the array in which the disks to be located are placed, and then press Enter. The screen for managing the selected array is displayed, see Figure 3-75.

#### Figure 3-75 Managing the Selected Array

Advanced	Aptio Setup — AMI	
Array Type List Logical Drives Create Logical Drive Manage Spare Drives Identify Device Delete Array	Data	Turn On/Off the device identification LED.
Version 2.22.1285 Copyright (C) 2022 AMI AB		

4. Use the arrow keys to select **Identify Device**, and then press **Enter**. The **Identify De**vice screen is displayed, see Figure 3-76.

#### Figure 3-76 Identify Device Screen

Advanced	Aptio Setup — AMI
Array A Turn On/Off the device ide Identification Duration (seconds) Identify by Drive Configuration type Start Stop	ntification LED. 6400 Device LED Identification Duration in seconds: 1-86400: Input range. 86400: Default ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C) 2022 AMI AB	

5. Next to **Identification Duration (seconds)**, enter the time of the lighting delay (unit: seconds), and then press **Enter** for confirmation, see Figure 3-77.

#### Figure 3-77 Lighting Delay

Aptio Setup – AMI Advanced	
Array A Turn Oh/Off the device identification LED. Identification 5000 Duration (seconds) Identify by Drive [Data Drive(s) only] Configuration type > Start > Stop	Device LED Identification Duration in seconds: 1-86400: Input range. 86400: Default ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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6. Use the arrow keys to select **Start**, and then press **Enter**. The red indicators of all the disks that belong to the array are lit and continuously flash, see Figure 3-78.

#### Figure 3-78 Starting Locating a Disk

Aptio Setup - A Advanced	MI
Turned on device identification LED ▶ [Back to Main Menu]	Navigate back to Main Menu
	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyrigh	t (C) 2022 AMI AB



The indicators of the hot spare disks belonging to the array are also lit and flash continuously at the same time. The indicator flashing duration is the configured lighting delay. After the lighting delay is reached, the default value 86400 s (24 hours) is restored, and the indicator goes out.

7. (Optional) To go out the disk indicator and end the locating, press **ESC** to return to the

locating screen, use the arrow keys to select Stop, and press Enter, see Figure 3-79.

#### Figure 3-79 Ending Disk Locating

Aptio Setup – AMI Advanced	
Turned off device identification LED > [Back to Main Menu]	Navigate back to Main Menu ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C) 2022 AMI AB	

8. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

# 3.5.3 Creating a Hot Spare Disk

#### Abstract

A hot spare disk improves the data security of a RAID array. For a description of the hot spare disk types supported by a SmartIOC 2100 RAID controller card, refer to Table 3-10.

Туре	Description
Dedicated	<ul> <li>This type of hot spare disks is exclusive to the specified one or more disk groups of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a dedicated hot spare disk temporarily takes over the faulty disk.</li> </ul>
Auto Replace	<ul> <li>This type of hot spare disks provides the hot standby function for a disk group of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a hot spare disk of this type automatically replaces the faulty disk.</li> </ul>

Table 3-10 Hot Spare Disk Types

#### Prerequisite

There are sufficient idle disks on the server.

#### Context

When creating a hot spare disk, pay attention to the following points:

- Multiple hot spare disks can be created for a disk group, but only one type of hot spare disk can be set at a time. That is, either **Dedicated** or **Auto Replace** is specified.
- An idle disk can be set as a hot spare disk. The disk that has been used to create a RAID volume cannot be set as a hot spare disk.
- The hot spare disk must be of the same type as that of any member disk in the corresponding disk group. That is, all of them are SATA disks or SAS disks, and the hot spare disk's capacity must not be less than the maximum capacity of the member disks.
- Disk groups at all levels except RAID 0 support hot spare disks.

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 3-80.

Advanced Advanced	p – AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an • ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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#### Figure 3-80 Array Configuration Screen

2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 3-81.

Advanced	Aptio Setup – AMI
▶ Array A	Array A ++: Select Screen +1: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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#### Figure 3-81 Managing Arrays Screen

3. Use the arrow keys to select the array for which you need to create the hot spare disk, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 3-82.

#### Figure 3-82 Managing the Selected Array

Advanced	Aptio Setup – A	MI
Array Type List Logical Drives Create Logical Drive Manage Spare Drives Identify Device Delete Array	Data	Adds or removes spare physical drives to or from an array. When a physical drive fails, the assigned spare will become active **: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyrigh	t (C) 2022 AMI AB

4. Use the arrow keys to select **Manage Spare Drives**, and then press **Enter**. The **Manage Spare Drives** screen is displayed, see Figure 3-83.

# Aptio Setup - AMI Advanced Drives assigned as Assign Auto Replace Spare dedicated spares can only be used as spare drives. ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-83 Manage Spare Drives Screen

5. In accordance with your actual conditions, use the arrow keys to select the type of the hot spare disk to be created, and then press **Enter**. The screen for selecting a hot spare disk is displayed, see Figure 3-84.

#### Figure 3-84 Selecting a Hot Spare Disk

Advanced	Aptio Setup -	AMI
Port:CNO Box:1 Bay:1 Size:4 TB SAS SEAGATE	[Disabled]	Size:3.6 TiB(4 TB) Port:CNO Box:1 Bay:1
ST4000NM003A Port:CNO Box:1 Bay:2 Size:4 TB SAS SEAGATE	[Disabled]	Device Type:SAS Logical Sector Size:512 Model:SEAGATE
Port:CNO Box:1 Bay:3 Size:4 TB SAS SEAGATE	[Disabled]	Number:WS23MQK30000E2307 500 Negotiated Link
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE	[Disabled]	++: Select Screen
<ul> <li>Assign Dedicated Spare</li> </ul>		Enter: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area
		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C) 2022 AMI		

6. Use the arrow keys to select the disk to be set as a hot spare disk, press **Enter**, and set the status of the disk to **Enabled**, see Figure 3-85.

#### Figure 3-85 Setting Disk Status

Advanced	Aptio Setup — AMI	
Port:CNO Box:1 Bay:1 Size:4 TB SAS SEAGATE ST4000NM003A	[Enabled]	Size:3.6 TiB(4 TB) Port:CNO Box:1 Bay:1 Device Type:SAS Logical
Port:CNO Box:1 Bay:2 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Sector Size:512 Model:SEAGATE ST4000NM003A Serial
Port:CNO Box:1 Bay:3 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Number:WS23MQK30000E2307 500 Negotiated Link 🔻
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	++: Select Screen fl: Select Item
▶ Assign Dedicated Spare		Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versior	2.22.1285 Copyright (C) :	2022 AMI AB

7. Use the arrow keys to select **Assign Dedicated Spare**, and then press **Enter**. The hot spare disk is successfully created, see Figure 3-86.

# Aptio Setup - AMI Advanced Adding of Spare Successful Navigate back to Main Menu ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-86 Hot Spare Disk Created Successfully

8. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

### 3.5.4 Changing a Hot Spare Disk

#### Abstract

A SmartIOC 2100 RAID controller card supports modifying the type of a hot spare disk, namely, allowing type change between **Dedicated** and **Auto Replace**.

Only one type of hot spare disk can be set at a time. That is, **Dedicated** and **Auto Replace** cannot be specified at the same time. This procedure uses changing a hot spare disk of the Dedicated type to that of the Auto Replace type as an example to describe how to perform a type change.

# III Note

A hot spare disk of the **Auto Replace** type can be changed to that of the **Dedicated** type by referring to this procedure.

#### Prerequisite

A hot spare disk is already set to the **Dedicated** type. For details, refer to "3.5.3 Creating a Hot Spare Disk".

Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 3-87.

#### Figure 3-87 Array Configuration Screen

Aptio Setup — Advanced	AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyri	ght (C) 2022 AMI AB

2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 3-88.
| Aptio Se<br>Advanced | etup – AMI  |
|----------------------|---|
| ▶ Array A            | Array A<br>++: Select Screen<br>fl: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>K/M: Scroll Help Area<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit |
| Version 2.22.1285 (  | Copyright (C) 2022 AMI<br>AB  |

3. Use the arrow keys to select the array for which you need to modify the hot spare disk, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 3-89.

### Figure 3-88 Managing Arrays Screen

#### Figure 3-89 Managing the Selected Array

Advanced	Aptio Setup – AMI	
Array Type • List Logical Drives • Create Logical Drive • Manage Spare Drives • Identify Device • Delete Array	Data	Adds or removes spare physical drives to or from an array. When a physical drive fails, the assigned spare will become active ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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4. Use the arrow keys to select **Manage Spare Drives**, and then press **Enter**. The **Manage Spare Drives** screen is displayed, see Figure 3-90.

#### Figure 3-90 Manage Spare Drives Screen

	Aptio Setup - Advanced	- AMI
▶ <i>P</i> ↓ 0	Assign Dedicated Spare Change Spare type to AutoReplace Delete Spare Drives	Change Spare type to AutoReplace ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
	Version 2.22.1285 Copyr	ight (C) 2022 AMI AB

5. Use the arrow keys to select **Change Spare type to Auto Replace**, and then press **Enter**. The **Change Spare type to Auto Replace** screen is displayed, see Figure 3-91.

Figure 3-91	Change Spar	re Type to	Auto	Replace	Screen

Aptio Setup – AMI Advanced	
All the existing Spare drive(s) will be converted to the selected Spare type > [Submit Changes]	Configuration changes will be applied immediately ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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6. Select **Submit Changes**, and then press **Enter**. The type of hot spare disk is changed successfully, see Figure 3-92.

#### Figure 3-92 Hot Spare Disk Type Changed Successfully

Aptio Setup – AM Advanced	1I
Spare type changed to AutoReplace ▶ [Back to Main Menu]	Navigate back to Main Menu
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7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

# 3.5.5 Deleting a Hot Spare Disk

#### Abstract

When the number of disks of a server cannot meet the requirements, you can delete an existing hot spare disk and restore it to a common disk.

#### Prerequisite

A hot spare disk is already created. For details, refer to "3.5.3 Creating a Hot Spare Disk".

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 3-93.

#### Figure 3-93 Array Configuration Screen

Aptio Setup	- AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an • •+: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 3-94.

Aptio Setu Advanced	p - AMI
▶ Array A	Array A ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Cop	yright (C) 2022 AMI AB

Figure 3-94 Managing Arrays Screen

3. Use the arrow keys to select the array for which you need to delete the hot spare disk, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 3-95.

#### Figure 3-95 Managing the Selected Array

Advanced	Aptio Setup — AMI	
Array Type • List Logical Drives • Create Logical Drive • Manage Spare Drives • Identify Device • Delete Array	Data	Adds or removes spare physical drives to or from an array. When a physical drive fails, the assigned spare will become active ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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4. Use the arrow keys to select **Manage Spare Drives**, and then press **Enter**. The **Manage Spare Drives** screen is displayed, see Figure 3-96.

#### Figure 3-96 Manage Spare Drives Screen

Aptio Setup — AMI Advanced		
<ul> <li>Assign Dedicated Spare</li> <li>Change Spare type to AutoReplace</li> <li>Delete Spare Drives</li> </ul>	Removes the Spare drive from the current Array Configuration.	
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5. Use the arrow keys to select **Delete Spare Drives**, and then press **Enter**. The **Delete Spare Drives** screen is displayed, see Figure 3-97.

#### Figure 3-97 Delete Spare Drives Screen

Advanced	Aptio Setup — A	MI
Port:CNO Box:1 Bay:1 Size:4 TB SAS SEAGATE ST4000NM003A ▶ Delete Spare Drives	[Disabled]	Size:3.6 TiB(4 TB) Port:CNO Box:1 Bay:1 Device Type:SAS Logical Sector Size:512 Model:SEAGATE ST4000NM003A Serial Number:WS23MQK30000E2307 500 Negotiated Link ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versio	n 2.22.1285 Copyrigh	t (C) 2022 AMI AB

6. Use the arrow keys to select the hot spare disk to be deleted, press **Enter**, and then set the status of the disk to **Enabled**, see Figure 3-98.

#### Figure 3-98 Setting Disk Status

Advanced	Aptio Setup – AMI	
Port:CNO Box:1 Bay:1 Size:4 TB SAS SEAGATE ST4000NM003A ▶ Delete Spare Drives	[Enabled]	Size:3.6 TiB(4 TB) Port:CNO Box:1 Bay:1 Device Type:SAS Logical Sector Size:512 Model:SEAGATE ST4000NM003A Serial Number:WS23MQK30000E2307 500 Negotiated Link * * * * * * Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versio	n 2.22.1285 Copyright (C)	2022 AMI AB

7. Use the arrow keys to select **Delete Spare Drive**, and then press **Enter**. The hot spare disk is successfully deleted, see Figure 3-99.

# Aptio Setup - AMI Advanced Delete Spare Successful Navigate back to Main Menu ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-99 Hot Spare Disk Deleted Successfully

8. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

# 3.5.6 Configuring the Performance or Power Mode

### Abstract

This procedure describes how to configure the power mode for a SmartIOC 2100 RAID controller card. For a description of the power modes supported by the SmartIOC 2100 RAID controller card, refer to Table 3-11.

Table 3-11 Power Mode Description	Table 3-11 Pov	wer Mode D	Descriptions
-----------------------------------	----------------	------------	--------------

Power Mode	Description
Minimum Power	In this mode, the static settings of the power are adjusted to the possible lowest val- ue, and the power is dynamically reduced based on the working load.
Maximum Perfor- mance	In this mode, the static settings of the power are adjusted to the possible highest val- ue, and the power is not dynamically reduced based on the working load.

#### Steps

 On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 3-100.

#### Figure 3-100 Configure Controller Settings Screen

Aptio Setup – AMI Advanced		
<ul> <li>Modify Controller Settings</li> <li>Advanced Controller Settings</li> <li>Clear Configuration</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Modifies the controller's power mode and enables or disables the survival mode for supported controllers. A reboot maybe required after changing the power mode to optimize • • • • • • • • • • • • • • • • • • •	
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 Use the arrow keys to select Manage Power Settings, and then press Enter. The Manage Power Settings screen is displayed, see Figure 3-101.

#### Figure 3-101 Manage Power Settings Screen

Advanced	Aptio Setup — AMI	
Power Mode Survival Mode ▶ [Submit Changes]	[Maximum Performance] [Enabled]	Sets the controller's power mode. Minimum Power: Static settings are set to the lowest level. Balanced: Static Settings are set based on the configuration. Maximum Performance: * * * * * Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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3. Use the arrow keys to select **Power Mode**, and then press **Enter**. The **Power Mode** menu is displayed, see Figure 3-102.

#### Figure 3-102 Power Mode Menu

Advanced	Aptio Setup – AMI	
Power Mode Survival Mode ▶ [Submit Changes]	[Maximum Performance] [Enabled] Power Mode Minimum Power Maximum Performance	Sets the controller's power mode. Minimum Power: Static settings are set to the lowest level. Balanced: Static Settings are set based on the configuration. Maximum Performance: ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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4. In accordance with your actual conditions, use the arrow keys to select the power mode to be applied, and then press **Enter** for confirmation, see Figure 3-103.

#### Figure 3-103 Selecting a Power Mode

Aptio Setup – AMI Advanced		
Power Mode Survival Mode ▶ [Submit Changes]	[Minimum Power] [Enabled]	Sets the controller's power mode. Minimum Power: Static settings are set to the lowest level. Balanced: Static Settings are set based on the configuration. Maximum Performance: ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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5. (Optional) Determine whether to enable **Survival Mode** as required.



By default, **Survival Mode** is enabled, indicating that when the working temperature of the power supply exceeds the threshold, the RAID controller card is allowed to switch to the energy saving mode, but it may cause performance deterioration.

a. Use the arrow keys to select **Survival Mode**, and then press **Enter**. The **Survival Mode** menu is displayed, see Figure 3-104.

#### Figure 3-104 Survival Mode Menu



b. Use the arrow keys to select **Disabled**, and then press **Enter**. The **Survival Mode** is disabled, see Figure 3-105.

#### Figure 3-105 Disabling Survival Mode

Aptio Setup — AMI Advanced		
Power Mode Survival Mode ▶ [Submit Changes]	[Minimum Power] [Disabled]	Enabling the survival mode will allow the controller to throttle back dynamic power settings to their minimums when the temperatures exceeds the threshold. This ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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6. Use the arrow keys to select **Submit Changes**, and press **Enter**. The power mode is set successfully, see Figure 3-106.

# Aptio Setup - AMI Advanced Power Settings applied successfully Navigate back to Main Menu ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-106 Power Mode Configured Successfully

7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 3.5.7 Deleting a RAID volume

#### Abstract

When a server no longer needs a RAID volume, you can delete the RAID volume to release the disk space.



- The data that is lost during deletion of the RAID volume cannot be restored. Therefore, you must make sure that you have backed up important data before deleting the volume.
- If the RAID logical volume to be deleted is the only logical volume on the current array, the array is also deleted after the RAID logical volume is deleted.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "3.3.2 Creating a RAID Volume"

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 3-107.

#### Figure 3-107 Array Configuration Screen



2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 3-108.

# Aptio Setup - AMI Advanced Annay A Annay A Annay A \*\*: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Xersion 2.22.1285 Copyright (C) 2022 AMI

Figure 3-108 Managing Arrays Screen

 Use the arrow keys to select the array for which you need to delete a logical volume, and then press Enter. The screen for managing the selected array is displayed, see Figure 3-109.

#### Figure 3-109 Managing the Selected Array

Advanced	Aptio Setup — AMI	
Array Type > List Logical Drives > Create Logical Drive > Manage Spare Drives > Identify Device > Delete Array	Data	Displays the list the logical drives contained in the array. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyright (C)	2022 AMI AB

Use the arrow keys to select List Logical Drives, and then press Enter. The List Logical Drives screen is displayed, see Figure 3-110.

#### Figure 3-110 List Logical Drives Screen

Aptio Setup – AMI Advanced	
▶ Logical Drive 1 (Logical Drive 1)	Logical Drive 1 (Logical Drive 1) ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C)	2022 AMI AB

5. Use the arrow keys to select the logical volume to be deleted, and then press **Enter**. The screen for managing the selected logical volume is displayed, see Figure 3-111.

# Aptio Setup - AMI Advanced Display Logical Drive Edit Logical Drive properties like status, Delete Logical Drive RAID level, C/H/S, its members, spare members, etc. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-111 Managing the Selected Logical Volume

 (Optional) To view the details of the logical volume, use the arrow keys to select Logical Drive Details, and then press Enter, see Figure 3-112.

### Figure 3-112 Viewing Logical Volume Details Screen

Aptio Setup – AMI Advanced		
Status Size RAID Level Legacy Disk Geometry(C/H/S) Strip Size Full Stripe Size Logical Drive Label	Ok 3.6 TiB(4 TB) RAID1 65535/255/32 256 KiB 256 KiB Logical Drive 1	
ACCEleration Method Logical Drive Members: Port:CN1 Box:1 Bay:4 S SEAGATE ST4000NM003A S	None Size:3.6 TiB(4 TB) SAS Status:Ok	<pre>→+: Select Screen ↑↓: Select Item Enter: Select</pre>
Port:CN1 Box:1 Bay:6 S SEAGATE ST4000NM003A S	ize:3.6 TiB(4 TB) SAS tatus:Ok	+/-: Change Opt. K/M: Scroll Help Area F1: General Help
Logical Drive Spare Me	mbers:	<ul> <li>F2: Previous Values</li> <li>▼ F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> </ul>
Versi	on 2.22.1285 Copyright (C	) 2022 AMI AB

 On the logical volume management screen, use the arrow keys to select **Delete Logical** Drive, and then press Enter. The confirmation screen for RAID volume deletion is displayed, see Figure 3-113.

Aptio Setup – AMI Advanced	
Deletes the Logical Drive. Any data contained in the Logical Drive will be lost. If the Logical Drive being deleted is the only Logical Drive of the Array, the Array will be deleted as well.	Configuration changes will be applied immediately
▶ [Submit Changes]	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C)	2022 AMI AB

#### Figure 3-113 Confirmation Screen for RAID Volume Deletion

8. Select **Submit Changes**, and then press **Enter**. The logical volume is deleted successfully, see Figure 3-114.

# Aptio Setup - AMI Advanced Successfully Deleted Logical Drive Navigate back to Main Menu ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI AB

#### Figure 3-114 Logical Volume Deleted Successfully

9. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 3.5.8 Deleting a Disk Group

#### Abstract

When a server no longer needs a disk group (array), you can delete it to release the disk space.



- When an array is deleted, the RAID logical volume built on it is also deleted, and the data lost during the deletion cannot be restored. Therefore, it is required to make sure that you have backed up important data before the deletion.
- If the array to be deleted is the only array of the RAID controller card, the configurations related to the RAID controller card are also cleared, and the default configurations are restored.

#### Prerequisite

A RAID volume is created successfully to form a disk group. For details, refer to "3.3.2 Creating a RAID Volume".

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 3-115.

#### Figure 3-115 Array Configuration Screen



2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 3-116.

#### Figure 3-116 Managing Arrays Screen

Aptio Setup – AMI Advanced	
> Array A	Array A ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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3. Use the arrow keys to select the array to be deleted, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 3-117.

#### Figure 3-117 Managing the Selected Array

Aptio Setup – AMI Advanced		
Array Type List Logical Drives Create Logical Drive Manage Spare Drives Identify Device Delete Array	Data	Deletes an Array. All the data on the logical drives that are part of deleted array will be lost. Also if the deleted array is the only one on the controller, the **: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyriş	(ht (C) 2022 AMI AB

4. Use the arrow keys to select **Delete Array**, and then press **Enter**. The **Delete Array** screen is displayed, see Figure 3-118.

Figure 3-118 Delete Array Screen		
Aptio Setup – AMI Advanced	94	
Deletes an Array. All the data on the logical drives that are part of deleted array will be lost. Also if the deleted array is the only one on the controller, the controller settings will be erased and its default configuration is restored.	Configuration changes will be applied immediately	
▶ [Submit Changes]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>	
Version 2.22.1285 Copyright (C) 2022 AMI		
	118	

5. Use the arrow keys to select **Submit Changes**, and press **Enter**. The array is deleted successfully, see Figure 3-119.

#### Figure 3-119 Array Deleted Successfully

Aptio Setup Advanced	- AMI
Delete Array Successful [Back to Main Menu]	Navigate back to Main Menu ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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6. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 3.5.9 Clearing RAID Configuration Information

#### Abstract

This procedure describes how to clear all configuration information that is already created on a SmartIOC 2100 RAID controller card.



The data that is lost during clearing of the configuration information on the RAID controller card cannot be restored. Therefore, it is required to make sure that you have backed up important data before the clearing operation.

#### Prerequisite

A RAID volume is created successfully and it has the corresponding RAID configuration information. For details, refer to "3.3.2 Creating a RAID Volume".

#### Steps

 On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 3-120.

#### Figure 3-120 Configure Controller Settings Screen

Aptio Setup – AM Advanced	I
<ul> <li>Modify Controller Settings</li> <li>Clear Configuration</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Option to reset the configuration to its default state. Any existing arrays or logical drives will be deleted, any data on the logical drives will be lost and option to *+: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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2. Use the arrow keys to select **Clear Configuration**, and then press **Enter**. The **Clear Con-figuration** screen is displayed, see Figure 3-121.

#### Figure 3-121 Clear Configuration Screen

Aptio Setup – AMI Advanced		
<ul> <li>Delete All Array Configurations</li> <li>Delete configuration metadata on all physical drives</li> </ul>	Warning: Resets the configuration to its default state. Any existing arrays or logical drives will be deleted, and any data on the logical drives will be lost. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
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3. Use the arrow keys to select **Delete All Array Configuration**, and then press **Enter**. The **Delete All Array Configuration** screen is displayed, see Figure 3-122.

Aptio Setup – AMI Advanced	
Clear Configuration will Clear all Array Configurations ▶ [Submit Changes]	Configuration changes will be applied immediately ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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#### Figure 3-122 Delete All Array Configuration Screen

4. Use the arrow keys to select **Submit Changes**, and press **Enter**. The configuration information is cleared successfully, see Figure 3-123.

#### Figure 3-123 Configuration Cleared Successfully

Aptio Setup – AMI Advanced	
Clear Configuration of Logical Drives Successful	Navigate back to Main Menu
▶ [Back to Main Menu]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
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5. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 3.5.10 Configuring a Pass-Through Disk

#### Abstract

In accordance with the actual RAID configuration, you can configure a pass-through disk in either of the following ways:

- Setting the mode of all ports in batches:
   If the disks connected to all ports are not used to create a RAID volume, the mode of these ports can be set to HBA in a unified manner.
- Setting the mode of ports separately:
   If the disks connected to some ports have been used to create a RAID volume, the mode of these ports can be set to Mixed and that of other ports can be set to HBA.

#### Context

Port modes include RAID, HBA and Mixed, which are described as follows:

• In RAID mode, the connected disks can be used only after they form a RAID volume.
- In HBA mode, the connected disks are pass-through disks and cannot be used to create a RAID volume. Instead, they can only be used directly.
- In Mixed mode, the connected disks support both RAID and HBA mode.
  - $\rightarrow$  The RAID mode is applicable to the disks that have been used to create a RAID volume.
  - → The HBA mode (pass-through) is applicable to the disks that are not used to create a RAID volume.

#### Steps

- Setting the Mode of All Ports in Batches
  - On the controller management screen, use the arrow keys to select Controller Information, and then press Enter. The Controller Information screen is displayed. The value of Controller Mode is Mixed, see Figure 3-124.

#### Figure 3-124 Controller Information Screen

Aptio Setup – AMI Advanced		
Advanced Hardware Revision Negotiated PCIe Data Rate Serial Number WWID Firmware version Firmware release date UEFI Driver version UEFI Driver release date Controller Memory Module Size Controller Status Cache Status Controller Modes:	Aptio Setup - AMI A 7880 MB/s 743775500013 50015EBE024B163F 3.22 Mar 19 2021 03:46:46 1.3.11.1 Sep 8 2020 15:33:52 128 MiB Ok Not Configured Mixed	++: Select Screen †↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values
Supported Modes: Port CNO: RAID HBA Mixed	1	<ul> <li>▼ F2: Previous Values</li> <li>▼ F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> </ul>
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 Press Esc to return to the controller management screen. Use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 3-125.

#### Figure 3-125 Configure Controller Settings Screen

Aptio Setup — AM	4Ι	
<ul> <li>Modify Controller Settings</li> <li>Clear Configuration</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configure the controller port mode to RAID, HBA, or Mixed	
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3. Use the arrow keys to select **Configure Controller Port Mode**, and then press **Enter**. The **Configure Controller Port Mode** screen is displayed, see Figure 3-126.

#### Figure 3-126 Configure Controller Port Mode Screen

Advanced	Aptio Setup – A	MI
Current Controller Port Mode	Independent	HBA mode allows A physical drives
Set Controller Port Mode ▶ [Submit Changes]	[Mixed]	be directly accessible from the operating system. RAID mode reserves all physical drives for array
		<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values</pre>
		F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyrigh	t (C) 2022 AMI AB

4. Use the arrow keys to select **Set Controller Port Mode**, and then press **Enter**. The **Set Controller Port Mode** dialog box is displayed, see Figure 3-127.

#### Figure 3-127 Set Controller Port Mode Dialog Box

Advanced	Aptio Setup – AM	4I
Current Controller Port Mode	Independent	HBA mode allows
Set Controller Port Mode ▶ [Submit Changes]	[Mixed]	be directly accessible from the operating system, RAID mode
	AID BA 1ixed	elect Screen elect Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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5. Use the arrow keys to select **HBA**, and then press **Enter**. The mode of all ports is set to **HBA**, see Figure 3-128.

# Figure 3-128 Setting the Port Mode to HBA

Advanced	Aptio Setup — AM	MI -
Current Controller Port Mode	Independent	HBA mode allows A physical drives
Set Controller Port Mode ▶ [Submit Changes]	[HBA]	trached to the port to be directly accessible from the operating system. RAID mode reserves all physical drives for array **: Select Screen fl: Select Item
		+/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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		AB

6. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 3-129.

#### Figure 3-129 Port Mode Set Successfully

Aptio Setup – AMI Advanced	
Controller Port Mode changes applied successfully	Navigate back to Main Menu
▶ [Back to Main Menu]	++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen, see Figure 3-130.

#### Figure 3-130 Controller Management Screen

Aptio Setup – AMI Advanced		
<ul> <li>Controller Information</li> <li>Configure Controller Settings</li> <li>Array Configuration</li> <li>Disk Utilities</li> <li>Set Bootable Device(s) for Legacy Boot Mode</li> <li>Administration</li> </ul>	Provides the information of the controller like PCI Bus:Device:Function, Firmware Revision, UEFI Driver Version, Controller Temperature etc. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
Version 2.22.1285 Copyright (	C) 2022 AMI AB	

 Use the arrow keys to select Controller Details, and then press Enter. On the displayed Controller Information screen, view the port mode after the modification, see Figure 3-131. The value of Controller Mode is HBA.

#### Figure 3-131 Controller Information Screen

Advanced	Aptio Setup – AMI	
Advanced Hardware Revision Negotiated PCIe Data Rate Serial Number WWID Firmware version Firmware release date UEFI Driver version UEFI Driver release date Controller Memory Module Size Controller Status Cache Status Cache Status Controller Modes: Port CNO: RAID HBA Mixe	A 7880 MB/s 743775500013 50015EBE024B163F 3.22 Mar 19 2021 03:46:46 1.3.11.1 Sep 8 2020 15:33:52 128 M1B Ok Not Configured HBA	<pre>**: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values • F3: Optimized Defaults</pre>
Versio	n 2.22.1285 Copyright (C	) 2022 AMI

- Setting the Mode of a Port Separately
  - On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 3-132.

#### Figure 3-132 Configure Controller Settings Screen

Aptio Setup – AM Advanced	4I
<ul> <li>Modify Controller Settings</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configures the supported controller settings. Depending on the controller, these can include setting the cache ratio, transformation and rebuild priorities and • • • • • • • • • • • • • • • • • • •
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2. Use the arrow keys to select **Modify Controller Settings**, and then press **Enter**. The **Modify Controller Settings** screen is displayed, see Figure 3-133.

<b>Figure 3-133</b>	Modify	Controller	<b>Settings Screen</b>
---------------------	--------	------------	------------------------

Advanced	Aptio Setup – AMI	
Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CN0 Mode Port CN1 Mode Port CN2 Mode Port CN2 Mode Port CN3 Mode Port CN4 Mode [Submit Changes]	[Default] [Default] [Default] [Mixed] [Mixed] [Mixed] [Mixed] [Mixed]	Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device. ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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 Use the arrow keys to select Port CN0 Mode, and then press Enter. The Port CN0 Mode dialog box is displayed, see Figure 3-134.

#### Figure 3-134 Port CNO Mode Dialog Box

Advanced	Aptio Setup – AMI	
Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CN0 Mode Port CN1 Mode Port CN2 Mode Port CN3 Mode Port CN3 Mode Port CN4 Mode ► [Submit Changes]	[Default] [Default] [Default] Port CNO Mode	Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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4. Use the arrow keys to select **HBA**, and then press **Enter**. The mode of the port whose connected disk is not used to create a RAID volume is set to **HBA**, see Figure 3-135.

#### Figure 3-135 Setting the Port Mode to HBA

Advanced	Aptio Setup — AMI	
Advanced Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CN0 Mode Port CN1 Mode Port CN2 Mode Port CN2 Mode Port CN3 Mode Port CN4 Mode [Submit Changes]	[Default] [Default] [Default] [HBA] [Mixed] [Mixed] [Mixed] [Mixed]	Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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- 5. Repeat Step 3 and Step 4 to set the mode of another port whose connected disk is not used to create a RAID volume to **HBA**.
- Use the arrow keys to select a port whose connected disk is already used to create a RAID volume (using **Port CN2 Mode** as an example), and then press **Enter**. The port mode setting menu is displayed, see Figure 3-136.

#### Figure 3-136 Port Mode Setting Menu

Advanced	Aptio Setup – AMI	
Advanced Current Parallel Surface Scan Count Spare Activation Mode Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CNO Mode Port CN1 Mode Port CN2 Mode	1 [Failure Spare Activation] [Default] Port CN1 Mode RAID Mixed [HBA] [Mixed] [HBA]	<ul> <li>Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device.</li> <li>++: Select Screen t1: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area</li> </ul>
Port CN3 Mode Port CN4 Mode ▶ [Submit Changes]	(HBA) [HBA]	F1: General Help F2: Previous Values ▼ F3: Optimized Defaults F4: Save & Exit
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7. Use the arrow keys to select **Mixed**, and then press **Enter**. The mode of the port whose connected disk is used to create a RAID volume is set to **Mixed**, see Figure 3-137.

#### Figure 3-137 Setting the Port Mode to Mixed

Current Parallel Surface Scan Count	1	Connector Mode: For
Spare Activation Mode	[Failure Spare Activation]	connections, Connector mode has to be changed
Unconfigured Physical Drive Write Cache State	[Default]	to the same mode for all connectors connected to the Multi
HBA Physical Drive Write Cache State	[Default]	domain device.
Configured Physical Drive Write Cache State	[Default]	++: Select Screen ↑↓: Select Item
Port CNO Mode	[HBA]	Enter: Select
Port CN1 Mode	[Mixed]	+/-: Change Opt.
Port CN2 Mode	[HBA]	K/M: Scroll Help Area
Port CN3 Mode	[HBA]	F1: General Help
Port CN4 Mode	[HBA]	F2: Previous Values
[Submit Changes]		▼ F3: Optimized Defaults F4: Save & Exit

# Note

The mode of the ports whose connected disks are already used to create a RAID volume cannot be set to HBA.

8. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 3-138.

#### Figure 3-138 Port Mode Set Successfully

Advanced	Aptio Setup – AMI	
Controller Settings Applied ▶ [Back to Main Menu]	Successfully	Navigate back to Main Menu ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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9. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

# 3.6 Typical Scenarios for Replacing a Disk (Legacy Mode)

For a description of the common scenarios for replacing disks in a RAID volume on a SmartIOC 2100 RAID card in legacy mode, refer to Table 3-12.

Scenario	Description
Scenario 1	A newly inserted disk is converted into a RAID member disk. For details, refer to "3.6.1 Converting a Newly Inserted Disk Into a RAID Member Disk".
Scenario 2	After a faulty SmartROC 2100 RAID card is replaced, all the member disks in the RAID 1 array managed by the original faulty RAID card are moved to a new RAID card. For details, refer to "3.6.2 Moving All Member Disks of a RAID 1 Volume".

# Table 3-12 Common Scenarios for Replacing a Disk in a RAID Volume on a SmartIOC 2100RAID Controller Card

# 3.6.1 Converting a Newly Inserted Disk Into a RAID Member Disk

#### Abstract

A newly inserted disk needs to be converted into a RAID member disk in the following two cases:

- The newly inserted disk is a foreign disk.
- The disk in a slot is removed and inserted back.

#### Inserting a Foreign Disk as a New Disk

When a disk in a RAID volume created on a server is faulty and needs replacement, remove the faulty disk from the disk slot on the server, and insert the prepared disk into the disk slot of the faulty disk.

After the disk is replaced, the configuration utility of the RAID controller card automatically synchronizes data on the newly inserted disk in the RAID volume.

# Note

Data is automatically synchronized to the newly inserted disk no matter whether it carries RAID information or not.

#### Installing a Disk in the Original Slot After Removing It from the Slot

After a disk on a server is used to create a RAID volume, if the disk is removed from its slot and then inserted back, the RAID controller card configuration utility automatically rebuild the disk.

# III Note

The RAID 0 volume does not support the above functions.

## 3.6.2 Moving All Member Disks of a RAID 1 Volume

#### Abstract

If a SmartIOC 2100 RAID controller card on a server fails and needs to be replaced, all the member disks in the RAID 1 volume on the faulty RAID controller card need to be moved to a new SmartIOC 2100 RAID controller card.

# Notice

It is risky to move the member disks of the RAID volume, and therefore it is recommended that you contact VANTAGEO technical support for help.

#### Steps

- 1. Shut down the server, and replace the faulty SmartIOC 2100 RAID controller card with a new one.
- Connect all member disks of the RAID 1 volume be moved to the new SmartIOC 2100 RAID controller card.
- 3. Power on the server again and start the server system.
- Start the BIOS configuration utility. For details, refer to "3.2.1 Starting the Configuration Utility".
- 5. Query RAID volume information. For details, refer to "3.4.1 Querying RAID Volume Information".
- 6. Contact VANTAGEO technical support to move member disks.

# 3.7 Typical Scenarios for Replacing a Disk (UEFI Mode)

For a description of the common scenarios for replacing a disk in a RAID volume on a SmartIOC 2100 RAID card in UEFI mode, refer to Table 3-13.

Scenario	Description
Scenario 1	When a RAID 0 member disk is faulty, the RAID controller card is reconfigured. For details, refer to "3.7.1 A RAID 0 Member Disk Fails".
Scenario 2	When a member disk of a logical volume with no hot spare disk configured is faulty, the faulty disk is replaced. For details, refer to "3.7.2 A Member Disk of a RAID Redundant Logical Volume (With- out a Configured Hot Spare Disk) Fails".
Scenario 3	When a member disk of a logical volume with a hot spare disk configured is faulty, the faulty disk is replaced. For details, refer to "3.7.3 A Member Disk of a RAID Redundant Logical Volume (with a Configured Hot Spare Disk) Fails".

# Table 3-13 Common Scenarios for Replacing a Disk in a RAID Volume on a SmartIOC 2100RAID Controller Card

## 3.7.1 A RAID 0 Member Disk Fails

RAID 0 does not support data redundancy or backup. As a result, data cannot be restored after a fault occurs in the RAID 0 logical volume. It is necessary to install a new disk and reconfigure the RAID array.

## 3.7.2 A Member Disk of a RAID Redundant Logical Volume (Without a Configured Hot Spare Disk) Fails

#### Abstract

If a fault occurs in a member disk of a redundant logical volume (with no hot spare disk configured) on a SmartIOC 2100 RAID controller card, the SmartIOC 2100 RAID controller card can automatically restore the data after the faulty disk is replaced with a new disk. During the process, the member disk status may be **OK**, but the logical disk status may be **Failed**. In this case, you need to restore the logical disk status.

#### Steps

- 1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The screen for configuring an array is displayed.
- 2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The screen for managing arrays is displayed.
- 3. Use the arrow keys to select the array for which you need to manage the logical volume, and then press **Enter**. The screen for managing the selected array is displayed.
- 4. Use the arrow keys to select **List Logical Drives**, and then press **Enter**. The screen for managing logical volumes is displayed.
- 5. Use the arrow keys to select the logical volume to be corrected, and then press **Enter**. The screen for managing the selected logical volume is displayed.
- 6. Use the arrow keys to select **Re-Enable Logical Drive**, and then press **Enter**. The screen for restoring logical volume status is displayed.
- 7. Press Enter. The status of the logical disk is restored.

#### Verification

On the logical volume management screen, use arrow keys to select **Logical Drive Details**, and then press **Enter**. The logical volume details are displayed. Verify that the logical volume status is **Ok**.

# 3.7.3 A Member Disk of a RAID Redundant Logical Volume (with a Configured Hot Spare Disk) Fails

When a fault occurs in a member disk of a redundant logical volume (with a hot spare disk configured) on a SmartIOC 2100 RAID controller card, the RAID controller card automatically replaces the faulty disk with the hot spare disk and restores the data.

• When the hot spare disk is of the **Dedicated** type, the RAID controller card temporarily replaces the faulty disk with the hot spare disk and automatically restores the data. After the faulty disk is replaced with a new disk, the hot spare disk is restored to Hot Spare status.

• When the hot spare disk is of the **Auto Replace** type, the RAID controller card immediately replaces the faulty disk with the hot spare disk and automatically restores the data. After the new disk is inserted, the new disk becomes a hot spare disk.

# Chapter 4 VT SmartROC 3100 RAID Controller Card

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A VT SmartROC 3100 RAID controller card is integrated with the BIOS configuration utility. By using the program, you can configure the disks that are supported by the VT SmartROC 3100 RAID controller card to a RAID volume of a specific level.

A VT SmartROC 3100 RAID controller card supports the caching function, which can improve read/write performance.

# Note

The operation screens of the BIOS configuration utility displayed in this chapter are for reference only, and may not be the same as the actual ones.

# **4.1 Capability Features**

For a description of the capabilities of a VT SmartROC 3100 RAID controller card, refer to Table 4-1.

Table 4-1	Descriptions of	of the Capabilities	s of a VT SmartR	OC 3100 RAI	D Controller Card
	Descriptions	or the oapabilities			

Capability Item	Capability Parameter
Product form	Mezz card
Controller chip	PMC PM8236

Capability Item	Capability Parameter
Host interface	PCIe 3.0x8
SAS interface	12 Gb SAS
Number of ports	16+2
Drive interface	SAS and SATA
Drive type	HDD and SSD
Whether drives are hot swappable	Supported
Maximum number of RAID groups	64
Number of drives	238
RAID level	RAID 0, RAID 1, RAID 10, RAID 5, RAID 50, RAID 6, RAID 60
JBOD mode	Supported
Cache	2 GB/4 GB
Cache protection	Super capacitor
Out-of-band management	Supported
Consistency check/verification and fix	Supported
Online capacity expansion	Supported
Online RAID level migration	Supported
Automatic rebuild	Supported
Manufacturer tool support	arcconf

# 4.2 Initial Configuration (Legacy Mode)

Figure 4-1 shows the initial configuration flow of a VT SmartROC 3100 RAID controller card.

#### Figure 4-1 Initial Configuration Flow of a VT SmartROC 3100 RAID Controller Card



### 4.2.1 Starting the Configuration Utility

#### Abstract

This procedure describes how to start the BIOS configuration utility of a VT SmartROC 3100 RAID controller card to log in to the management screen and complete the subsequent initial and common configurations.

#### Prerequisite

The boot mode is already set to **Legacy** in BIOS. For details, refer to "5.3.1 Setting the Boot Mode to Legacy".

#### Steps

- 1. Start the server system.
- 2. During the POST process, press **Ctrl+A** to start the BIOS configuration utility of the VT SmartROC 3100 RAID controller card. The screen as shown in Figure 4-2 is displayed.



 In the Options area, use the arrow keys to select Array Configuration, and then press Enter. The Configuration Menu screen is displayed, see Figure 4-3.

Figure 4-3 Configuration Menu Screen



## 4.2.2 Creating a RAID Volume

#### Abstract

You can create RAID volumes at different levels as required.

The procedures for creating RAID volumes at different levels are similar. This procedure uses a RAID 0 volume in legacy mode as an example.

#### Prerequisite

Sufficient SATA and SAS disks are installed on the server.

#### Context

For a description of the number of disks required to create a RAID volume, refer to Table 4-2.

RAID Level	Description
RAID 0	RAID 0 requires at least one disks.
RAID1	RAID 1 requires at least two disks. Disks with different capacities can be used in a RAID 1 volume, but the logi- cal capacity of each member disk depends on the space of the disk with the smallest capacity.
RAID 5	RAID 5 requires at least three disks.
RAID 6	RAID 6 requires at least four disks.
RAID 10	RAID 10 requires at least four disks. A RAID 10 volume consists of at least two RAID 1 volumes. For example, if there are four disks to be used in RAID 10 mode, you need to add them to two drive groups, each of which is mounted with two disks in RAID 1 mode.
RAID 50	RAID 50 requires at least six disks. A RAID 50 volume consists of at least two RAID 5 volumes. For example, if there are six disks to be used in RAID 50 mode, you need to add them to two drive groups, each of which is mounted with three disks in RAID 5 mode.
RAID 60	RAID 60 requires at least eight disks. A RAID 60 volume consists of at least two RAID 6 volumes. For example, if there are eight disks to be used in RAID 60 mode, you need to add them to two drive groups, each of which is mounted with four disks in RAID 6 mode.

Table 4-2 Number of Disks Required for Creating a RAID Volume

#### Steps

 On the Configuration Menu screen, use the arrow keys to select Create Array, and then press Enter. On the displayed Select drives to create Array screen, all the disks that can be used to create a RAID volume are displayed, see Figure 4-4.

#### Figure 4-4 Select Drives to Create Array Screen

2. Use the arrow keys to select the disks to be used to create the RAID volume, and then press **Insert** to add these disks to the **Selected Drives** list, see Figure 4-5.

	———— Conf igur	ation ——		
Select drives to cre	ate Array		-Selected Drives-	1
CN0:01:00 SEAGATE ST40	00NM 3.6TiB	CN0:01:00	SEAGATE ST4000NM	3.6TiB
CN0:01:01 SEAGATE ST40	00NM 3.6TiB	CN0:01:01	SEAGATE ST4000NM	3.6TiB
CN0:01:02 SEAGATE ST40	00NM 3.6TiB			
CN0:01:03 SEAGATE ST40	00NM 3.6TiB			
CN1:01:05 SEAGATE ST40	00NM 3.6TiB			
CN1:01:06 SEAGATE ST40	00NM 3.6TiB			
CN1:01:07 SEAGATE ST40	00NM 3.6TiB			
CN4:01:16 SEAGATE ST40	00NM 3.6TiB			
<pgup pgdn=""> Preu/Next pag</pgup>	e of Selected D	rives(Port:B	ox (Bay)	
<ti>Move Cursor, <ins>/&lt;</ins></ti>	SpaceBar> Selec	t, (DEL) Des	elect	
<enter> Submit, <esc> Can</esc></enter>	cel			

#### **Figure 4-5 Selected Drives List**

# Note

- The disks for creating a RAID volume must be of the same type. It is forbidden to select disks with interface types such as SATA and SAS at the same time.
- Press the Delete key to delete the selected disk from the Selected Drives list.

3. Press Enter. The Create Logical Drive screen is displayed, see Figure 4-6.

Crea	Configuration te Logical Drive
RAID Level Logical Drive Name	: RAID 0(Stripe) RAID 1(Mirror)
Strip/Full Stripe Size	: 256KiB/512KiB
Parity Group Count	: Not Applicable
Build Method	: Not Applicable
Size	: 7.276 TiB
Acceleration Method	: None
14> Moves Cursor, (Esc) C	ancel Selection, (Enter) Accept Selection

#### Figure 4-6 Create Logical Drive Screen

Use Tab/Tab+Shift to select the parameters that you want to modify. In the displayed operation box, use the arrow keys to select the related parameters, and then press Enter for confirmation. For a description of the parameters on the Create Logical Drive screen, refer to Table 4-3.

Parameter	Description		
RAID Level	Sets a RAID level, for example, RAID 0(Stripe).		
Logical Drive Name	Sets the RAID name, for example, "0".		
Strip/Full Stripe Size	<ul> <li>The stripe size should be equal to the size of average disk IO requests generated by server applications. In the optimum status, only one IO operation is executed for each IO request. The recommended stripe size configurations are as follows:</li> <li>For a Web server, 8 KB is recommended.</li> <li>For a groupware server (such as an email server), 16 KB is recommended.</li> <li>For a database server, 16 KB or 32 KB is recommended.</li> <li>For a file server, 32 KB or 64 KB is recommended.</li> <li>For a video file server, 64 KB, 128 KB, or 256 KB is recommended.</li> </ul>		
Parity Group Count	Configures logical-device parity groups in accordance with the number of physical devices in the array. It is not applicable to all RAID levels.		

#### Table 4-3 Descriptions of the Parameters on the Create Logical Drive Screen

Parameter	Description		
Build Method	<ul> <li>Sets the RAID initialization method, which is used to determine how the logical devices prepare for read and write, and how long the initialization takes.</li> <li>default: When the logical devices can be accessed by the operating system, parity blocks are initialized at the back end. A lower RAID level can achieve faster parity initialization.</li> <li>RPI: The data and parity blocks at the front end are overwritten. Before the parity initialization procedure is completed, logical devices remain invisible and unavailable to the operating system. All parity groups are initialized in parallel, but the initialization of a single parity group (RAID 5) is faster. The RAID level does not affect the performance during the RAID initialization.</li> <li>Not Applicable: unavailable.</li> <li>Keep the default configuration unless otherwise specified.</li> </ul>		
Size	Displays the storage size of the disk array in accordance with the total storage space of the disks added to the disk array. By default, the RAID created uses all the available disk space.		
Acceleration Method	<ul> <li>Sets the caching mode for the RAID volume.</li> <li>IO Bypass: This option is valid only when the RAID logical volume is formed by SSDs.</li> <li>Controller Cache: enables controller cache optimization. The read cache and write cache are used at the same time.</li> <li>None: disables the controller cache. Neither IO Bypass nor Controller Cache is used.</li> <li>Keep the default configuration unless otherwise specified.</li> </ul>		

5. Use **Tab** to select **Done**, and then press **Enter** to create the RAID volume, see Figure 4-7.

#### Figure 4-7 Creating a RAID Volume

Configuration -	
Creating Array	
Please wait	

6. The RAID volume is created successfully, see Figure 4-8. Press any key to return to the **Configuration Menu** screen.

Figure 4-8 RAID Volume Creat	ed Successfully
	Configuration =



# 4.2.3 Configuring a Boot Device

#### Abstract

After a RAID volume is created, if you need to install an operating system on the RAID volume, and there are multiple RAID volumes on the RAID controller card, you must set the RAID volume as a boot device.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "4.2.2 Creating a RAID Volume".

Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** page is displayed, see Figure 4-9.

#### Figure 4-9 List of Arrays Screen



 Use the arrow keys to select the array where the RAID volume to be set as a boot device is located, and then press Enter. The List of Logical Drives screen is displayed, see Figure 4-10.

#### Figure 4-10 List of Logical Drives Screen



3. Select the RAID volume to be booted first, and then press **Ctrl+P** to configure it as the first boot device, see Figure 4-11.



#### Figure 4-11 Configuring a Boot Device

# 4.3 Initial Configuration (UEFI Mode)

Figure 4-12 shows the initial configuration flow of a VT SmartROC 3100 RAID controller card.



#### Figure 4-12 Initial Configuration Flow of a VT SmartROC 3100 RAID Controller Card

- The SmartROC 3100 RAID controller card is in UEFI mode, and it currently does not support the boot disk settings.
- The SmartROC 3100 RAID controller card does not support the co-existence of configurations in both UEFI and legacy modes. If the mode is switched from UEFI to legacy, the configuration in UEFI mode must be cleared. Otherwise, the normal operation of the RAID controller card is affected.

## 4.3.1 Starting the Configuration Utility

#### Abstract

This procedure describes how to start the BIOS configuration utility of a VT SmartROC 3100

RAID controller card to log in to the management screen and complete the subsequent initial and common configurations.

#### Prerequisite

The boot mode is already set to UEFI in BIOS. For details, refer to "5.3.2 Setting the Boot Mode to UEFI".

#### Steps

- 1. Start the server system.
- During the POST process, press F2/DEL. The Aptio Setup screen is displayed, see Figure 4-13.

#### Figure 4-13 Aptio Setup Screen

Aptio Setup — AMI				
Main Advanced	Platform Configuration	Socket C	onfiguration	Server Mgmt 🕨
BIOS Information				
BIOS Version	09.00.00.01			
Build Date	07/12/2022			
Product Name	NZA			
Serial Number	N/A			
Asset Tag	N/A			
Access Level	Administrator			
Platform Informat	tion			
Platform	TypeArcherCityR	P	→+: Select	Screen
Processor	806F3 - SPR-SP	Dx	1↓: Select	Item
PCH	EBG A0/A1/B0/B1	SKU -	Enter: Sele	ct
	BO		+/-: Change	Opt.
RC Revision	80.D21		K/M: Scroll	Help Area
BIOS ACM	1.0.A		F1: General	Help
SINIT ACM	1.0.A		F2: Previou	s Values
			▼ F3: Optimiz	ed Defaults
			F4: Save &	Exit
Version 2.22.1285 Copyright (C) 2022 AMI				

3. Use the arrow keys to select **Advanced**, and then press **Enter**. The **Advanced** screen is displayed, see Figure 4-14.

Figure 4-14 Advanced Screen	
Aptio Setup – AMI Main Advanced Platform Configuration Socket Co	onfiguration Server Mgmt
<ul> <li>VLAN Configuration (MAC:5853C06403F5)</li> <li>MAC:5853C06403F5-IPv6 Network Configuration</li> <li>MAC:5853C06403F5-IPv4 Network Configuration</li> <li>Intel(R) 82599 10 Gigabit Dual Port Network Connection - 84:13:9F:32:74:0A</li> <li>VLAN Configuration (MAC:84139F32740A)</li> <li>MAC:84139F32740A-IPv6 Network Configuration</li> <li>MAC:84139F32740A-IPv4 Network Configuration</li> <li>Intel(R) 82599 10 Gigabit Dual Port Network Connection - 84:13:9F:32:74:0B</li> <li>VLAN Configuration (MAC:84139F32740B)</li> <li>MAC:84139F32740B-IPv6 Network Configuration</li> <li>MAC:84139F32740B-IPv6 Network Configuration</li> <li>MAC:84139F32740B-IPv6 Network Configuration</li> <li>VLAN Configuration (MAC:84139F32740B)</li> <li>MAC:84139F32740B-IPv4 Network Configuration</li> <li>VT SmartR0C3100 RM241B-18i 2G</li> <li>Driver Health VT SmartR0C3100 RM241B-18i 2G</li> </ul>	Configuration Utility for VT SmartR0C3100 RM241B-18i 2G ++: Select Screen tJ: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C) 2	2022 AMI

4. Use the arrow keys to select **VT SmartROC3100 RM242-18i 4G**, and press **Enter**. The controller management screen is displayed, see Figure 4-15.

#### Figure 4-15 Controller Management Screen

Aptio Setup – AMI Advanced		
<ul> <li>Controller Information</li> <li>Configure Controller Settings</li> <li>Array Configuration</li> <li>Disk Utilities</li> <li>Set Bootable Device(s) for Legacy Boot Mode</li> <li>Administration</li> </ul>	Provides the information of the controller like PCI Bus:Device:Function, Firmware Revision, UEFI Driver Version, Controller Temperature etc. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
Version 2.22.1285 Copyright (C) 2022 AMI		

For a description of the functions of the menus on the controller management screen, refer to Table 4-4.

Menu	Function Description
Controller Information	Displays the basic information, firmware, current temperature, and port configuration of the controller.
Configure Controller Settings	Provides advanced configuration options for the controller.
Array Configuration	Creates an array or RAID.
Disk Utilities	Displays the list of disk devices mounted under the controller as well as the basic disk information. It allows you to turn on the disk location indica- tor, erase disk data and upgrade the firmware.
Set Bootable Device(s) for Legacy Boot Mode	Configures, or clears the primary and secondary boot disks.
Administration	Allows the controller administrator to perform operations, such as upgrad- ing the firmware and restoring factory defaults.

#### Table 4-4 Functions of Menus on the Controller Management Screen

## 4.3.2 Creating a RAID Volume

#### Abstract

You can create RAID volumes at different levels as required.

The operations for creating RAID volumes at different levels are similar. This procedure uses creating a RAID 1 volume in UEFI mode as an example.

#### Prerequisite

- Sufficient SATA and SAS disks are installed on the server.
- The port mode for the disks to be connected is already set. For details, refer to "4.5.1 Setting the Mode of a Port".

#### Context

For a description of the number of disks required to create a RAID volume, refer to Table 4-5.

RAID Level	Description
RAID 0	RAID 0 requires at least one disks.
RAID 1	RAID 1 requires at least two disks. Disks with different capacities can be used in a RAID 1 volume, but the logical capaci- ty of each member disk depends on the space of the disk with the smallest capacity.
RAID 5	RAID 5 requires at least three disks.
RAID 6	RAID 6 requires at least four disks.
RAID 1+0	RAID 1+0 requires at least four disks. A RAID 1+0 volume consists of at least two RAID 1 volumes. For example, if there are four hard disks to be stored in the RAID 1+0 mode, you need to add them to two "Dri- ve Group," and each "Drive Group" mounts two hard disks. The storage mode is RAID 1.
RAID 50	RAID 50 requires at least six disks. A RAID 50 volume consists of at least two RAID 5 volumes. For example, if six hard disks need to be stored in the RAID 50 mode, it is necessary to add six hard disks to two "Drive Group," each of which is mounted with three hard disks, and the storage mode is RAID 5.
RAID 60	RAID 60 requires at least eight disks. A RAID 60 volume consists of at least two RAID 6 volumes. For example, if there are eight disks to be used in RAID 60 mode, you need to add them to two drive groups, each of which is mounted with four disks in RAID 6 mode.

#### Table 4-5 Number of Disks Required for Creating a RAID Volume

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 4-16.

#### Figure 4-16 Array Configuration Screen

Aptio Setup	- AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Creates an array from the group of selected physical drives of same type. Once an array is created, the unused space is available for creating logical drives. **: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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2. Use the arrow keys to select **Create Array**, and then press **Enter**. In the displayed disk list, all the disks that can be used to create a RAID volume are displayed, see Figure 4-17.
### Figure 4-17 Viewing the Disk List

Advanced	Aptio Setup – A	AMI
Port:CNO Box:1 Bay:3 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Proceed to next Form
Port:CN1 Box:1 Bay:5 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	
Port:CN1 Box:1 Bay:6 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	++: Select Screen ↑↓: Select Item
Port:CN4 Box:1 Bay:16 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Enter: Select +/-: Change Opt. K/M: Scroll Help Area
▶ [Proceed to next Form]		F1: General Help F2: Previous Values ▼ F3: Optimized Defaults F4: Save & Exit
Versior	1 2.22.1285 Copyrigh	nt (C) 2022 AMI

3. Select the disk to be added to the array, and then press **Enter** to set the disk port to **Enabled** status, see Figure 4-18.

#### Figure 4-18 Confirming the Configuration

Advanced	Aptio Setup –	AMI
Port:CNO Box:1 Bay:3 Size:4 TB SAS SEAGATE ST4000NM003A	[Enabled]	▲ Size:3.638 TiB(4 TB) Port:CN1 Box:1 Bay:5 Device Type:SAS Logical
Port:CN1 Box:1 Bay:5 Size:4 TB SAS SEAGATE ST4000NM003A	[Enabled]	Sector Size:512 Model:SEAGATE ST4000NM003A Serial
Port:CN1 Box:1 Bay:6 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Number:WS23MQK30000E2307 500 Negotiated Link ▼
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	++: Select Screen ↑↓: Select Item
Port:CN4 Box:1 Bay:16 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Enter: Select +/-: Change Opt. K/M: Scroll Help Area
▶ [Proceed to next Form]		F1: General Help F2: Previous Values ▼ F3: Optimized Defaults F4: Save & Exit
Version	1 2.22.1285 Copyrig	ht (C) 2022 AMI

# Note

The disks for creating a RAID volume must be of the same type. It is forbidden to select disks with interface types such as SATA and SAS at the same time.

4. Use the arrow keys to select **Proceed to Next Form**, and then press **Enter**. The screen for creating RAID is displayed, see Figure 4-19.

Figure 4-19 Creating RAID

Advanced	Aptio Setup – AMI	
RAID Level ▶ [Proceed to next Form]	[RAIDO]	RAID Level ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version	1 2.22.1285 Copyright (C) 2	022 AMI

5. Use the arrow keys to select **RAID Level**, and then press **Enter**. From the displayed shortcut menu, select the desired RAID level, see Figure 4-20.

#### Figure 4-20 Selecting a RAID Level



6. Use the arrow keys to select **Proceed to Next Form**, and press **Enter**. The screen for setting RAID logical volumes is displayed, see Figure 4-21.

#### Figure 4-21 Setting RAID Logical Volumes

Advanced	Aptio Setup — AMI	
Logical Drive Label Strip Size / Full Stripe Size Size Unit Size Acceleration Method Isubmit Changes]	Logical Drive 1 [256 Ki8 / 256 Ki8] 3.638 [Ti8] [None]	Enter a label for this logical drive. The label is displayed in the Logical Drive Details section ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyright (C	) 2022 AMI

7. Use the arrow keys to select the parameters that you want to modify. In the displayed operation boxes, configure the related parameters. For a description of the parameters for setting a logical volume, refer to Table 4-6.

Parameter	Description
Logical Drive Label	Sets the name of the RAID logical volume, for example, "Logical Drive 1".
Strip Size/Full Strip Size	<ul> <li>Strip Size indicates the size of the current stripe. The stripe size should be equal to the size of average disk IO requests generated by server applications. In the optimum status, only one IO operation is executed for each IO request. The size can be 16 KiB, 32 KiB, 64 KiB, 128KiB, 512 KiB, or 1024 KiB. The default value is 256 KiB. The recommended stripe size configurations are as follows:</li> <li>For a Web server, 8 KiB is recommended.</li> <li>For a groupware server (such as an email server), 16 KiB is recommended.</li> <li>For a database server, 16 KiB or 32 KiB is recommended.</li> <li>For a file server, 32 KiB or 64 KiB, is recommended.</li> <li>For a video file server, 64 KiB, 128 KiB, or 256 KiB is recommended.</li> </ul>

#### Table 4-6 Parameter Descriptions for Logical Volume Configuration

AB

Parameter	Description
	<ul> <li>Full Strip Size indicates the total size of all stripes. When you set</li> <li>Strip Size, the system automatically calculates Full Stripe Size.</li> </ul>
Size	Displays the storage size of the RAID volume in accordance with the total storage space of the disks added to the RAID volume. By default, all available space is used to create a RAID logical volume. To create multiple RAID logical volumes, you can define the size of the volumes.
Unit Size	Select the unit (MiB/GiB/TiB) of the logical drive.
Acceleration Method	<ul> <li>Sets the caching mode for the RAID volume.</li> <li>IO Bypass: This option is valid only when the RAID logical volume is formed by SSDs.</li> <li>Controller Cache: enables controller cache optimization. The read cache and write cache are used at the same time.</li> <li>None: disables the controller cache. Neither IO Bypass nor Controller Cache is used.</li> <li>Keep the default configuration unless otherwise specified.</li> </ul>

8. Use the arrow keys to select **Submit Changes**, and press **Enter**. The RAID volume is created successfully, see Figure 4-22.

# Aptio Setup - AMI Advanced Logical Drive Creation Successful • [Back to Main Menu] ++: Select screen 1: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

#### Figure 4-22 RAID Volume Created Successfully

9. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 4.4 Common Configurations (Legacy Mode)

By using the BIOS configuration utility, you can configure and maintain a created RAID volume. For a description of the common operations on a SmartROC 3100 RAID controller card in legacy mode, refer to Table 4-7.

Common Operation	Description
Querying RAID volume infor- mation	Refer to "4.4.1 Querying RAID Volume Information".
Creating a hot spare disk	Refer to "4.4.2 Creating a Hot Spare Disk".
Deleting a RAID volume	Refer to "4.4.3 Deleting a RAID Volume".
Deleting a hot spare disk	Refer to "4.4.4 Deleting a Hot Spare Disk".
Locating a disk	Refer to "4.4.5 Locating a Disk".

#### Table 4-7 Common Operations on a SmartROC 3100 RAID Controller Card

Common Operation	Description
Configuring a pass-through disk	Refer to "4.4.6 Configuring a Pass-Through Disk".
Enabling the caching function	Refer to "4.4.7 Enabling the Caching Function".

## 4.4.1 Querying RAID Volume Information

#### Abstract

This procedure describes how to query the RAID information created on a SmartROC 3100 RAID controller card, such as the RAID volume status and member disk status.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "4.2.2 Creating a RAID Volume".

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 4-23.

#### Figure 4-23 List of Arrays Screen



2. Select the RAID volume whose properties you want to view, and then press Enter. The List of Logical Drives screen is displayed, see Figure 4-24.

#### Figure 4-24 List of Logical Drives Screen



3. Press Enter. In the displayed Logical Drive Details dialog box, view the property information about the RAID volume, see Figure 4-25.

Log i	cal	Drive Details
Array Name		Array-A
Status		Ok
Drive Type		Data
Size		14.5TiB
RAID Level		RAIDO
Legacy Disk Geometry(C/H/S)		65535/255/32
Strip Size/Full Stripe size		256KiB/512KiB
Drive Unique ID		600508b1001c05fb6c5db9f603958377
Logical Drive Label		0
Acceleration Method	8	None

#### Figure 4-25 Logical Drive Details Dialog Box

4. (Optional) To view the member disk information, press **Ctrl+D**. The **Array Member Drives** dialog box is displayed, see Figure 4-26.

#### Figure 4-26 Array Member Drives Dialog Box



## 4.4.2 Creating a Hot Spare Disk

#### Abstract

A hot spare disk improves the data security of a RAID array. For a description of the hot spare disk types supported by a SmartROC 3100 RAID controller card, refer to Table 4-8.

#### Table 4-8 Hot Spare Disk Types

Туре	Description
Dedicated	<ul> <li>This type of hot spare disks is exclusive to the specified one or more disk groups of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a dedicated hot spare disk temporarily takes over the faulty disk.</li> </ul>
Auto Replace	<ul> <li>This type of hot spare disks provides the hot standby function for a disk group of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a hot spare disk of this type automatically replaces the faulty disk.</li> </ul>

#### Prerequisite

There are sufficient idle disks on the server.

#### Context

When creating a hot spare disk, pay attention to the following points:

- Multiple hot spare disks can be created for a disk group, but only one type of hot spare disk can be set at a time. That is, either **Dedicated** or **Auto Replace** is specified.
- An idle disk can be set as a hot spare disk. The disk that has been used to create a RAID volume cannot be set as a hot spare disk.
- The hot spare disk must be of the same type as that of any member disk in the corresponding disk group. That is, all of them are SATA disks or SAS disks, and the hot spare disk's capacity must not be less than the maximum capacity of the member disks.
- Disk groups at all levels except RAID 0 support hot spare disks.

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 4-27.



Figure 4-27 List of Arrays Screen

2. Use the arrow keys to select the RAID volume for which you want to configure a hot spare disk, and press **Ctrl+S**. The **Select Hotspare Drives** screen is displayed, see Figure 4-28.

	iguration
Select Hotspare drives CN0:01:00 SEAGATE ST4000NM 3.6 CN0:01:01 SEAGATE ST4000NM 3.6 CN0:01:02 SEAGATE ST4000NM 3.6 CN0:01:03 SEAGATE ST4000NM 3.6 CN1:01:05 SEAGATE ST4000NM 3.6 CN1:01:06 SEAGATE ST4000NM 3.6 CN1:01:16 SEAGATE ST4000NM 3.6 CN4:01:16 SEAGATE ST4000NM 3.6 CN4:01:16 SEAGATE ST4000NM 3.6	Selected Drives Selected Drives Selected Drives Selected Drives Selected Drives Fibric F
(14) Move Cursor, (INS)/(SpaceBar) S (Enter) Submit (Esc) Cancel	elect, <del> Deselect</del>

#### Figure 4-28 Select Hotspare Drives Screen

3. Use the arrow keys to select the idle disk to be set as a hot spare disk, and then press **Insert** to add the disk to the **Selected Drives** list, see Figure 4-29.

	<b>Configura</b>	tion ——		
Select Hotspare drives			-Selected Drives-	
CN0:01:00 SEAGATE ST4000NM	3.6TiB	CN1:01:05	SEAGATE ST4000NM	3.6TiB
CN0:01:01 SEAGATE ST4000NM	3.6TiB			
CN0:01:02 SEAGATE ST4000NM	3.6TiB			
CN0:01:03 SEAGATE ST4000NM	3.6TiB			
CN1:01:05 SEAGATE ST4000NM	3.6TiB			
CN1:01:06 SEAGATE ST4000NM	3.6TiB			
CN1:01:02 SEAGATE ST4000NM	3 6TiB			
CN4:01:16 STAGATE ST4000MM	3 6718			
	3.0115			
<pre><pgup pgdn=""> Prev/Next page of Se</pgup></pre>	elected Dr ar> Select	vives(Port:B ., <del> Des</del>	ox:Bay) elect	

#### Figure 4-29 Selected Drives Screen



Press the **Delete** key to delete the selected disk from the **Selected Drives** list.

4. Press Enter. A confirmation dialog box is displayed, see Figure 4-30.

	Configura	ution ———		
Select Hotspare drives	1	K	-Selected Drives-	
CN0:01:00 SEAGATE ST4000NM	3.6TiB	CN1:01:05	SEAGATE ST4000NM	3.6TiB
CN0:01:01 SEAGATE ST4000NM	3.6TiB			
CN0:01:02 SEAGATE ST4000NM	3.6TiB			
CN0:01:03 SEAGATE ST4000NM	3.6TiB			
CN1:01:05 SEAGATE ST4000NM	3.6TiB			
CN1:01:06 SEAGATE ST4000NM	3.6TiB			
CN1:01:07 SEAGATE ST4000NM	3.6TiB			
CN4:01:16 SEAGATE ST4000NM	3.6TiB			
Do you want to submit	t the char	nges made ?		
		1		
Y - save changes and return to m	nain menu,	N - contin	ue	

#### Figure 4-30 Confirmation Dialog Box

5. At the cursor in the confirmation dialog box, enter **Y**. The **Select Spare Type** screen is displayed, see Figure 4-31.

#### Figure 4-31 Select Spare Type Screen

	Configuration
ſ	Select Spare Type
	Select Spare Type Dedicated Spare Drive Auto replace drives
	[Done]
<11	> Moves Cursor, <esc> Cancel Selection, <enter> Accept Selection</enter></esc>

6. Use the arrow keys to select the type of hot spare disk to be created, and then press **Enter** for confirmation, see Figure 4-32.

Figure 4-32 Select Spare Type Screen

	- Configuration -
	Select Spare Type
	Select Spare Type Auto replace drives
	[Done]
	AN NEW PROPERTY AND A REAL
	AD NEXT FIELD, SANTEHAD FREUDOUS FIELD
< E1	nuery Hecept Value, KESC> Lancel Platog Box

7. Use Tab to select Done, and then press Enter to create the hot spare disk, see Figure 4-33.

#### Figure 4-33 Creating a Hot Spare Disk

Configuration	
Creating Spare Drive	
Please wait	

## 4.4.3 Deleting a RAID Volume

#### Abstract

When a server no longer needs a RAID volume, you can delete the RAID volume to release the disk space.

Notice

The data that is lost during deletion of the RAID volume cannot be restored. Therefore, you must make sure that you have backed up important data before deleting the volume.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "4.2.2 Creating a RAID Volume".

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 4-34.

#### Figure 4-34 List of Arrays Screen



2. Use the arrow keys to select the array where the RAID volume to be deleted is located, and then press **Enter**. The **List of Logical Drives** screen is displayed, see Figure 4-35.

#### Figure 4-35 List of Logical Drives Screen

	Con	nfiguration ———		
01 0	-List of Logica RAID	ul Drives (Page 1 )1 3.6TiB	of 1)	
<enter> Display Logi <ctrl+p> Set as Prim <ctrl+d> Delete Boot &lt;14&gt; Moves Cursor</ctrl+d></ctrl+p></enter>	cal Drive Detai ary Boot LD, <ct able Logical Dr</ct 	ls, <del> Delete rl+S&gt; Set as Sec vive , <ctrl+f>Fo</ctrl+f></del>	Logical Device ondary Boot LD rce Online LD	

3. Use the arrow keys to select the RAID volume to be deleted, and press **Delete**. A warning dialog box is displayed, see Figure 4-36.



#### Figure 4-36 Warning Dialog Box

4. At the cursor in the warning dialog box, enter **Y** to delete the selected hot spare disk, see Figure 4-37.

#### Figure 4-37 Deleting a RAID Volume



## 4.4.4 Deleting a Hot Spare Disk

### Abstract

When the number of disks of a server cannot meet the requirements, you can delete an existing hot spare disk and restore it to a common disk.

#### Prerequisite

A hot spare disk is already created. For details, refer to "4.4.2 Creating a Hot Spare Disk".

#### Steps

1. On the **Configuration Menu** screen, use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **List of Arrays** screen is displayed, see Figure 4-38.

Figure 4-38 List of Arrays Screen

Configuration
List of Arrays (Page 1 of 1) ARRAY-A - 002-PD(s), 01-LD(s) ARRAY-B - 002-PD(s), 01-LD(s)
<pre><enter>List Logical Drives, <ctrl+c>Create Logical Drives, <ctrl+d>Delete Array</ctrl+d></ctrl+c></enter></pre>
<pre><ctrl+s>Add Spare drives, <del>Delete Spare Drive, <esc>Cancel.</esc></del></ctrl+s></pre>
<ctrl+e>Enable/Disable_SSD_1/O_Bupass,<ctrl+f>1dentifu_Device.</ctrl+f></ctrl+e>

2. Use the arrow keys to select the array where the hot spare disk to be deleted is located, and press **Delete**. The **Select Hotspare drives** screen is displayed, see Figure 4-39.

Conf igura	ation
Select Hotspare drives	Selected Drives
CN0:01:00 SEAGATE ST4000NM 3.6TiB	
CN0:01:01 SEAGATE ST4000NM 3.6TiB	
CN0:01:02 SEAGATE ST4000NM 3.6TiB	
CN0:01:03 SEAGATE ST4000NM 3.6TiB	
CN1:01:05 SEAGATE ST4000NM 3.6TiB	
CN1:01:06 SEAGATE ST4000NM 3.6TiB	
CN1:01:07 SEAGATE ST4000NM 3.6TiB	
CN4:01:16 SEAGATE ST4000NM 3.6TiB	
<pgup pgdn=""> Prev/Next page of Selected Di</pgup>	rives(Port:Box:Bay)
<14> Nove Cursor, <1MS>/ <spacebar> Select</spacebar>	t, <pel> Deselect</pel>

#### Figure 4-39 Select Hotspare Drives Screen

3. Use the arrow keys to select the hot spare disk to be deleted, and then press **Insert** to add the disk to the **Selected Drives** list, see Figure 4-40.

	Configura	tion ——		
Select Hotspare drives	l		=Selected Drives=	
CN0:01:00 SEAGATE ST4000NM	3.6TiB	CN1:01:05	SEAGATE ST4000NM	3.6TiB
CN0:01:01 SEAGATE ST4000NM	3.6TiB	Contraction in the product of the second		8340-83210, XX80200 (13
CN0:01:02 SEAGATE ST4000NM	3.6TiB			
CN0:01:03 SEAGATE ST4000NM	3.6TiB			
CN1:01:05 SEAGATE ST4000MM	3 6TiB			
CN1:01:06 SFACATE ST4000NM	3 6718			
CN1.01.02 SFACATE ST4000MM	3 6718			
CN4+B1+16 SEACATE STABBONN	3 67 10			
CH1.01.10 SEHGHIE ST1000hil	J.011D			
<pre><pgup pgdn=""> Prev/Next page of Se <ft></ft></pgup></pre> <pre></pre>	lected Di ir> Select	vives(Port:B t, <del> Des</del>	ox:Bay) elect	

#### Figure 4-40 Selected Drives List



Press the Delete key to delete the selected disk from the Selected Drives list.

4. Press Enter. A confirmation dialog box is displayed, see Figure 4-41.

	<b>Configura</b>	tion ——		
Select Hotspare drives			-Selected Drives-	
CN0:01:00 SEAGATE ST4000NM	3.6TiB	CN1:01:05	SEAGATE ST4000NM	3.6TiB
CN9:01:01 SEAGATE ST4000NM	3 6TiB			978234111767237C
CN9-01-02 STACATE ST4000NM	3 GT IB			
CNO.01.02 SEACATE STABBONN	3.011D			
	3.011D			
CH1:01:05 SEHGHIE S14000MM	3.0118			
CN1:01:06 SEAGATE ST4000NM	3.6TiB			
CN1:01:07 SEAGATE ST4000NM	3.6TiB			
CN4:01:16 SEAGATE ST4000NM	3.6TiB			
Do you want to submit	t the char	nges made ?		
Y - save changes and return to r	main menu,	n - contin	ue	

#### Figure 4-41 Confirmation Dialog Box

5. At the cursor in the confirmation dialog box, enter **Y** to delete the selected hot spare disk, see Figure 4-42.

#### Figure 4-42 Deleting a Hot Spare Disk

Deleting Spare Drive

## 4.4.5 Locating a Disk

## Abstract

After the indicator of a disk is lit, you can locate the disk so that you can easily replace or maintain it.

#### Steps

 In the Options area on the BIOS configuration utility screen, use the arrow keys to select Disk Utilities, and then press Enter. The Select Disks and press <Enter> screen is displayed, see Figure 4-43. Figure 4-43 Select Disks and Press <Enter> Screen

rort# Box# Bay#	Model	Rev#	Speed	Size
: 00 :	VT Smart Adapter	5.00		
CN0: 01 :000	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN0: 01 :001	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN0: 01 :002	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN0: 01 :003	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN1: 01 :005	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN1: 01 :006	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN1: 01 :007	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN4: 01 :016	SEAGATE ST4000NM00	N003	6.0G	3.6TiB
	No device			
	No device			
: :	No device			
	no device			

2. Use the arrow keys to select the disk to be located, and then press **Enter**. A function menu is displayed, see Figure 4-44.

Port# Box	# Bau# Model	S (LIICOL)	Rev#	Speed S	ize
: 00	: VT Sma	art Adapter	5.00		
CN0: 01	:000 SEAGAT	E ST4000NM00	N003	12.0G	3.6TiB
CN9: 91	:001 SEAGAT	E ST4000NM00	NØØ3	12.0G	3.6TiB
CN0: 01	:002 SEAGAT	E ST4000NM00	N003	12.0G	3.6TiB
CN0: 01	:003 SEAGAT	E ST4000NM00	N003	12.0G	3.6TiB
CN1: 01	:005 SEAGAT	E ST4000NM00	N003	12.0G	3.6TiB
CN1: 01	:006			12.0G	3.6TiB
CN1: 01	:007 De	vice Informat	tion	12.0G	3.6TiB
CN4: 01	:016	dentify Devia	ce	6.0G	3.6TiB
	:				
	: No	device			
	: No	device			
	: No	device			
:	: No	device			
	: No	device			
:	: No	device			
Use Page l	Up or Page Down	n keys to mov	ve to next	page	

Figure 4-44 Function Menu

3. Use the arrow keys to select **Identify Device**, and then press **Enter**. A prompt message is displayed, see Figure 4-45. At this time, the red indicator of the corresponding disk is lit and flashes continuously.

IOLC. D	ox# Bay#	Node I	Rev#	Speed S	ize
	00 :	VT Smart Adapter	5.00		
CN0:	01 :000	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN0:	01 :001	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN0:	01 :002	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN0:	01 :003	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN1:	01 :005	SEAGATE ST4000NM00	N003	12.0G	3.6TiB
CN1:					- 6TiB
CN1:	Turn	ed on device identif	fication	n LED	.6TiB
CN4:	Pres	sing any key will to	irn off	the	.6TiB
1000 B	iden	tification LED.			
	r T				
		No device			
		No device			
		No device			
		No device			
		No device			

Figure 4-45 Disk Indicator Lit

4. Press any key to go out the disk indicator. The disk locating ends.

## 4.4.6 Configuring a Pass-Through Disk

#### Abstract

In accordance with the actual RAID configuration, you can configure a pass-through disk in either of the following ways:

• Setting the mode of all ports in batches:

If the disks connected to all ports are not used to create a RAID volume, the mode of these ports can be set to HBA in a unified manner.

• Setting the mode of ports separately:

If the disks connected to some ports have been used to create a RAID volume, the mode of these ports can be set to Mixed and that of other ports can be set to HBA.

#### Context

Port modes include RAID, HBA and Mixed, which are described as follows:

- In RAID mode, the connected disks can be used only after they form a RAID volume.
- In HBA mode, the connected disks are pass-through disks and cannot be used to create a RAID volume. Instead, they can only be used directly.
- In Mixed mode, the connected disks support both RAID and HBA mode.
  - $\rightarrow$  The RAID mode is applicable to the disks that have been used to create a RAID volume.
  - → The HBA mode (pass-through) is applicable to the disks that are not used to create a RAID volume.

#### Steps

 In the Options area on the BIOS configuration utility screen, use the arrow keys to select Controller Details, and then press Enter. The controller details are displayed. The value of Controller Mode is MIXED, see Figure 4-46.

#### **Figure 4-46 Controller Details**

VT SmartROC3108 Controller Information Product Name PCI Slot Number PCI (Bus:Device:Function) Hardware Revision Serial Number WWN Number Firmware Version Controller Temperature Supported Features Controller Memory Size Controller Mode Number of OS bootable drive	guration Utility (Build 0 1)>>> 8 Family Controller #0 : VT SmartROC3100 RM241B-18i : 238 : 39:00:0 : A : 744841200425 : 50015EBE06C7393F : 5.00-0 : 0048 C : RAID/HBA/MIXED : 2048 MiB : MIXED es. 2
<esc> - To Exit</esc>	
Arrow keys to move cursor, <enter> to</enter>	o select optiom, <esc> to exit (*=default)</esc>

 Press ESC to return to the BIOS configuration screen. Use the arrow keys to select Configure Controller Settings and press Enter. The Configure Controller Settings screen is displayed, see Figure 4-47.



 Use the arrow keys to select Configure Controller Port Mode, and then press Enter. The Configure Controller Port Mode screen is displayed, see Figure 4-48.

Figure 4-48 Configure Controller Port Mode Screen	
★★★ Adaptec SAS/SATA Configuration Utility IBuild 8 I→→→	
Configure Controller Port Mode	
configure concreter fore noue	
Port CN0 MIXED	
Port CN1 MIXED	
Port CN2	
Port CN4 MIXED	
<esc> - To Exit</esc>	
	etet stet
arrow keys to move cursor, (Enter) to select option, (Esc) to exit (*-aerau	6.2

Use the arrow keys to select the port whose connected disk is not used to create a RAID volume, and press Enter. In the displayed dialog box, set the port mode to HBA, see Figure 4-49.

### Figure 4-49 Setting the Port Mode to HBA 📢 Adaptec SAS/SATA Configuration Utility [Build VT SmartROC3100 Family Controller #0 Configure Controller Port Mode Port CN0. MIXED Port CN1..... MIXED Port CN2. Port CN3. MIXED MIXED Port CN4.... MIXED RAID MIXED HBA <ESC> - To Exit Arrow keys to move cursor, <Enter> to select option, <Esc> to exit (\*=default)

5. (Optional) If the connected disk is already used to create a RAID volume, set the port mode to **MIXED**, see Figure 4-50.

#### Figure 4-50 Setting the Port Mode to MIXED



III Note

The mode of the ports whose connected disks are already used to create a RAID volume cannot be set to HBA.

 Set the port mode as required, and then press Esc to exit. In the displayed dialog box, select Yes to save the configuration, see Figure 4-51.



Figure 4-51 Saving the Configuration

7. Wait until a configuration success message is displayed, see Figure 4-52.

#### Figure 4-52 Successful Configuration



8. Press Esc multiple times until the Exit Utility dialog box is displayed, see Figure 4-53.



 In the Exit Utility dialog box, select NO, and then press Enter. The BIOS configuration utility screen is displayed, see Figure 4-54.



Figure 4-54 BIOS Configuration Utility Screen

10. Use the arrow keys to select **Controller Details**, and then press **Enter**. The controller details are displayed, see Figure 4-55. The value of **Controller Mode** is **HBA**. Figure 4-55 Controller Details

Product Name	: VT SmartROC3100 RM241B-18i
PCI Slot Number	: 238
PCI (Bus:Device:Function)	: 39:00:0
Hardware Revision	: A
Serial Number	: 744841200425
WWN Number	: 50015EBE06C7393F
Firnware Version	: 5.00-0
Controller Temperature	: 0047 C
Supported Features	: RAID/HBA/MIXED
Controller Memory Size	: 2048 MiB
Controller Mode	: HBA
Number of OS bootable drive	pes. 2

## 4.4.7 Enabling the Caching Function

#### Abstract

A VT SmartROC 3100 RAID controller card supports the caching function. In legacy mode, a SmartROC 3100 RAID supports the following three caching modes:

- IO Bypass: valid only when a RAID logical volume is formed by SSDs.
- Controller Cache: enables controller cache optimization. The read cache and write cache are used at the same time.

• None: disables the controller cache. Neither **IO Bypass** nor **Controller Cache** is used. After you select **Controller Cache** mode, the caching function is enabled, which improves the data read/write speed.



You can enable the caching function only by referring to this procedure. The caching function cannot be enabled on the Web portal of the BMC.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "4.2.2 Creating a RAID Volume".

#### Context

Enabling the caching function improves the data read/write speed. The details are as follows:

- When a RAID controller card reads the data, if the data has been written into the Cache, the data can be directly read from the Cache to prevent the hard disk from searching for the data again, thus saving the response time and improving the data read speed.
- When a RAID controller card writes the data, the data is directly written into the Cache. The RAID controller card refreshes the data to the hard disk only when the written data is accumulated to a certain extent, achieving batch data write. In addition, the Cache is a fast read/ write device, so the read/write speed of the Cache is higher than that of the hard disk, thus improving the data write speed.

# Note

To ensure the data security in the Cache, you can configure a super capacitor for the RAID controller card. In case of unexpected power failure of the server, the super capacitor is used to supply power, and provides data security protection in the Cache.

#### Steps

- 1. Switch to UEFI mode. For details, refer to "5.3.2 Setting the Boot Mode to UEFI".
- 2. Perform the following operations as required.

lf	Then			
The super capacitor is configured	View the status of the backup power. The value of <b>Backup Power Status</b> is <b>charged</b> .			
The super capacitor	a. Disable Survival Mode.			
is not configured	i. Use the arrow keys to select VT SmartROC3100 RS241-18i > Array			
	<b>Configuration &gt; Manage Arrays</b> , and press <b>Enter</b> . The <b>Manage Arrays</b> screen is displayed.			
	ii. Use the arrow keys to select the array for which you need to disable Sur-			
	<b>vival Mode</b> , and then press <b>Enter</b> . The screen for managing the select- ed array is displayed.			
	iii. Use the arrow keys to select I/O Bypass Settings, and press Enter. In the displayed dialog box, set I/O Bypass to Disabled.			
	b. Enable <b>No Battery Write Cache</b> .			
	i. Use the arrow keys to select VT SmartROC3100 RS241-18i > Config-			
	ure Controller Settings > Modify Cache Settings, and press Enter.			
	The Modify Cache Settings screen is displayed.			
	<ul> <li>Use the arrow keys to select No Battery Write Cache, and press Enter.</li> <li>In the displayed dialog box, set No Battery Write Cache to Enabled.</li> </ul>			



When the super capacitor is not configured and the **No battery Write Cache** is disabled, there is no cache setting option in Legacy mode.

- 3. Return to Legacy mode. For details, refer to "5.3.1 Setting the Boot Mode to Legacy".
- In the Options area, use the arrow keys to select Configuration Menu > Manage Arrays, and then press Enter. The List of Arrays screen is displayed, see Figure 4-56.



#### Figure 4-56 List of Arrays Screen

5. Use the arrow keys to select the array for which the caching function needs to be enabled, and then press **Enter**. The **List of Logical Drives** screen is displayed, see Figure 4-57.



#### Figure 4-57 List of Logical Drives Screen

 Press Enter. In the displayed Logical Drive Details dialog box, view the property information about the RAID volume, see Figure 4-58. The value of Acceleration Method is None, indicating that the caching function is disabled.

Arrau Name	.a 1	Arrau-B	
Status		0k	
Drive Type		Data	
Size		3.6T1B	
RAID Level		RAIDØ	
Legacy Disk Geometry(C/H/S)		65535/255/32	
Strip Size/Full Stripe size		256KiB/256KiB	
Drive Unique ID		600508b1001c881b5b832774d25b14ea	
Logical Drive Label		1	
Acceleration Method		None	

#### Figure 4-58 Logical Drive Details Dialog Box

 Press Ctrl+C to switch the caching mode. On the screen as shown in Figure 4-59, the value of Acceleration Method becomes Controller Cache, indicating that the caching function is enabled.

	figuration
List of Logic.	1 Drives (Page 1 of 1)
02 1 RAI	8 3.6TiB
Logic	1 Drive Details
Array Name	Array-B
Status	: Ok
Drive Type	: Data
Size	: 3.6TiB
RAID Level	: RAID0
Legacy Disk Geometry(C/H/S)	: 65535/255/32
Strip Size/Full Stripe size	: 256KiB/256KiB
Drive Unique ID	: 690508b1001c881b5b832774d25b14ea
Logical Drive Label	: 1
Acceleration Method	: Controller cache
ESC> Back to previous menu <ctbl+< td=""><td>&gt; Display Array Members</td></ctbl+<>	> Display Array Members

#### Figure 4-59 Enabling the Caching Function

## 4.5 Common Configurations (UEFI Mode)

By using the BIOS configuration utility, you can configure and maintain a created RAID volume. For a description of the common operations on a SmartROC 3100 RAID controller card in UEFI mode, refer to Table 4-9.

Common Operation	Description		
Setting a port mode	Refer to "4.5.1 Setting the Mode of a Port".		
Locating a disk	Refer to "4.5.2 Locating a Disk".		
Creating a hot spare disk	Refer to "4.5.3 Creating a Hot Spare Disk".		
Changing a hot spare disk	Refer to "4.5.4 Changing a Hot Spare Disk".		
Deleting a hot spare disk	Refer to "4.5.5 Deleting a Hot Spare Disk".		
Configuring a power mode	Refer to "4.5.6 Configuring the Performance or Power Mode".		
Deleting a RAID volume	Refer to "4.5.7 Deleting a RAID Volume".		
Deleting a disk group	Refer to "4.5.8 Deleting a Disk Group".		
Clearing RAID configuration in- formation	Refer to "4.5.9 Clearing RAID Configuration Information".		
Configuring a pass-through disk	Refer to "4.5.10 Configuring a Pass-Through Disk".		
Enabling the caching function	Refer to "4.5.11 Enabling the Caching Function".		

#### Table 4-9 Common Operations on a SmartROC 3100 RAID Controller Card

## 4.5.1 Setting the Mode of a Port

#### Abstract

The ports of a SmartROC 3100 RAID controller card, namely, the ports connected with a disk backplane and disk cables, support three modes: RAID, HBA and Mixed. Before adding the disk corresponding to a port to a RAID logical volume, you must check the port mode. The SmartROC 3100 RAID controller card supports setting the port mode in the following two ways:

- Setting the mode of all ports in batches
- Setting the mode of a port separately

#### Context

Port modes include RAID, HBA and Mixed, which are described as follows:

• In RAID mode, the connected disks can be used only after they form a RAID volume.

- In HBA mode, the connected disks are pass-through disks and cannot be used to create a RAID volume. Instead, they can only be used directly.
- In Mixed mode, the connected disks support both RAID and HBA mode.
  - $\rightarrow$  The RAID mode is applicable to the disks that have been used to create a RAID volume.
  - → The HBA mode (pass-through) is applicable to the disks that are not used to create a RAID volume.

#### Steps

- Setting the Mode of All Ports in Batches
  - On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 4-60.

#### Figure 4-60 Configure Controller Settings Screen

Aptio Setup – A Advanced	MI
<ul> <li>Modify Controller Settings</li> <li>Modify Cache Settings</li> <li>Advanced Controller Settings</li> <li>Clear Configuration</li> <li>Backup Power Source</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configure the controller port mode to RAID, HBA, or Mixed ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyrigh	t (C) 2022 AMI

 Use the arrow keys to select Configure Controller Port Mode, and then press Enter. The Configure Controller Port Mode screen is displayed, see Figure 4-61.

#### Figure 4-61 Configure Controller Port Mode Screen

AMI
HBA mode allows
be directly accessible from the operating system. RAID mode reserves all physical drives for array
++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values 52: Optimized Defaults
F4: Save & Exit

3. Use the arrow keys to select **Set Controller Port Mode**, and then press **Enter**. The **Set Controller Port Mode** dialog box is displayed, see Figure 4-62.

## Figure 4-62 Set Controller Port Mode Dialog Box

Advanced	Aptio Setup -	AMI
Current Controller Port Mode	Mixed	HBA mode allows
Set Controller Port Mode ▶ [Submit Changes]	[Mixed]	be directly accessible from the operating system. RAID mode reserves all physical
	—— Set Controller F AID lixed	Port Mode ves for array elect Screen elect Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area E1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyri	ght (C) 2022 AMI

4. Use the arrow keys to select the port mode to be set, and then press **Enter**, see Figure 4-63.

#### Figure 4-63 Selecting a Port Mode

Advanced	Aptio Setup	- AMI
Current Controller Port Mode	Mixed	Configuration changes will be applied
Set Controller Port Mode ▶ [Submit Changes]	[RAID]	Tumediately
		<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Versi	on 2.22.1285 Copyr	ight (C) 2022 AMI

5. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 4-64.
#### Figure 4-64 Successful Setting

Aptio Setup – AM Advanced	1I
Controller Port Mode changes applied successfully	Navigate back to Main Menu
▶ [Back to Main Menu]	<pre>**: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Version 2.22.1285 Copyright (C) 2022 AMI	

- 6. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.
- Setting the Mode of a Port Separately
  - On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 4-65.

#### Figure 4-65 Configure Controller Settings Screen

Aptio Setup – AMI Advanced	
<ul> <li>Modify Controller Settings</li> <li>Modify Cache Settings</li> <li>Advanced Controller Settings</li> <li>Clear Configuration</li> <li>Backup Power Source</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configures the supported controller settings. Depending on the controller, these can include setting the cache ratio, transformation and rebuild priorities and • • • • • • • • • • • • • • • • • • •
Version 2.22.1285 Copyright	(C) 2022 AMI

2. Use the arrow keys to select **Modify Controller Settings**, and then press **Enter**. The **Modify Controller Settings** screen is displayed, see Figure 4-66.

## Figure 4-66 Modify Controller Settings Screen

Advanced	Aptio Setup – AMI	
Advanced Transformation Priority Rebuild Priority Surface Scan Analysis Priority Current Parallel Surface Scan Count Spare Activation Mode Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CNO Mode	[Medium] [High] 3 1 [Failure Spare Activation] [Default] [Default] [Default] [Default]	<ul> <li>Transformation         Priority: Refers to the             priority given to Array             Expansion, Logical             Drive Extension,             Logical Drive             Migrations and Array             shrink/move operations.     </li> <li>++: Select Screen             t.i: Select Item             Enter: Select             +/-: Change Opt.             K/M: Scroll Help Area             F1: General Help             F2: Previous Values             F3: Optimized Defaults</li> </ul>
F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI		

 Use the arrow keys to select Port CN0 Mode, and then press Enter. The Port CN0 Mode dialog box is displayed, see Figure 4-67.

#### Figure 4-67 Port CNO Mode Dialog Box

Aptio Setup - AMI Advanced		
Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CNO Mode Port CN1 Mode Port CN2 Mode Port CN2 Mode Port CN3 Mode Port CN4 Mode [Submit Changes]	[Default] [Default] [Default] Port CNO Mode RAID HBA Mixed [R [RAID]	Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C) 2022 AMI		

4. Use the arrow keys to select the port mode to be set, and then press **Enter**, see Figure 4-68.

#### Figure 4-68 Setting the Port Mode

Advanced	Aptio Setup – A	AMI
Unconfigured Physical Drive Write Cache State	[Default]	Connector Mode: For Multiple domain connections, Connector
HBA Physical Drive Write Cache State	[Default]	mode has to be changed to the same mode for
Configured Physical Drive Write Cache State	[Default]	all connectors connected to the Multi domain device.
Port CNO Mode Port CN1 Mode	[Mixed] [Mixed]	
Port CN2 Mode	[Mixed]	++: Select Screen
Port CN4 Mode	[Mixed]	Enter: Select
[Submitt Changes]		K/M: Scroll Help Area F1: General Help
		F2: Previous Values F3: Optimized Defaults F4: Save & Exit

5. Repeat Step 3 and Step 4 to set the mode of another port, see Figure 4-69.

#### Figure 4-69 Setting the Port Mode

Advanced	Aptio Setup – n	AMI
Unconfigured Physical Drive Write Cache State	[Default]	Configuration changes will be applied immediately
HBA Physical Drive Write Cache State	[Default]	
Configured Physical Drive Write Cache State	[Default]	
Port CNO Mode	[RAID]	
Port CN1 Mode	[HBA] [Miyod]	++· Salart Screen
Port CN3 Mode	[HBA]	↑↓: Select Item
Port CN4 Mode	[RAID]	Enter: Select
▶ [Submit Changes]		+/-: Change Opt.
		K/M: Scroll Help Area
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
Version 2.22.1285 Copyright (C) 2022 AMI		

6. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 4-70.

#### Figure 4-70 Port Mode Set Successfully

Advanced	Aptio Setup – AMI	
Advanced Controller Settings Applied	Successfully	Navigate back to Main Menu ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt.
		K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 4.5.2 Locating a Disk

#### Abstract

After the indicator of a disk is lit, you can locate the disk so that you can easily replace or maintain it. You can locate a physical disk or multiple disks in a disk group.

#### Steps

- Locating a Single Physical Disk
  - On the controller management screen, use the arrow keys to select **Disk Utilities**, and then press **Enter**. The screen for the list of physical disks mounted on the RAID controller card is displayed, see Figure 4-71.

#### Figure 4-71 Screen for the List of Disks Mounted on the RAID Controller Card

Advanced	Aptio Setup – AMI	
navanceu		
Port:CN0 Box:1 Bay:0 Size:4 ST4000NM003A	TB SAS SEAGATE	Size:3.638 TiB(4 TB) Port:CNO Box:1 Bay:0
<ul> <li>Port:CNO Box:1 Bay:1 Size:4 ST4000NM003A</li> </ul>	TB SAS SEAGATE	Device Type:SAS Logical Sector Size:512
Port:CNO Box:1 Bay:2 Size:4 ST4000NM003A	TB SAS SEAGATE	Model:SEAGATE ST4000NM003A Serial
Port:CN0 Box:1 Bay:3 Size:4 ST4000NM003A	TB SAS SEAGATE	Number:WS23L22N0000E2303 9GS Negotiated Link 💌
<ul> <li>Port:CN1 Box:1 Bay:5 Size:4 ST4000NM003A</li> </ul>	TB SAS SEAGATE	
<ul> <li>Port:CN1 Box:1 Bay:6 Size:4 ST4000NM003A</li> </ul>	TB SAS SEAGATE	↔: Select Screen t∔: Select Item
Port:CN1 Box:1 Bay:7 Size:4 ST4000NM003A	TB SAS SEAGATE	Enter: Select +/−: Change Opt.
Port:CN4 Box:1 Bay:16 Size: ST4000NM003A	4 TB SAS SEAGATE	K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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2. Use the arrow keys to select the disk to be located, and then press **Enter**. The screen for setting a disk is displayed, see Figure 4-72.

#### Figure 4-72 Setting a Disk

Aptio Setup – AMI Advanced	
Port:CNO Box:1 Bay:O Size:4 TB SAS SEAGATE ST4000NM003A Device Information Identify Device Erase Disk Update Device Firmware	Turn On/Off the device identification LED.
	++: Select Screen fJ: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

3. Use the arrow keys to select **Identify Device**, and then press **Enter**. The **Identify De**vice screen is displayed, see Figure 4-73.

#### Figure 4-73 Identify Device Screen

Aptio Setup – AMI Advanced	
Port:CNO Box:1 Bay:0 Size:4 TB SAS SEAGATE ST4000NM003A	Device LED Identification Duration
Turn On/Off the device identification LED.	Input range. 86400: Default
Note: Identification LED will be operational only if the hardware on which the device is connected supports turning on/off identification LED.	
Identification 86400 Ducation (seconds)	↔: Select Screen 11: Select Item
► Start	Enter: Select
▶ Stop	+/-: Change Opt.
	K/M: Scroll Help Area
	F1: General help F2: Previous Values
	F3: Optimized Defaults
	F4: Save & Exit
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4. Next to **Identification Duration (seconds)**, enter the time of the lighting delay (unit: seconds), select **Yes**, and press **Enter** for confirmation, see Figure 4-74.

#### Figure 4-74 Lighting Delay

Aptio Setup — AMI Advanced	
<pre>Port:CNO Box:1 Bay:0 Size:4 TB SAS SEAGATE ST4000NM003A Turn On/Off the device identification LED. Note: Identification LED will be operational only if the hardware on which the device is connected supports turning on/off identification LED. Identification (seconds) Start Stop</pre>	Device LED Identification Duration in seconds: 1-86400: Input range. 86400: Default **: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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5. Use the arrow keys to select **Start**, and then press **Enter**. The red indicator of the corresponding disk is lit and continuously flashes, see Figure 4-75.

#### Figure 4-75 Starting Locating a Disk

Aptio Setup – AMI Advanced	
Port:CNO Box:1 Bay:0 Size:4 TB SAS SEAGATE ST4000NM003A	Navigate back to Main Menu
Turned on device identification LED	
▶ [Back to Main Menu]	
	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
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# Note

The indicator flashing duration is the configured lighting delay. After the lighting delay is reached, the default value 86400 s (24 hours) is restored, and the indicator goes out.

6. (Optional) To go out the disk indicator and end the locating, press **Esc** to return to the locating screen, use the arrow keys to select **Stop**, and press **Enter**, see Figure 4-76.

#### Figure 4-76 Ending Disk Locating

Aptio Setup – AMI Advanced	
Port:CNO Box:1 Bay:0 Size:4 TB SAS SEAGATE ST4000NM003A	Navigate back to Main Menu
Turned off device identification LED	
▶ [Back to Main Menu]	
	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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- 7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.
- Locating Multiple Disks in a Disk Group
  - On the controller management screen, use the arrow keys to select Array Configuration, and then press Enter. The Array Configuration screen is displayed, see Figure 4-77.

#### Figure 4-77 Array Configuration Screen

Aptio Set	up - AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an • • • • • • • • • • • • • • • • • • •
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2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 4-78.

#### Figure 4-78 Managing Arrays Screen

Advanced	Aptio Setup — AMI
► Array A	Array A ++: Select Screen +: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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3. Use the arrow keys to select the array in which the disk to be located is placed, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 4-79.

#### Figure 4-79 Managing the Selected Array

Advanced	Aptio Setup — AMI	
Array Type ID Interface Type Total Space Unused Space Used Space Block Size Array Status Member Logical Drive(s) Member Physical Drive(s) List Logical Drives Create Logical Drives Create Logical Drives Identify Device Delete Array	Data O SAS-HDD 7.277 TiB(8.001 TB) NA(NA) 7.277 TiB(8.001 TB) 512 Bytes Ok 1	Turn On/Off the device identification LED. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyright (C	) 2022 AMI

4. Use the arrow keys to select **Identify Device**, and then press **Enter**. The **Identify De**vice screen is displayed, see Figure 4-80.

#### Figure 4-80 Identify Device Screen

Aptio Setup – AMI Advanced	
Array A Turn On/Off the device identification LED. Note: Identification LED will be operational only if the hardware on which the device is connected supports turning on/off identification LED.	Device LED Identification Duration in seconds: 1–86400: Input range. 86400: Default
Identification 86400 Duration (seconds) Identify by Drive [Data Drive(s) only] Configuration type > Start > Stop	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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5. Next to **Identification Duration (seconds)**, enter the time of the lighting delay (unit: seconds), and then press **Enter** for confirmation, see Figure 4-81.

#### Figure 4-81 Lighting Delay

Aptio Setup – AMI Advanced	
Array A Turn On/Off the device identification LED. Note: Identification LED will be operational only if the hardware on which the device is connected supports turning on/off identification LED.	Device LED Identification Duration in seconds: 1–86400: Input range. 86400: Default
Identification 50 Duration (seconds) Identify by Drive [Data Drive(s) only] Configuration type > Start > Stop	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
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6. Use the arrow keys to select **Start**, and then press **Enter**. The red indicators of all the disks that belong to the array are lit and continuously flash, see Figure 4-82.

#### Figure 4-82 Starting Locating a Disk

Aptio Setup – AMI Advanced	I
Turned on device identification LED ▶ [Back to Main Menu]	Navigate back to Main Menu
	++: Select Screen fJ: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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# Note

The indicators of the hot spare disks belonging to the array are also lit and flash continuously at the same time. The indicator flashing duration is the configured lighting delay. After the lighting delay is reached, the default value 86400 s (24 hours) is restored, and the indicator goes out.

 (Optional) To go out the disk indicator and end the locating, press Esc to return to the locating screen, and use the arrow keys to select Stop. The disk indicator goes out and the disk locating ends, see Figure 4-83.

#### Figure 4-83 Ending Disk Locating

Aptio Setup — A Advanced	MI
Turned off device identification LED • [Back to Main Menu]	Navigate back to Main Menu ++: Select Screen 1J: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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8. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 4.5.3 Creating a Hot Spare Disk

#### Abstract

A hot spare disk improves the data security of a RAID array. For a description of the hot spare disk types supported by a SmartROC 3100 RAID controller card, refer to Table 4-10.

Туре	Description
Dedicated	<ul> <li>This type of hot spare disks is exclusive to the specified one or more disk groups of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a dedicated hot spare disk temporarily takes over the faulty disk.</li> </ul>
Auto Replace	<ul> <li>This type of hot spare disks provides the hot standby function for a disk group of a RAID controller card. One or more hot spare disks can be created for each disk group.</li> <li>When a disk in a disk group is faulty, a hot spare disk of this type automatically replaces the faulty disk.</li> </ul>

Table 4-10 Hot Spare Disk Types

#### Prerequisite

There are sufficient idle disks on the server.

#### Context

When creating a hot spare disk, pay attention to the following points:

- Multiple hot spare disks can be created for a disk group, but only one type of hot spare disk can be set at a time. That is, either **Dedicated** or **Auto Replace** is specified.
- An idle disk can be set as a hot spare disk. The disk that has been used to create a RAID volume cannot be set as a hot spare disk.
- The hot spare disk must be of the same type as that of any member disk in the corresponding disk group. That is, all of them are SATA disks or SAS disks, and the hot spare disk's capacity must not be less than the maximum capacity of the member disks.
- Disk groups at all levels except RAID 0 support hot spare disks.

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 4-84.

Aptio Se	tup – AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an • • • • • • • • • • • • • • • • • • •
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#### Figure 4-84 Array Configuration Screen

2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 4-85.

Advanced	ptio Setup — AMI
Array A	Array A ++: Select Screen ++: Select Screen +-: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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#### Figure 4-85 Managing Arrays Screen

3. Use the arrow keys to select the array for which you need to create the hot spare disk, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 4-86.

#### Figure 4-86 Managing the Selected Array

Advanced	Aptio Setup – AMI	
Array Type ID Interface Type Total Space Unused Space Used Space Block Size Array Status Member Logical	Data O SAS-HDD 7.277 TiB(8.001 TB) NA(NA) 7.277 TiB(8.001 TB) 512 Bytes Ok 1	Adds or removes spare physical drives to or from an array. When a physical drive fails, the assigned spare will become active
Member Physical Drive(s) List Logical Drives Create Logical Drive Manage Spare Drives Identify Device Delete Array	2	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>

4. Use the arrow keys to select **Manage Spare Drives**, and then press **Enter**. The **Manage Spare Drives** screen is displayed, see Figure 4-87.

#### Figure 4-87 Manage Spare Drives Screen

Aptio Set	up — AMI
▶ Assign Dedicated Spare ▶ Assign Auto Replace Spare	Drives assigned as dedicated spares can only be used as spare drives.
	<pre> ++: Select Screen  14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
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5. In accordance with your actual conditions, use the arrow keys to select the type of the hot spare disk to be created, and then press **Enter**. The screen for selecting a hot spare disk is displayed, see Figure 4-88.

## Figure 4-88 Selecting a Hot Spare Disk

Advanced	Aptio Setup — AMI	
Port:CNO Box:1 Bay:2 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Size:3.638 TiB(4 TB) Port:CNO Box:1 Bay:2 Device Type:SAS Logical
Port:CNO Box:1 Bay:3 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Sector Size:512 Model:SEAGATE ST4000NM003A Serial
Port:CN1 Box:1 Bay:5 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Number:WS23L25W0000E2303 8FM Negotiated Link 🔻
Port:CN1 Box:1 Bay:6 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Enter: Select +/-: Change Opt. K/M: Scroll Help Area
Assign Dedicated Spare		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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6. Use the arrow keys to select the disk to be set as a hot spare disk, press **Enter**, and then set the status of the disk to **Enabled**, see Figure 4-89.

#### Figure 4-89 Setting Disk Status

Advanced	Aptio Setup – AMI	
Port:CNO Box:1 Bay:2 Size:4 TB SAS SEAGATE ST4000NM003A	[Enabled]	Size:3.638 TiB(4 TB) Port:CNO Box:1 Bay:2 Device Type:SAS Logical
Port:CNO Box:1 Bay:3 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Sector Size:512 Model:SEAGATE ST4000NM003A Serial
Port:CN1 Box:1 Bay:5 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Number:WS23L25W0000E2303 8FM Negotiated Link ▼
Port:CN1 Box:1 Bay:6 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	++: Select Screen 11: Select Item
Port:CN1 Box:1 Bay:7 Size:4 TB SAS SEAGATE ST4000NM003A	[Disabled]	Enter: Select +/–: Change Opt. K/M: Scroll Help Area
<ul> <li>Assign Dedicated Spare</li> </ul>		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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7. Use the arrow keys to select **Assign Dedicated Spare**, and then press **Enter**. The hot spare disk is successfully created, see Figure 4-90.

# Adding of Spare Successful Adding of Spare Successful F[Back to Main Menu] \*\*: Select Screen \*\*: Select Screen \*\*: Select Item Enter: Select \*/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI

#### Figure 4-90 Hot Spare Disk Created Successfully

8. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

#### 4.5.4 Changing a Hot Spare Disk

#### Abstract

A SmartROC 3100 RAID controller card supports modifying the type of a hot spare disk, namely, allowing type change between **Dedicated** and **Auto Replace**.

Only one type of hot spare disk can be set at a time. That is, **Dedicated** and **Auto Replace** cannot be specified at the same time. This procedure uses changing a hot spare disk of the **Dedicated** type to that of the **Auto Replace** type as an example to describe how to perform a type change.

# III Note

A hot spare disk of the **Auto Replace** type can be changed to that of the **Dedicated** type by referring to this procedure.

#### Prerequisite

A hot spare disk is already set to the **Dedicated** type. For details, refer to "4.5.3 Creating a Hot Spare Disk".

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 4-91.

#### Figure 4-91 Array Configuration Screen

Advanced Advanced	tup – AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an ++: Select Screen <b>14</b> : Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 4-92.

# Aptio Setup - AMI Advanced Array A Array A Array A ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI

Figure 4-92 Managing Arrays Screen

3. Use the arrow keys to select the array for which you need to modify the hot spare disk, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 4-93.

#### Figure 4-93 Managing the Selected Array

Aptio Setup – AMI Advanced			
Array Type ID Interface Type Total Space Unused Space Block Size Array Status Spare Rebuild Mode Spare Drive(s) Member Logical Drive(s) Member Physical Drive(s) List Logical Drives Create Logical Drives Identify Device	Data O SAS-HDD 7.277 TiB(8.001 TB) NA(NA) 7.277 TiB(8.001 TB) 512 Bytes Ok Dedicated 1 1 2		Adds or removes spare physical drives to or from an array. When a physical drive fails, the assigned spare will become active ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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4. Use the arrow keys to select **Manage Spare Drives**, and then press **Enter**. The **Manage Spare Drives** screen is displayed, see Figure 4-94.

#### Figure 4-94 Manage Spare Drives Screen

Aptio Setup — AMI Advanced		
<ul> <li>Assign Dedicated Spare</li> <li>Change Spare type to Au</li> <li>Delete Spare Drives</li> </ul>	Replace Change Spare type to AutoReplace ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
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 Use the arrow keys to select Change Spare type to AutoReplace, and then press Enter. The screen for hot spare disk type modification is displayed, see Figure 4-95.

Aptio Setup	- AMI
All the existing Spare drive(s) will be converted to the selected Spare type [Submit Changes]	Configuration changes will be applied immediately ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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#### Figure 4-95 Screen for Hot Spare Disk Type Modification

6. Select **Submit Changes**, and then press **Enter**. The type of hot spare disk is changed successfully, see Figure 4-96.

#### Figure 4-96 Hot Spare Disk Type Changed Successfully

Aptio Setup – Al Advanced	MI
Spare type changed to AutoReplace ▶ [Back to Main Menu]	Navigate back to Main Menu ++: Select Screen 1J: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyrigh	t (C) 2022 AMI

7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

#### 4.5.5 Deleting a Hot Spare Disk

#### Abstract

When the number of disks of a server cannot meet the requirements, you can delete an existing hot spare disk and restore it to a common disk.

#### Prerequisite

A hot spare disk is created successfully. For details, refer to "4.5.3 Creating a Hot Spare Disk".

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 4-97.

#### Figure 4-97 Array Configuration Screen

Aptio Setu Advanced	o - AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an • • • • • • • • • • • • • • • • • • •
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2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 4-98.

#### Figure 4-98 Managing Arrays Screen

Advanced	Aptio Setup — AMI
Array A	Array A ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.	2.1205 CUP9F18N1 (C) 2022 HM1

3. Use the arrow keys to select the array for which you need to delete the hot spare disk, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 4-99.

#### Figure 4-99 Managing the Selected Array

Aptio Setup – AMI Advanced		
Array Type ID Interface Type Total Space Unused Space Used Space Block Size Array Status Spare Rebuild Mode Spare Drive(s) Member Logical Drive(s) Member Physical Drive(s) List Logical Drives Create Logical Drives Identify Device	Data O SAS-HDD 7.277 TiB(8.001 TB) NA(NA) 7.277 TiB(8.001 TB) 512 Bytes Ok Auto Replace 1 1	<ul> <li>Adds or removes spare physical drives to or from an array. When a physical drive fails, the assigned spare will become active</li> <li>*+: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</li> </ul>
Versi	on 2.22.1285 Copyright (C	F4: Save & Exit

4. Use the arrow keys to select **Manage Spare Drives**, and then press **Enter**. The **Manage Spare Drives** screen is displayed, see Figure 4-100.
#### Figure 4-100 Manage Spare Drives Screen

Aptio Setup –	AMI
<ul> <li>Assign Auto Replace Spare</li> <li>Change Spare type to Dedicated</li> <li>Delete Spare Drives</li> </ul>	Removes the Spare drive from the current Array Configuration.
Version 2.22.1285 Copyrig	(ht (C) 2022 AMI

5. Use the arrow keys to select **Delete Spare Drives**, and then press **Enter**. The screen for selecting a hot spare disk is displayed, see Figure 4-101.

#### Figure 4-101 Selecting a Hot Spare Disk

Advanced	Aptio Setup - AMI	
Port:CNO Box:1 Bay:2 Size:4 TB SAS SEAGATE ST4000NM003A ▶ Delete Spare Drives	[Disabled]	Size:3.638 TiB(4 TB) Port:CNO Box:1 Bay:2 Device Type:SAS Logical Sector Size:512 Model:SEAGATE ST4000NM003A Serial Number:WS23L25W0000E2303 8FM Negotiated Link ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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6. Use the arrow keys to select the hot spare disk to be deleted, press **Enter**, and then set the status of the disk to **Enabled**, see Figure 4-102.

#### Figure 4-102 Setting Disk Status

Advanced	Aptio Setup – A	MI
Port:CNO Box:1 Bay:2 Size:4 TB SAS SEAGATE ST4000NM003A ▶ Delete Spare Drives	[Enabled]	Size:3.638 TiB(4 TB) Port:CNO Box:1 Bay:2 Device Type:SAS Logical Sector Size:512 Model:SEAGATE ST4000NM003A Serial Number:WS23L25W0000E2303 8FM Negotiated Link * *+: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version	n 2.22.1285 Copyrigh	it (C) 2022 AMI

7. Use the arrow keys to select **Delete Spare Drives** and press **Enter**. The hot spare disk is deleted successfully, see Figure 4-103.

#### Aptio Setup - AMI Advanced Delete Spare Successful IBack to Main Menu Henu Select Screen IJ: Select Item Enter: Select Henu File General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

#### Figure 4-103 Hot Spare Disk Deleted Successfully

8. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

# 4.5.6 Configuring the Performance or Power Mode

#### Abstract

This procedure describes how to configure a power mode for a SmartROC 3100 RAID controller card. For a description of the power modes supported by the SmartROC 3100 RAID controller card, refer to Table 4-11.

Power Mode	Description
Minimum Power	In this mode, the static settings of the power are adjusted to the possible lowest val- ue, and the power is dynamically reduced based on the working load.
Balanced	In this mode, the static settings of the power are adjusted in accordance with the ac- tual RAID configuration, and the power is dynamically reduced based on the working load.
Maximum Perfor- mance	In this mode, the static settings of the power are adjusted to the possible highest val- ue, and the power is not dynamically reduced based on the working load.

#### Table 4-11 Power Supply Mode Descriptions

#### Steps

 On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 4-104.

#### Figure 4-104 Configure Controller Settings Screen

Aptio Setup – AM Advanced	Ĩ
<ul> <li>Modify Controller Settings</li> <li>Modify Cache Settings</li> <li>Advanced Controller Settings</li> <li>Clear Configuration</li> <li>Backup Power Source</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Modifies the controller's power mode and enables or disables the survival mode for supported controllers. A reboot maybe required after changing the power mode to optimize • • • • • • • • • • • • • • • • • • •
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 Use the arrow keys to select Manage Power Settings, and then press Enter. The Manage Power Settings screen is displayed, see Figure 4-105.

#### Figure 4-105 Manage Power Settings Screen

Advanced	Aptio Setup – AMI	
Power Mode Survival Mode ▶ [Submit Changes]	[Maximum Performance] [Enabled]	Sets the controller's power mode. Minimum Power: Static settings are set to the lowest level. Balanced: Static Settings are set based on the configuration. Maximum Performance: ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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3. Use the arrow keys to select **Power Mode**, and then press **Enter**. The **Port Mode** menu is displayed, see Figure 4-106.

#### Figure 4-106 Power Mode Menu

Advanced	Aptio Setup – AMI	
Advanced Power Mode Survival Mode • [Submit Changes]	[Maximum Performance] [Enabled] Power Mode Minimum Power Balanced Maximum Performance	Sets the controller's power mode. Minimum Power: Static settings are set to the lowest level. Balanced: Static Settings are set based on the configuration. Maximum Performance: **: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values
F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI		

4. In accordance with your actual conditions, use the arrow keys to select the power mode to be applied, and then press **Enter** for confirmation, see Figure 4-107.

#### Figure 4-107 Selecting a Power Mode

Aptio Setup – AMI Advanced		
Power Mode Survival Mode ▶ [Submit Changes]	[Minimum Power] [Enabled]	Sets the controller's power mode. Minimum Power: Static settings are set to the lowest level. Balanced: Static Settings are set based on the configuration. Maximum Performance: ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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5. (Optional) Determine whether to enable **Survival Mode** as required.



By default, **Survival Mode** is enabled, indicating that when the working temperature of the power supply exceeds the threshold, the RAID controller card is allowed to switch to the energy saving mode, but it may cause performance deterioration.

• Use the arrow keys to select **Survival Mode**, and then press **Enter**. The **Survival Mode** menu is displayed, see Figure 4-108.

#### Figure 4-108 Survival Mode Menu

Aptio Setup – AMI Advanced		
Power Mode Survival Mode ▶ [Submit Changes]	[Maximum Performance] [Enabled] Survival Mode Enabled Disabled	Enabling the survival mode will allow the controller to throttle back dynamic power settings to their minimums when the temperatures exceeds the threshold. This ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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• Use the arrow keys to select **Disabled**, and then press **Enter**. The **Survival Mode** is disabled, see Figure 4-109.

#### Figure 4-109 Survival Mode Menu

Aptio Setup – AMI Advanced		
Power Mode Survival Mode ▶ [Submit Changes]	[Maximum Performance] [Disabled]	Enabling the survival mode will allow the controller to throttle back dynamic power settings to their minimums when the temperatures exceeds the threshold. This ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Vens	ion 2.22.1285 Copyright (C)	2022 AMI

6. Use the arrow keys to select **Submit Changes**, and press **Enter**. The power mode is set successfully, see Figure 4-110.

# Aptio Setup - AMI Advanced Power Settings applied successfully Mavigate back to Main Menu #: Select Screen 1: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

#### Figure 4-110 Power Mode Configured Successfully

7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

#### 4.5.7 Deleting a RAID Volume

#### Abstract

When a server no longer needs a RAID volume, you can delete the RAID volume to release the disk space.



- The data that is lost during deletion of the RAID volume cannot be restored. Therefore, you must make sure that you have backed up important data before deleting the volume.
- If the RAID logical volume to be deleted is the only logical volume on the current array, the array is also deleted after the RAID logical volume is deleted.

#### Prerequisite

The RAID volume is created successfully. For details, refer to "4.3.2 Creating a RAID Volume".

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 4-111.

#### Figure 4-111 Array Configuration Screen

Aptio Setup	- AMI
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an • •+: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 4-112.

#### Figure 4-112 Managing Arrays Screen

Advanced	Aptio Setup – AMI
▶ Array A	Array A ++: Select Screen ++: Select Screen +: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit 22.1285 Copyright (C) 2022 AMI

 Use the arrow keys to select the array for which you need to delete a logical volume, and then press Enter. The screen for managing the selected array is displayed, see Figure 4-113.

#### Figure 4-113 Managing the Selected Array

Advanced	Aptio Setup – AMI	
Array Type ID Interface Type Total Space Unused Space Used Space Block Size Array Status Spare Rebuild Mode Space Drive(s)	Data O SAS-HDD 7.277 TiB(8.001 TB) NA(NA) 7.277 TiB(8.001 TB) 512 Bytes Ok Auto Replace	Displays the list the logical drives contained in the array.
<ul> <li>Member Logical</li> <li>Drive(s)</li> <li>Member Physical</li> <li>Drive(s)</li> <li>List Logical Drives</li> <li>Create Logical Drive</li> <li>Manage Spare Drives</li> <li>Identify Device</li> </ul>	1 2	<ul> <li>**: Select Screen</li> <li>*1: Select Item</li> <li>Enter: Select</li> <li>+/-: Change Opt.</li> <li>K/M: Scroll Help Area</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> </ul>
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Use the arrow keys to select List Logical Drives, and then press Enter. The List Logical Drives screen is displayed, see Figure 4-114.

#### Figure 4-114 List Logical Drives Screen

Aptio Setup – AMI Advanced			
▶ Logical Drive 1 (Logical Drive 1)	Logical Drive 1 (Logical Drive 1) ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1285 Copyright (C) 2022 AMI			

5. Use the arrow keys to select the logical volume to be deleted, and then press **Enter**. The screen for managing the selected logical volume is displayed, see Figure 4-115.

Aptio Setup	AMI
<ul> <li>Logical Drive Details</li> <li>Edit Logical Drive</li> <li>Delete Logical Drive</li> </ul>	Display Logical Drive properties like status, RAID level, C/H/S, its members, spare members, etc.
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#### Figure 4-115 Managing the Selected Logical Volume

(Optional) To view the details of the logical volume, use the arrow keys to select Logical Drive Details, and then press Enter, see Figure 4-116.

#### Figure 4-116 Logical Volume Details

Aptio Setup — AMI Advanced			
StatusOkSize3.638 TiB(4 TB)RAID LevelRAID1Legacy Disk65535/255/32Geometry(C/H/S)Strip SizeStrip Size256 KiBFull Stripe Size256 KiBLogical Drive LabelLogical Drive 1Volume Unique600508B1001CC3D8B72E246IdentifierC801F9966Acceleration MethodController CacheLogical Drive Members:Port:CN0 Box:1 Bay:0 Size:3.638 TiB(4 TB) SASSEAGATE ST4000NM003A Status:0kPort:CN0 Box:1 Bay:1 Size:3.638 TiB(4 TB) SASSEAGATE ST4000NM003A Status:0k	<pre>++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>		
Version 2.22.1285 Copyright (C) 2022 AMI			

 On the logical volume management screen, use the arrow keys to select **Delete Logical** Drive, and then press Enter. The confirmation screen for RAID volume deletion is displayed, see Figure 4-117.

		-			
Figure $1-117$	Confirmation	Scroon f	or RAID	Volume	Deletion
$r_{1}$	commation	<b>OCICEIII</b>		Volume	Deletion

Aptio Setup – AMI Advanced	
Deletes the Logical Drive. Any data contained in the Logical Drive will be lost. If the Logical Drive being deleted is the only Logical Drive of the Array, the Array will be deleted as well.	Configuration changes will be applied immediately
▶ [Submit Changes]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
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8. Select **Submit Changes**, and then press **Enter**. The logical volume is deleted successfully, see Figure 4-118.

# Aptio Setup - AMI Advanced Successfully Deleted Logical Drive FiBack to Hain Menu] Advigate back to Main Menu \*\*: Select to Main Menu \*\*: Select Screen \*\*: Select Screen \*\*: Select Item Enter: Select \*/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI

Figure 4-118 Logical Volume Deleted Successfully

9. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

### 4.5.8 Deleting a Disk Group

#### Abstract

When a server no longer needs a disk group (array), you can delete it to release the disk space.



- When an array is deleted, the RAID logical volume built on it is also deleted, and the data lost during the deletion cannot be restored. Therefore, it is required to make sure that you have backed up important data before the deletion.
- If the array to be deleted is the only array of the RAID controller card, the configurations related to the RAID controller card are also cleared, and the default configurations are restored.

#### Prerequisite

A RAID volume is created successfully to form a disk group. For details, refer to "4.3.2 Creating a RAID Volume".

#### Steps

1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The **Array Configuration** screen is displayed, see Figure 4-119.

#### Figure 4-119 Array Configuration Screen



2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The **Manage Arrays** screen is displayed, see Figure 4-120.

#### Figure 4-120 Managing Arrays Screen

Advanced	Aptio Setup – AMI
Array A	Array A ++: Select Screen +: Select Screen +: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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3. Use the arrow keys to select the array to be deleted, and then press **Enter**. The screen for managing the selected array is displayed, see Figure 4-121.

#### Figure 4-121 Managing the Selected Array

Advanced	Aptio Setup – AMI	
Array Type ID Interface Type Total Space Unused Space Used Space Block Size Array Status Member Logical Drive(s) Member Physical Drive(s) List Logical Drives Create Logical Drives Create Logical Drives Identify Device Delete Array	Data O SAS-HDD 7.277 TiB(8.001 TB) NA(NA) 7.277 TiB(8.001 TB) 512 Bytes Ok 1 2	Deletes an Array. All the data on the logical drives that are part of deleted array will be lost. Also if the deleted array is the only one on the controller, the **: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

4. Use the arrow keys to select **Delete Array**, and then press **Enter**. The **Delete Array** screen is displayed, see Figure 4-122.

Figure 4-122 Delete Array Screen		
Aptio Setup – AMI Advanced		
Deletes an Array. All the data on the logical drives that are part of deleted array will be lost. Also if the deleted array is the only one on the controller, the controller settings will be erased and its default configuration is restored.	Configuration changes will be applied immediately	
▶ [Submit Changes]	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>	
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5. Use the arrow keys to select Submit Changes, and press Enter. The array is deleted successfully, see Figure 4-123.

#### Figure 4-123 Array Deleted Successfully

Advanced	otio Setup — AMI
Delete Array Successful ▶ [Back to Main Menu]	Navigate back to Main Menu ++: Select Screen fl: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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6. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

# 4.5.9 Clearing RAID Configuration Information

#### Abstract

This procedure describes how to clear all configuration information that is already created on a SmartROC 3100 RAID controller card.



The data that is lost during clearing of the configuration information on the RAID controller card cannot be restored. Therefore, it is required to make sure that you have backed up important data before the clearing operation.

#### Prerequisite

A RAID volume is created successfully and it has the corresponding RAID configuration information. For details, refer to "4.3.2 Creating a RAID Volume".

#### Steps

 On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 4-124.

#### Figure 4-124 Configure Controller Settings Screen

Aptio Setup – AMI Advanced			
<ul> <li>Modify Controller Settings</li> <li>Modify Cache Settings</li> <li>Advanced Controller Settings</li> <li>Clear Configuration</li> <li>Backup Power Source</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Option to reset the configuration to its default state. Any existing arrays or logical drives will be deleted, any data on the logical drives will be lost and option to ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
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2. Use the arrow keys to select **Clear Configuration**, and then press **Enter**. The screen for clearing the configurations is displayed, see Figure 4-125.

#### Figure 4-125 Clearing the Configurations

Aptio Setup – AMI Advanced			
<ul> <li>Delete All Array Configurations</li> <li>Delete configuration metadata on all physical drives</li> </ul>	Warning: Resets the configuration to its default state. Any existing arrays or logical drives will be deleted, and any data on the logical drives will be lost. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
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3. Use the arrow keys to select **Delete All Array Configuration**, and then press **Enter**. The screen for clearing the array configurations is displayed, see Figure 4-126.

#### Figure 4-126 Clearing the Array Configurations

Aptio Setup – AMI Advanced	
Clear Configuration will Clear all Array Configurations [Submit Changes]	Configuration changes will be applied immediately **: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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4. Use the arrow keys to select **Submit Changes**, and press **Enter**. The configuration information is cleared successfully, see Figure 4-127.

#### Figure 4-127 Configuration Cleared Successfully

Aptio Setup – AMI Advanced	
Clear Configuration of Logical Drives Successful	Navigate back to Main Menu
▶ [Back to Main Menu]	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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5. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

#### 4.5.10 Configuring a Pass-Through Disk

#### Abstract

In accordance with the actual RAID configuration, you can configure a pass-through disk in either of the following ways:

• Setting the mode of all ports in batches:

If the disks connected to all ports are not used to create a RAID volume, the mode of these ports can be set to HBA in a unified manner.

Setting the mode of ports separately:
 If the disks connected to some ports have been used to create a RAID volume, the mode of these ports can be set to Mixed and that of other ports can be set to HBA.

#### Context

Port modes include RAID, HBA and Mixed, which are described as follows:

• In RAID mode, the connected disks can be used only after they form a RAID volume.

- In HBA mode, the connected disks are pass-through disks and cannot be used to create a RAID volume. Instead, they can only be used directly.
- In Mixed mode, the connected disks support both RAID and HBA mode.
  - $\rightarrow$  The RAID mode is applicable to the disks that have been used to create a RAID volume.
  - → The HBA mode (pass-through) is applicable to the disks that are not used to create a RAID volume.

#### Steps

- Setting the Mode of All Ports in Batches
  - On the controller management screen, use the arrow keys to select Controller Information, and then press Enter. The Controller Information screen is displayed. The value of Controller Mode is Mixed, see Figure 4-128.

#### Figure 4-128 Controller Information Screen

UEFI Driver version 1.3.17.1 UEFI Driver release Jan 10 2022 15:42:39 date Controller Memory 2048 MiB Module Size Controller Status Ok	Advanced	Aptio Setup – AMI	
ControllerUkConfiguration StatusCache StatusNot ConfiguredExpander Minimum Scan60Duration (Seconds)Expander Scan350Time-Out(Seconds)Controller ModeMixedSupported Modes:Port CN0: RAID HBA MixedPort CN1: RAID HBA MixedF3: Optimized DefaultsF4: Save & Exit	UEFI Driver version UEFI Driver release date Controller Memory Module Size Controller Status Controller Configuration Status Cache Status Expander Minimum Scan Duration (Seconds) Expander Scan Time-Out(Seconds) Controller Modes: Port CN0: RAID HBA Mixe Port CN1: RAID HBA Mixe	1.3.17.1 Jan 10 2022 15:42:39 2048 MiB Ok Ok Not Configured 60 350 Mixed	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>

 Press Esc to return to the controller management screen. Use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 4-129.

#### Figure 4-129 Configure Controller Settings Screen

Aptio Setup – AM Advanced	I
<ul> <li>Modify Controller Settings</li> <li>Clear Configuration</li> <li>Backup Power Source</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configure the controller port mode to RAID, HBA, or Mixed ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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3. Use the arrow keys to select **Configure Controller Port Mode**, and then press **Enter**. The screen for setting the port mode is displayed, see Figure 4-130.

#### Figure 4-130 Setting the Port Mode

Advanced	Aptio Setup	- AMI
Current Controller Port Mode	Mixed	HBA mode allows
Set Controller Port Mode ▶ [Submit Changes]	[Mixed]	be directly accessible from the operating system. RAID mode reserves all physical drives for array
		<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Versio	on 2.22.1285 Copyr	ight (C) 2022 AMI

4. Use the arrow keys to select **Set Controller Port Mode**, and then press **Enter**. The **Set Controller Port Mode** dialog box is displayed, see Figure 4-131.

#### Figure 4-131 Set Controller Port Mode Dialog Box

Advanced	Aptio Setup	- AMI
Current Controller Port Mode	Mixed	HBA mode allows A physical drives
Set Controller Port Mode ▶ [Submit Changes]	[Mixed]	be directly accessible from the operating system. RAID mode
	RAID HBA Mixed	elect Screen elect Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Vers	sion 2.22.1285 Copy	right (C) 2022 AMI

5. Use the arrow keys to select **HBA**, and then press **Enter**. The mode of all ports is set to **HBA**, see Figure 4-132.

#### Figure 4-132 Setting the Port Mode to HBA

Advanced	Aptio Setup	- AMI
Current Controller Port Mode	Mixed	Configuration changes will be applied
Set Controller Port Mode [Submit Changes]	[HBA]	<pre>&gt;++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Versio	n 2.22.1285 Copyr	ight (C) 2022 AMI

6. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 4-133.

#### Figure 4-133 Port Mode Set Successfully

Aptio Setup - Ah Advanced	MI
Controller Port Mode changes applied successfully	Navigate back to Main Menu
▶ [Back to Main Menu]	<pre>**: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Version 2.22.1285 Copyrigh	t (C) 2022 AMI

7. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen, see Figure 4-134.

#### Figure 4-134 Controller Management Page

Aptio Setup — AMI Advanced	
<ul> <li>Controller Information</li> <li>Configure Controller Settings</li> <li>Array Configuration</li> <li>Disk Utilities</li> <li>Set Bootable Device(s) for Legacy Boot Mode</li> <li>Administration</li> </ul>	Provides the information of the controller like PCI Bus:Device:Function, Firmware Revision, UEFI Driver Version, Controller Temperature etc. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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 Use the arrow keys to select Controller Details, and then press Enter. On the displayed Controller Information screen, view the port mode after the modification, see Figure 4-135. The value of Controller Mode is HBA.

#### Figure 4-135 Controller Information Screen

Advanced	Aptio Setup — AMI	
Controller Configuration Status Cache Status Expander Minimum Scan Duration (Seconds) Expander Scan Time-Out(Seconds) Controller Mode Supported Modes: Port CN0: RAID HBA Mixed Port CN1: RAID HBA Mixed Port CN2: RAID HBA Mixed Port CN3: RAID HBA Mixed Port CN4: RAID HBA Mixed Configuration Summary:	Ok Not Configured 60 350 HBA	<ul> <li>★+: Select Screen</li> <li>↑↓: Select Item</li> <li>Enter: Select</li> <li>+/-: Change Opt.</li> <li>K/M: Scroll Help Area</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> </ul>
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- Setting the Mode of a Port Separately
  - On the controller management screen, use the arrow keys to select Configure Controller Settings, and then press Enter. The Configure Controller Settings screen is displayed, see Figure 4-136.
## Figure 4-136 Configure Controller Settings Screen

Aptio Setup – AMI Advanced		
<ul> <li>Modify Controller Settings</li> <li>Clear Configuration</li> <li>Backup Power Source</li> <li>Manage Power Settings</li> <li>Out of Band Messaging Settings</li> <li>Configure Controller Port Mode</li> <li>Modify Expander Minimum Scan Duration</li> </ul>	Configures the supported controller settings. Depending on the controller, these can include setting the cache ratio, transformation and rebuild priorities and *#: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
Version 2.22.1285 Copyright (C) 2022 AMI		

2. Use the arrow keys to select **Modify Controller Settings**, and then press **Enter**. The screen for setting the controller is displayed, see Figure 4-137.

#### Figure 4-137 Setting the Controller

Aptio Setup — AMI Advanced		
Unconfigured Physical Drive Write Cache State	[Default]	Connector Mode: For Multiple domain connections, Connector
HBA Physical Drive Write Cache State	[Default]	mode has to be changed to the same mode for
Configured Physical Drive Write Cache State	[Default]	all connectors connected to the Multi domain device.
Port CNO Mode	[Mixed]	
Port CN2 Mode Port CN3 Mode	[Mixed] [Mixed]	↔+: Select Screen ↑↓: Select Item
Port CN4 Mode ▶ [Submit Changes]	[Mixed]	Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C) 2022 AMI		

 Use the arrow keys to select Port CN0 Mode, and then press Enter. The Port CN0 Mode dialog box is displayed, see Figure 4-138.

## Figure 4-138 Port CNO Mode Dialog Box

Advanced	Aptio Setup — AMI	
Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State Configured Physical Drive Write Cache State Port CNO Mode Port CN1 Mode Port CN2 Mode Port CN2 Mode Port CN3 Mode Port CN4 Mode • [Submit Changes]	[Default] [Default] [Default] Port CNO Mode	Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.22.1285 Copyright (C) 2022 AMI		

4. Use the arrow keys to select **HBA**, and then press **Enter**. The mode of the port whose connected disk is not used to create a RAID volume is set to **HBA**, see Figure 4-139.

#### Figure 4-139 Setting the Port Mode to HBA

Advanced	Aptio Setup – AMI	
Unconfigured Physical Drive Write Cache State	[Default]	Connector Mode: For Multiple domain connections, Connector
HBA Physical Drive Write Cache State	[Default]	mode has to be changed to the same mode for
Configured Physical Drive Write Cache State	[Default]	all connectors connected to the Multi domain device.
Port CNO Mode Port CN1 Mode	[HBA] [Mixed]	
Port CN2 Mode Port CN3 Mode	[Mixed] [Mixed]	++: Select Screen ↑↓: Select Item
Port CN4 Mode ▶ [Submit Changes]	[Mixed]	Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults
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- 5. Repeat Step 3 and Step 4 to set the mode of another port whose connected disk is not used to create a RAID volume to **HBA**.
- Use the arrow keys to select a port whose connected disk is already used to create a RAID volume (using **Port CN2 Mode** as an example), and then press **Enter**. The port mode setting menu is displayed, see Figure 4-140.

## Figure 4-140 Port Mode Setting Menu

Advanced	Aptio Setup — AMI	
Current Parallel Surface Scan Count Spare Activation Mode Unconfigured Physical Drive Write Cache State HBA Physical Drive Write Cache State	1 [Failure Spare Activation] [Default] Port CN1 Mode — RAID	Connector Mode: For Multiple domain connections, Connector mode has to be changed to the same mode for all connectors connected to the Multi domain device.
Configured Physical Drive Write Cache State Port CNO Mode Port CN1 Mode Ropt CN2 Mode	Mixed [HBA] [Mixed]	++: Select Screen †J: Select Item Enter: Select +/-: Change Opt. K/W: Screell Help Open
Port CN2 Mode Port CN3 Mode Port CN4 Mode ▶ [Submit Changes]	(HBA) (HBA) (HBA)	<ul> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> </ul>

7. Use the arrow keys to select **Mixed**, and then press **Enter**. The mode of the port whose connected disk is used to create a RAID volume is set to **Mixed**, see Figure 4-141.

#### Figure 4-141 Setting the Port Mode to Mixed

Aptio Setup – AMI Advanced		
Current Parallel	1	Connector Mode: For
Surface Scan Count		Multiple domain
Spare Activation Mode	[Failure Spare Activation]	connections, Connector mode has to be changed
Unconfigured Physical Drive Write Cache State	[Default]	to the same mode for all connectors
HBA Physical Drive Write Cache State	[Default]	domain device.
Configured Physical Drive Write Cache State	[Default]	++: Select Screen
Port CNO Mode	(HBA)	Enter: Select
Port CN1 Mode	[Mixed]	+/-: Change Opt.
Port CN2 Mode	[HBA]	K/M: Scroll Help Area
Port CN3 Mode	[HBA]	F1: General Help
Port CN4 Mode	(HBA)	F2: Previous Values
[Submit Changes]		<ul> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> </ul>
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# Note

The mode of the ports whose connected disks are already used to create a RAID volume cannot be set to HBA.

8. Use the arrow keys to select **Submit Changes**, and press **Enter**. The port mode is set successfully, see Figure 4-142.

#### Figure 4-142 Port Mode Set Successfully

Advanced	Aptio Setup — AMI	
Controller Settings Applied	Successfully	Navigate back to Main Menu ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Version 2.	22.1285 Copyright (C) 20	022 AMI

9. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen.

## 4.5.11 Enabling the Caching Function

#### Abstract

A VT SmartROC 3100 RAID controller card supports the caching function. In UEFI mode, a SmartROC 3100 RAID supports the following two caching modes:

- Controller Cache: enables controller cache optimization. The read cache and write cache are used at the same time.
- None: disables the controller cache.

After you select the **Controller Cache** mode, the caching function is enabled, which improves the data read/write speed.

## III Note

You can enable the caching function only by referring to this procedure. The caching function cannot be enabled on the Web portal of the BMC.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "3.3.2 Creating a RAID Volume".

#### Context

Enabling the caching function improves the data read/write speed. The details are as follows:

- When a RAID controller card reads the data, if the data has been written into the Cache, the data can be directly read from the Cache to prevent the hard disk from searching for the data again, thus saving the response time and improving the data read speed.
- When a RAID controller card writes the data, the data is directly written into the Cache. The RAID controller card refreshes the data to the hard disk only when the written data is accumulated to a certain extent, achieving batch data write. In addition, the Cache is a fast read/ write device, so the read/write speed of the Cache is higher than that of the hard disk, thus improving the data write speed.

## III Note

To ensure the data security in the Cache, you can configure a super capacitor for the RAID controller card. In case of unexpected power failure of the server, the super capacitor is used to supply power, and provides data security protection in the Cache.

#### Steps

lf	Then	
The super capacitor is configured	View the status of the backup power. The value of <b>Backup Power Status</b> is <b>charged</b> .	
The super capacitor is not configured	<ul> <li>a. Disable Survival Mode.</li> <li>i. Use the arrow keys to select VT SmartROC3100 RS241-18i &gt; Array Configuration &gt; Manage Arrays, and press Enter. The Manage Arrays screen is displayed.</li> <li>ii. Use the arrow keys to select the array for which you need to disable Survival Mode, and then press Enter. The screen for managing the select- ed array is displayed.</li> <li>iii. Use the arrow keys to select I/O Bypass Settings, and press Enter. In the displayed dialog box, set I/O Bypass to Disabled.</li> <li>b. Enable No Battery Write Cache.</li> <li>i. Use the arrow keys to select VT SmartROC3100 RS241-18i &gt; Config- ure Controller Settings &gt; Modify Cache Settings, and press Enter. The Modify Cache Settings screen is displayed.</li> <li>ii. Use the arrow keys to select No Battery Write Cache, and press Enter. In the displayed dialog box, set No Battery Write Cache to Enabled.</li> </ul>	

1. On the controller management screen, perform the following operations as required.



When the super capacitor is not configured and the **No battery Write Cache** is disabled, setting **Acceleration Method** to **Controller Cache** will not take effect.

- 2. Press **Esc** multiple times until the controller management screen is displayed.
- 3. Use the arrow keys to select **Array Configuration**, and then press **Enter**. The screen for configuring an array is displayed, see Figure 4-143.

#### Figure 4-143 Configuring an Array

Aptio Setup Utility – Copyright (C) 2021 American Megatrends, Inc. Advanced	
<ul> <li>Create Array</li> <li>Create maxCache Array</li> <li>Manage Arrays</li> </ul>	Lists the set of operations that can be done on the arrays present. Options like displaying the properties of the arrays, Add or delete the spare drives to an • <b>11++:</b> Move Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.20.1276. Copyright (C) 2021 Ame	erican Megatrends, Inc.

4. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The screen for managing arrays is displayed, see Figure 4-144.

#### Figure 4-144 Managing Arrays

	Aptio Setup - AMI Advanced	
<ul> <li>Annay</li> </ul>	A B C D E F G H H	Array A ++: Select Screen tl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit D22 AMI

 Use the arrow keys to select the array for which the caching function needs to be enabled, and then press Enter. The screen for managing the selected array is displayed, see Figure 4-145.

## Figure 4-145 Managing the Selected Array

Aptio Setup – AMI Advanced		
Array Type ID Interface Type Total Space Unused Space Used Space Block Size Array Status Member Logical Drive(s) Member Physical Drive(s) List Logical Drives Create Logical Drives Manage Spare Drives Identify Device Delete Array	Data O SAS-HDD 3.638 TiB(4 TB) NA(NA) 3.638 TiB(4 TB) 512 Bytes Ok 1	Displays the list the logical drives contained in the array. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versi	on 2.22.1285 Copyright	(C) 2022 AMI

 Use the arrow keys to select List Logical Drives, and then press Enter. The screen for managing RAID logical volumes is displayed, see Figure 4-146.

#### Figure 4-146 Managing Logical Volumes

Aptio Setup – AMI Advanced		
▶ Logical Drive 1 (Logical Drive 1)	Logical Drive 1 (Logical Drive 1)	
Version 2.22.1285 Copyright (C) 2022 AMI		

 Use the arrow keys to select the RAID logical volume for which the caching function needs to be enabled, and then press Enter. The screen for managing the selected RAID logical volume is displayed, see Figure 4-147.

## Aptio Setup - AMI Advanced Display Logical Drive Edit Logical Drive properties like status, Delete Logical Drive RAID level, C/H/S, its members, spare members, etc. ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit Version 2.22.1285 Copyright (C) 2022 AMI

#### Figure 4-147 Managing the Selected Logical Volume

8. Use the arrow keys to select **Logical Drive Details**, and press **Enter**. The RAID volume information is displayed, see Figure 4-148. The value of **Acceleration Method** is **None**, indicating that the caching function is disabled.

#### Figure 4-148 Viewing RAID Volume Information

Aptio Setup – AMI Advanced		
Status Size RAID Level Legacy Disk Geometry(C/H/S) Strip Size Full Stripe Size Logical Drive Label Volume Unique Identifier Acceleration Method Logical Drive Members: Port:CNO Box:1 Bay:0 Siz SEAGATE ST4000NM003A Sta	Ok 3.638 TiB(4 TB) RAIDO 65535/255/32 256 KiB 256 KiB Logical Drive 1 600508B1001C912DA9C770D 4EE7039FE None e:3.638 TiB(4 TB) SAS itus:Ok	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Version 2.22.1285 Copyright (C) 2022 AMI		

 Press Esc to return to the RAID volume management screen. Use the arrow keys to select Edit Logical Drive and press Enter. The screen for setting RAID volume information is displayed, see Figure 4-149.

## Figure 4-149 Setting RAID Volume Information

Advanced	Aptio Setup – AMI	
Acceleration Method Logical Drive Label ▶ [Submit Changes]	[None] Logical Drive 1	Logical Drive Acceleration Method ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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10. Use the arrow keys to select **Acceleration Method**, and then press **Enter**. The **Accelera-tion Method** dialog box is displayed, see Figure 4-150.

#### Figure 4-150 Acceleration Method Dialog Box

Advanced	Aptio Setup – AMI	
Acceleration Method Logical Drive Label > [Submit Changes]	[None] Logical Drive 1 Acceleration Metho Controller Cache None	Dd
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## Note

There is no **I/O Bypass** option in **Acceleration Method** when HDDs are used. The **Acceleration Method** dialog box is displayed based on the actual hard disk configuration.

11. Use the arrow keys to select **Controller Cache**, and then press **Enter**. The caching mode is set to **Controller Cache**, see Figure 4-151.

Document Serial Number: VT20240308 (R1.1)

## Figure 4-151 Setting the Caching Mode

Advanced	Aptio Setup — AMI	
Acceleration Method Logical Drive Label ▶ [Submit Changes]	[Controller Cache] Logical Drive 1	Logical Drive Acceleration Method ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Versio	n 2.22.1285 Copyright (C) 2	2022 AMI

12. Use the arrow keys to select **Submit Changes**, and press **Enter**. The caching mode is set successfully, see Figure 4-152.

#### Figure 4-152 Caching Mode Set Successfully

Aptio Setup – AMI Advanced	
Logical Drive has been edited successfully • [Back to Main Menu]	Navigate back to Main Menu ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area
Version 2.22.1285 Copyright (C) 2	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit

13. Select **Back to Main Menu**, and then press **Enter** to return to the controller management screen, see Figure 4-153.

#### Figure 4-153 Managing the Controller

Aptio Setup – AMI Advanced		
<ul> <li>Controller Information</li> <li>Configure Controller Settings</li> <li>Array Configuration</li> <li>Disk Utilities</li> <li>Set Bootable Device(s) for Legacy Boot Mode</li> <li>Administration</li> </ul>	Creates new array(s) from the list of drives available and manages the existing arrays ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	
Version 2.22.1285 Copyright (C	) 2022 AMI	

14. Repeat Step 3 through Step 8. The RAID volume information is displayed, see Figure 4-154. The value of **Acceleration Method** is **Controller Cache**, indicating that the caching function is enabled.

#### Figure 4-154 Viewing RAID Volume Information

Aptio Setup - AMI Advanced		
Status Size RAID Level Legacy Disk Geometry(C/H/S) Strip Size Full Stripe Size Logical Drive Label Volume Unique Identifier Acceleration Method Logical Drive Members: Port:CNO Box:1 Bay:0 Si SEAGATE ST4000NM003A St	Ok 3.638 TiB(4 TB) RAIDO 65535/255/32 256 KiB 256 KiB Logical Drive 1 600508B1001C912DA9C770D 4EE7039FE Controller Cache ze:3.638 TiB(4 TB) SAS atus:Ok	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
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## 4.6 Typical Scenarios for Replacing a Disk (Legacy Mode)

For a description of the common scenarios for replacing a disk in a RAID volume on a SmartROC 3100 RAID card in legacy mode, refer to Table 4-12.

## Table 4-12 Common Scenarios for Replacing a Disk in a RAID Volume on a SmartROC 3100RAID Controller Card

Scenario	Description
Scenario 1	A newly inserted disk is converted into a RAID member disk. For details, refer to "4.6.1 Converting a Newly Inserted Disk Into a RAID Member Disk".
Scenario 2	After a faulty SmartROC 3100 RAID card is replaced, all the member disks in the RAID 1 array managed by the original faulty RAID card are moved to a new RAID card. For details, refer to "4.6.2 Moving All Member Disks of a RAID 1 Volume".

## 4.6.1 Converting a Newly Inserted Disk Into a RAID Member Disk

### Abstract

To convert a newly inserted disk into a RAID member disk, perform the following operations:

• The newly inserted disk is a foreign disk.

• The disk in a slot is removed and inserted back.

#### Inserting a Foreign Disk as a New Disk

When a disk in a RAID volume created on a server is faulty and needs replacement, remove the faulty disk from the disk slot on the server, and insert the prepared disk into the disk slot of the faulty disk.

After the disk is replaced, the configuration utility of the RAID controller card automatically synchronizes data on the newly inserted disk in the RAID volume.

## III Note

Data is automatically synchronized to the newly inserted disk no matter whether it carries RAID information or not.

#### Installing a Disk in the Original Slot After Removing It from the Slot

After a disk on a server is used to create a RAID volume, if the disk is removed from its slot and then inserted back, the RAID controller card configuration utility automatically rebuild the disk.



The RAID 0 volume does not support the above functions.

## 4.6.2 Moving All Member Disks of a RAID 1 Volume

#### Abstract

If a SmartROC 3100 RAID controller card on a server fails and needs to be replaced, all the member disks in the RAID 1 on the faulty RAID controller card need to be moved to a new SmartROC 3100 RAID controller card.



It is risky to move the member disks of the RAID volume, and therefore it is recommended that you contact VANTAGEO technical support for help.

#### Steps

- 1. Shut down the server, and replace the faulty SmartROC 3100 RAID controller card with a new one.
- Connect all member disks of the RAID 1 be moved to the new SmartROC 3100 RAID controller card.

- 3. Power on the server again and start the server system.
- Start the BIOS configuration utility. For details, refer to "4.2.1 Starting the Configuration Utility".
- 5. Query RAID volume information. For details, refer to "4.4.1 Querying RAID Volume Information".
- 6. Contact VANTAGEO technical support to move member disks.

## 4.7 Typical Scenarios for Replacing a Disk (UEFI Mode)

For a description of the common scenarios for replacing a disk in a RAID volume on a SmartROC 3100 RAID card in UEFI mode, refer to Table 4-13.

## Table 4-13 Common Scenarios for Replacing Disks in a RAID Volume on a SmartROC 3100RAID Controller Card

Scenario	Description
Scenario 1	When a RAID 0 member disk is faulty, the RAID controller card is reconfigured. For details, refer to "4.7.1 A RAID 0 Member Disk Fails".
Scenario 2	When a member disk of a logical volume with no hot spare disk configured is faulty, the faulty disk is replaced. For details, refer to "4.7.2 A Member Disk of a RAID Redundant Logical Volume (With- out a Configured Hot Spare Disk) Fails".
Scenario 3	When a member disk of a logical volume with a hot spare disk configured is faulty, the faulty disk is replaced. For details, refer to "4.7.3 A Member Disk of a RAID Redundant Logical Volume (with a Configured Hot Spare Disk) Fails".

## 4.7.1 A RAID 0 Member Disk Fails

RAID 0 does not support data redundancy or backup. As a result, data cannot be restored after a fault occurs in the RAID 0 logical volume. It is necessary to install a new disk and reconfigure RAID.

## 4.7.2 A Member Disk of a RAID Redundant Logical Volume (Without a Configured Hot Spare Disk) Fails

### Abstract

If a fault occurs in a member disk of a redundant logical volume (with no hot spare disk configured) on a SmartROC 3100 RAID controller card, the SmartROC 3100 RAID controller card can automatically restore the data after the faulty disk is replaced with a new disk. During the process, the member disk status may be **OK**, but the logical disk status may be **Failed**. In this case, you need to restore the logical disk status.

#### Steps

- 1. On the controller management screen, use the arrow keys to select **Array Configuration**, and then press **Enter**. The screen for configuring an array is displayed.
- 2. Use the arrow keys to select **Manage Arrays**, and then press **Enter**. The screen for managing arrays is displayed.
- 3. Use the arrow keys to select the array for which you need to manage the logical volume, and then press **Enter**. The screen for managing the selected array is displayed.
- 4. Use the arrow keys to select **List Logical Drives**, and then press **Enter**. The screen for managing logical volumes is displayed.
- 5. Use the arrow keys to select the logical volume to be corrected, and then press **Enter**. The screen for managing the selected logical volume is displayed.
- 6. Use the arrow keys to select **Re-Enable Logical Drive**, and then press **Enter**. The screen for restoring logical volume status is displayed.
- 7. Press Enter. The status of the logical disk is restored.

#### Verification

On the logical volume management screen, use arrow keys to select **Logical Drive Details**, and then press **Enter**. The logical volume details are displayed. Verify that the logical volume status is **Ok**.

## 4.7.3 A Member Disk of a RAID Redundant Logical Volume (with a Configured Hot Spare Disk) Fails

When a fault occurs in a member disk of a redundant logical volume (with a hot spare disk configured) on a SmartROC 3100 RAID controller card, the RAID controller card automatically replaces the faulty disk with the hot spare disk and restores the data.

- When the hot spare disk is of the **Dedicated** type, the RAID controller card temporarily replaces the faulty disk with the hot spare disk and automatically restores the data. After the faulty disk is replaced with a new disk, the hot spare disk is restored to Hot Spare status.
- When the hot spare disk is of the **Auto Replace** type, the RAID controller card immediately replaces the faulty disk with the hot spare disk and automatically restores the data. After the new disk is inserted, the new disk becomes a hot spare disk.

# Chapter 5 Appendixes

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## 5.1 ARCCONF CLI Tool

During the proper operation of a server, the ARCCONF CLI tool allows you to configure a RAID controller card without restarting the server.

## 5.1.1 Downloading and Installing the ARCCONF Tool

### Abstract

Before using the ARCCONF tool to operate a RAID controller card, you must download and install the ARCCONF tool.

#### Steps

### Downloading the ARCCONF Tool

- On the address bar of the browser on the maintenance PC, enter https://vantageo.com /tools-detail.html?id=9, and then press Enter. The page for downloading the tool is displayed.
- 2. Click the latest version. The page for downloading it is displayed.



For example, the filename of the downloaded tool is " $LogTool\_V01.20.01.02.zip$ ," where "V01.20.01.02" is the tool version number and vary with the update of the tool version. This manual uses the tool of the  $LogTool\_V01.20.01.02.zip$  version as an example to describe how to download and install the ARCCONF tool.

3. Click . The latest version of the tool is downloaded to the maintenance PC.

#### Installing the ARCCONF Tool

- 4. Decompress the LogTool\_V01.20.01.02.zip tool package to the Log-Tool\_V01.20.01.02 folder, and then enter this folder.
- 5. Depending on the server operating system, perform the following operations:

lf	Then	
The OS is Linux	<ul> <li>a. Decompress the LogCollect_linux.tar.gz package in the Log- Tool_V01.20.01.02 folder to the LogCollect_linux folder. Access the LogCollect_linux\components\raid\tools direc- tory. Arcconf-linux in the tools folder is the ARCCONF tool.</li> <li>b. Connect the maintenance PC to the server directly through a network cable, and upload the arcconf-linux file to any directory of the server OS through the SSH tool on the maintenance PC.</li> <li>c. Rename the arcconf-linux file as arcconf.</li> <li>d. Grant the executable permission to the arcconf files.</li> </ul>	
The OS is Windows	<ul> <li>a. Decompress the LogCollect_windows.7z package in the Log- Tool_V01.20.01.02 folder to the LogCollect_windows folder. Access the LogCollect_windows\components\raid\tool- s\x86_64 directory. Arcconf64.exe in the x86_64 folder is the ARCCONF tool.</li> <li>b. On the maintenance PC, upload the arcconf64.exe file to the C :\Windows\System32 directory of the server OS through the SSH tool.</li> <li>c. Rename the arcconf64.exe file as arcconf.exe.</li> </ul>	
The OS is VMware	<ul> <li>a. Use a file transfer tool (for example, Putty) to upload the tool package applicable to VMware to any directory of the server OS. The following uses /tmp as an example.</li> <li>b. Run the following command to install the ARCCONF tool: <ul> <li>esxcli software vib install -v=/tmp/vmware-esx</li> <li>-provider-arcconf.vibno-sig-check</li> <li>In the above command, /tmp/vmware-esx-provider-arc-conf.vib must be the complete path of the ARCCONF tool file.</li> </ul> </li> <li>c. Enter the /opt/pmc (installation path of the ARCCONF tool) directory and execute the commands related to the RAID controller card.</li> </ul>	



If the OS is Linux, the ARCCONF tool can be used only after the executable permission is granted to it. The following command is used to grant the highest permission. You must exercise caution when executing the following command:

# chmod 777 arcconf

## 5.1.2 Common Commands

When you configure a RAID controller card by using the ARCCONF CLI tool, it is recommended that you comply with the initial configuration flow shown in Figure 5-1.

#### **Figure 5-1 Initial Configuration Flow**



## Note

- The ID of a queried RAID controller card is used as a parameter for executing other common commands. For the commands, refer to "5.1.2.1 Querying the Basic Information About a RAID Controller Card".
- The queried available disks and disk slots are used as the parameters of the RAID creation command. For the command, refer to "5.1.2.6 Creating and Deleting a RAID Array".
- A RAID volume is set as the first boot device. For the command, refer to "5.1.2.7 Setting a Boot Device".

### 5.1.2.1 Querying the Basic Information About a RAID Controller Card

#### **Command Function**

This command displays all the RAID controller cards identified by the ARCCONF tool or the basic information about the specified RAID controller card.

#### **Syntax**

- arcconf list
- arcconf list [Controller#]

#### **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-

## **Usage Guidelines**

None

#### Example

• The following example shows how to query the IDs of all RAID controller cards identified by the ARCCONF tool:

# arcconf list

Controllers found: 1	
Controller information	
Controller ID	: Status, Slot, Moda, Nama, SerialNumber, WWN
Controller 1:	: Optimal, Slot 0, RAID (Hide RAW), VT Adaptec SmartIOC2100 SDPSx V2.0, 7193
Command completed succe	ssfully.

For a description of the fields in the command output, refer to Table 5-1.

#### Table 5-1 Descriptions of the Fields in the Command Output

Field	Description
Controller ID	ID of a RAID controller card
Status	Status of a RAID controller card
Slot	Slot number of a RAID controller card
Mode	Work mode of a RAID controller card

• The following example shows how to query information about RAID controller card 1:

#### # arcconf list 1

Controllers found: 1	
Controller information	
Controller ID	i Status, Slot, Mode. Name, Serialwamber, WWN
Controller 1:	: Optimol, Slot 0, RAID (Hido RAw), VY Adaptec Smart10C2100 SDPSc V2.0, 7193
Array Information	
Array ID	: Status (Interface, TotalSize HB, Preespace HB)
Array B Array 1	СК (SATA SSE, 45.1728 МВ, 8 МВ) СК (SATA SSE, 3662336 МС, 8 МВ)
Logical device informat	100
Logical ID	: Status (RAID, Interface, Sizo MB) Namo
Logical 0 Logical 1	: Optimal (0, Data, 457830 MD) system : Optimal (1, Data, 1831380 MB) test
Physical Device inform	tion
Physical ID	: State (Interface, GlockSize, Size#E, Vander, Medel, Type) W#W, [lecation]
Physicsl 0,0 Physicsl 0,1 Physicsl 0,2 Physicsl 0,4 Physicsl 0,4 Physicsl 0,6 Physicsl 0,7 Physicsl 0,1 Physicsl 0,3	Peady (SXTA, 512 Bytes, 1335:03040, ATK , ST14090100061-2T, Hard Drive) 3012245670040602, [Enclosure Birect Attached, Slet 0(Connector Dicho]] Neady (SXTA, 512 Bytes, 1335:04040, ATK , ST14090100061-2T, Hard Drive) 3012245670040603, [Enclosure Birect Attached, Slet 1(Connector Dicho]] Neady (SXTA, 512 Bytes, 1335:04040, ATK , ST14090100061-2T, Hard Drive) 3012345670040603, [Enclosure Birect Attached, Slet 1(Connector Dicho]] Online (SXTA, 512 Bytes, 1335:0404, ATK , SAMENKE (ST1570, Self State Drive) 301245670040603, [Enclosure Birect Attached, Slet 3(Connector Dicho]] Online (SXTA, 512 Bytes, 1831-2004, ATK , SAMENKE (ST1570, Self State Drive) 301245670040603, [Enclosure Birect Attached, Slet 3(Connector Dicho]] Online (SXTA, 512 Bytes, 1831-2004, ATK , SAMENKE (ST1570, Self State Drive) 30124567040607, [Enclosure Birect Attached, Slet 3(Connector Dicho]] Poady (SXTA, 512 Bytes, 1831-2004, ATK , SAMENKE (SLET), Self State Drive) 30124567040607, [Enclosure Birect Attached, Slet 3(Connector Dicho]] Poady (SXTA, 512 Bytes, 200520000, ATK , SAMENKE (SLET), Self State Drive) 30124567040607, [Enclosure Birect Attached, Slet 3(Connector Dicho]] Poady (SXTA, 512 Bytes, 200520000, ATK , SAMENKE (SLET), Self State Drive) 30124567040607, [Enclosure Birect Attached, Slet 3(Connector Dicho]] Poady (SXTA, 512 Bytes, 200520000, ATK , SAMENKE (SLET), Self State Drive) 30124567040000, [Enclosure Birect Attached, Slet 3(Connector Dicho]] Poady (SXTA, 512 Bytes, 3012600, ATK , SAMENKE (SLET), Self State Drive) 301234570340400, [Enclosure Birect Attached, Slet 3(Connector Dicho)] Poady (SXTA, 512 Bytes, 3012600, ATK , SAMENKE (SLET), Self State Drive) 30123457034000, [Enclosure Birect Attached, Slet 3(Connector Attached, Slet 3)] Poady (SXTA, SLED), Attached, SLEt 3(Connector Attached, Slet 3(Connector Attached, Slet 3(Connector Attached, Slet 3)] Poady (SXTA, SLED), Attached, SLET 3(Connector

For a description of the fields in the command output, refer to Table 5-2.

Field	Description
Array ID	ID of the disk array
Logical ID	ID of the virtual disk
Physical ID	ID of the physical disk

## 5.1.2.2 Querying the Detailed Information About a RAID Controller Card

### **Command Function**

This command displays detailed information about a RAID controller card, disk array, virtual disk, and physical disk.

### Syntax

arcconf getconfig <Controller#> [AD | LD [LD#] | AR [AR#] | PD [Channel# ID# Channel# ID#...]| MC | CN | [AL]] [nologs]

#### **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
AD	Specifies that RAID controller card attributes are queried	-
LD	Specifies that virtual disk attributes are queried	-
[LD#]	ID of a virtual disk	-
[AR#]	ID of a disk array	-
PD	Specifies that physical disk attributes are queried	-
<channel# id#=""></channel#>	Channel ID (slot number) of a disk	-
MC	Specifies that the maximum cache infor- mation is queried	-
CN	Specifies that the RAID controller card in- formation is queried	-
[AL]	Specifies that all device information is queried	-

## **Usage Guidelines**

None

## Example

• The following example shows how to query the information about a RAID controller card:

# arcconf getconfig 1 ad

Controllers Tound: 1	
Controller information	
Controller Status Controller Mode Channel description Controller Model Controller Serial Number Controller World Wide Name Physical Slot Temperature Host bus type Host bus speed Host bus link width PCI Address (Bus:Device:Function) Number of Ports Internal Port Count External Port Count Defunct disk drive count NCQ status Queue Depth Monitor and Performance Delay Elevator Sort Degraded Mode Performance Optimization Latency Statistics data collection mode Post Prompt Timeout Boot Controller Primary Boot Volume Driver Supports SSD I/O Bypass Manufacturing Part Number Manufacturing Spare Part Number Manufacturing Wellness Log NVRAM Checksum Status Sanitize Lock Setting	<pre>: Optimal : RAID (Hide RAW) : SCSI : VT Adaptec SmartIOC2100 SDPSx V2.0 : 71934 : 50123456789ABC00 : 0 : 46 C/ 114 F (Normal) PCIe 3.0 : 7880 MBps : 8 bit(s)/link(s) : 0:3c:0:0 : 5 : 5 : 0 : 0 : Enabled : Automatic : 60 minutes : Enabled : Disabled : Disabled : Disabled : Disabled : Disabled : Disabled : Disabled : Disabled : Seconds : False : None : Smartpqi : Yes : Not Applicable : Not Applicable : None : Passed : None</pre>
Power Settings	
Power Consumption Current Power Mode Pending Power Mode Survival Mode	: Not Available : Maximum Performance : Not Applicable : Enabled
12C Address	: 0x0
Cache Properties	

Default Default Default
2/0/0 Disabled High D seconds Enabled L Disabled Disabled Medium Medium
2.66[0] _inux 1.1.4-115 A
9 37 deg C 46 deg C Inlet Ambient
l 46 deg C 56 deg C ASIC

For a description of the fields in the command output, refer to Table 5-3.

#### Table 5-3 Descriptions of the Fields in the Command Output

Field	Description
Controller Status	Status of the RAID controller card
Controller Mode	Work mode of the RAID controller card
Controller Model	Model of the RAID controller card

Field	Description
Firmware	Firmware version of the RAID controller card
Driver	Driver version of the RAID controller card

• The following example shows how to query the information about array 1:

# arcconf getconfig 1 ar 1

Controllers found: 1	
Array Information	
Array Number 1 Name Status Interface Total Size Unused Size Block Size Array Utilization Type Transformation Status Spare Rebuild Mode SSD I/O Bypass	: B : Ok : SATA SSD : 3662336 MB : 0 MB : 512 Bytes : 100.00% Used, 0.00% Unused : Data : Not Applicable : Dedicated : Enabled
Array Logical Device Information	
Logical 1	: Optimal (1, Data, 1831388 MB) test
Array Physical Device Information	

• The following example shows how to query the information about virtual disk 1:

# arcconf getconfig 1 ld

Controllers found: 1	
Logical device information	
Logical Device number 0 Logical Device name Disk Name Block Size of member drives Array RAID level Status of Logical Device Size Stripe-unit size Full Stripe Size Interface Type Device Type Boot Type Heads Sectors Per Track Cylinders Caching Mount Points LD Acceleration Method Volume Unique Identifier	<pre>: system //dev/sdd S12 Bytes 0 1 Optimal 457830 MB 256 KB 256 KB SATA SSD Data None 255 S25 32 65535 Enabled //boot/efi 200 MB Partition Number 1 /boot 1024 MB Partition Number 2 Controller Cache 600508B1001C1FF69AB000FC028B878C</pre>
Array Physical Device Information	
Device 16 Device 17	: Present (457862MB, SATA, SSD, Channel:0, Device:16) PHYS7295555 : Present (457862MB, SATA, SSD, Channel:0, Device:17) BTHC450456555555555555555555555555555555555

For a description of the fields in the output displayed after the command for querying virtual disk 1 is executed, refer to Table 5-4.

#### Table 5-4 Description of the Fields in the Command Output

Parameter	Description
Logical Device name	Name of the virtual disk
Disk Name	Drive letter of the virtual disk
Array	ID of the virtual disk
RAID level	RAID level
Status of Logical Device	RAID status
Boot Type	Boot type of the virtual disk
Caching	Whether cache is enabled

• The following example shows how to query the information about the disk in slot 5:

# arcconf getconfig 1 pd 0 5

Controllers found: 1	
Physical Device information	
Device #0 Device is a Hard drive State Drive has stale RIS data Block Size Physical Block Size Transfer Speed Reported Channel,Device(T:L) Reported Location Array Vendor	: Online : False : 512 Bytes : 4K Bytes : SATA 6.0 Gb/s : 0,5(5:0) : Enclosure Direct Attached, Slot 5(Connector 1:CN1) : 1 : ATA

## 5.1.2.3 Querying Virtual Disk Information

### **Command Function**

This command displays virtual disk information.

#### Syntax

arcconf getconfig <Controller#> LD [LD#]

#### **Syntax Description**

Parameter	Description	Range
<controller#></controller#>	ID of the RAID controller card that the disks are connected to	-
LD	Specifies that virtual disk attributes are queried	-
[LD#]	ID of a virtual disk	-

#### **Usage Guidelines**

None

#### Example

The following example shows how to display the information about all virtual disks in RAID con-

troller card 1:

# arcconf getconfig 1 ld



For a description of the fields in the command output, refer to Table 5-5.

#### Table 5-5 Descriptions of the Fields in the Command Output

Field	Description
Logical Device name	Name of the virtual disk
Disk Name	Drive letter of the virtual disk
Array	ID of the virtual disk
RAID level	RAID level of the virtual disk
Status of Logical Device	RAID status
Boot Type	Boot type of the virtual disk
Caching	Whether the caching function is enabled

#### 5.1.2.4 Querying Physical Disk Information

#### **Command Function**

This command displays physical disk information.

#### Syntax

arcconf getconfig <Controller#> PD [Channel# ID# Channel# ID#...]

#### **Syntax Description**

Parameter	Description	Range
<controller#></controller#>	ID of the RAID controller card that the disks are connected to	-
PD	Specifies that physical disk attributes are queried	-
<channel# id#=""></channel#>	Channel ID (slot number) of a physical disk	-

#### **Usage Guidelines**

None

#### Example

The following example shows how to display the information about the physical disk in slot 5: # arcconf getconfig 1 pd 0 5

Controllers found: 1	
Physical Device information	
Device #0 Device is a Hard drive State Drive has stale RIS data Block Size Physical Block Size Transfer Speed Reported Channel,Device(T:L) Reported Location Array Vendor	: Online : False : 512 Bytes : 4K Bytes : SATA 6.0 Gb/s : 0,5(5:0) : Enclosure Direct Attached, Slot 5(Connector 1:CN1) : 1 : ATA

#### 5.1.2.5 Querying the Firmware/Driver Version of a RAID Controller Card

#### **Command Function**

This command displays the firmware/driver version of a RAID controller card.

#### Syntax

arcconf getversion [Controller#]

#### **Syntax Description**

Parameter	Description	Setting
[Controller#]	ID of a RAID controller card	-

#### **Usage Guidelines**

None

#### Example

The following example shows how to query the firmware/driver version of the RAID controller card whose ID is 1:

# arcconf getversion 1

Controllers found: 1 Controller #1	
============= Firmware Driver	: 2.66[0] (0) : Linux 1.1.4-115 (0)
Command completed successfully.	

For a description of the fields in the command output, refer to Table 5-6.

#### Table 5-6 Descriptions of the Fields in the Command Output

Field	Description
Firmware	Firmware version of the RAID controller card
Driver	Driver version of the RAID controller card

#### 5.1.2.6 Creating and Deleting a RAID Array

#### **Command Function**

The following commands create and delete a RAID array.

#### Syntax

- arcconf create <Controller#> logicaldrive [Options] <Size> <RAID#> <Channel# ID#> [Channel# ID#] ... [noprompt] [nologs]
- arcconf delete <Controller#> logicaldrive <Id#> [noprompt] [nologs]

#### **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
[Options]	Options for creating a RAID ar- ray	<ul> <li>stripesize: optional, specifying the stripe size in KB, range: 16, 32, 64, 128*, 256, 512, 1024.</li> <li>legs: optional parameter, specifying the number of sub-logical devices.</li> </ul>

Parameter	Description	Setting
		<ul> <li>name: optional, used to specify the name of the logical disk.</li> <li>method: initialization method of the logical device. Valid options include BUILD and DEFAULT.</li> <li>wcache: write cache setting of the logical device. Valid options include WT and WB.</li> <li>Idcache: sets the cache of the logical device. Valid options include LON and LOFF.</li> <li>ssdoverprovisioningoptimization <enable disable=""  ="">: specifies the initialization to support the fast parity check function.</enable></li> <li>cachelinesize: specifies the size of the maximum cache. The default value is 64.</li> </ul>
<size></size>	Logical device size (MB). You can set it to all available space by using the MAX keyword.	-
<raid#></raid#>	RAID level	RAID 0, RAID 1, RAID 1ADM, RAID 10, RAID 10ADM, RAID 5, RAID 6, RAID 50, RAID 60
<channel# id#=""></channel#>	Channel ID (slot number) of a disk	-
<ld#></ld#>	ID of a virtual disk	-

#### **Usage Guidelines**

By default, the disks without data are used to create a RAID array.

#### Example

The following example shows how to query available disks. In the command output, the disk whose State is Ready can be used to create a RAID array, and the disk whose State is On-line has been used to create a RAID array.

# arcconf getconfig 1 pd
# vantageo

Controllers found: 1	
Physical Device information	
Channel #0: Device #0	
Device H0 Device is a Hard drive State Drive has stale RIS data Block Size Physical Block Size Transfer Speed Reported Channel.Device(T:L) Reported Location Array Vendor Model Firmware Serial number World-wide name Reserved Size Unused Size Unused Size Unused Size Write Cache S.M.A.R.T. S.M.A.R.T. warnings SSD Device On Boot Connector NCQ supported NCQ status Boot Type	<pre>: Onlinc False : False : S12 Bytes : Af Bytes : Af Bytes : SATA 6.8 Gb/s : 0,00000 : Direct Attached, Slot 0(Connector 0:CN0) : Direct Attached, Slot 0(Connector 0:CN0) : 0 : ATA : Micron_5300_MTFD : DisMU001 : 21022CAFD044 : 21022CAFD044 : 32768 KB : 457830 MB : 457830 MB : 457862 MB : 0 MB : 457862 MB : Disabled (write-through) : No : 0 : Yes : No : Supported : Enabled : None</pre>
Current Temperature Maximum Temperature Threshold Temperature PHY Count Drive Configuration Type	: 28 deg C : 47 deg C : 78 deg C : 1 : Data
Drive Exposed to OS Sanitize Erase Support Sanitize Lock Freeze Support Sanitize Lock Anti-Freeze Support Sanitize Lock Setting	: False : True : True : Truc : None
Usage Remaining Estimated Life Remaining SSD Smart Trip Wearout 56 Day Warning Present Drive Unique ID Drive SUI Number	: 100 percent : Not Applicable : False : False : 6C0D214B7B889236EEB49804E39D9427 : Not Amplicable

• The following example shows how to create RAID 1:

# arcconf create 1 logicaldrive stripesize 64 name test max 1 0 4 0 5



# • The following example shows how to delete the virtual disk whose ID is 1:

# arcconf delete 1 logicaldrive 1



# 5.1.2.7 Setting a Boot Device

# **Command Function**

The following two commands set a RAID volume or physical disk as a boot device.

- The configuration takes effect when the work mode of a RAID volume on a RAID controller card is mixed or RAID.
- The configuration takes effect when the work mode of a physical disk on a RAID controller card is HBA or mixed.

# Syntax

- arcconf setboot <Controller#> logicaldrive <LogicalDrive#> type <Boot Type>
- arcconf setboot <Controller#> device <Channel# ID#> type <Boot Type>

# Syntax Description

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
<logicaldrive#></logicaldrive#>	ID of a virtual disk	-
<boot type=""></boot>	Boot order	<ul> <li>Primary: sets the virtual disk or physical disk as the primary boot device.</li> <li>Secondary: sets the virtual disk or physical disk as the sec- ondary boot device.</li> </ul>
<channel# id#=""></channel#>	ID of a physical disk	-

# **Usage Guidelines**

None

# Example

• The following example shows how to set virtual disk 0 as the primary boot device:

# arcconf setboot 1 logicaldrive 0 type Primary

```
Controllers found: 1
Do you wish to change the boot type of the selected device.
Press y, then ENTER to continue or press ENTER to abort: y
Command completed successfully.
```

The following example shows how to set the disk in slot 6 as the secondary boot device:
 # arcconf setboot 1 device 0 6 type Secondary

Controllers found: 1 Do you wish to change the boot type of the selected device. Press y, then ENTER to continue or press ENTER to abort: y

Command completed successfully.

# 5.1.2.8 Setting a Hot Spare Disk

# **Command Function**

This command sets a global or dedicated hot spare disk.

# Syntax

arcconf setstate <Controller#> device <Channel# ID#> <State> [ARRAY <AR#> [AR#] ... ] [SPARETYPE <TYPE>] [noprompt] [nologs]

# **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
<channel# id#=""></channel#>	Channel ID (slot number) of a disk	-
<state></state>	Adds or deletes a hot spare disk	<ul> <li>HSP: adds a hot spare disk for one or more arrays</li> <li>RDY: deletes a hot spare disk</li> </ul>
[ARRAY <ar#> [AR#] ]</ar#>	ID of a virtual disk	-
[SPARETYPE <type>]</type>	Sets the replacement mode of the hot spare disk	<ul> <li>1: dedicated spare, which can be shared between arrays</li> <li>2: automatically replaced but cannot be shared between ar- rays</li> </ul>

# **Usage Guidelines**

None

# Example

• The following example shows how to set the disk in slot 6 as a dedicated hot spare disk: # arcconf setstate 1 device 0 6 hsp array 1 sparetype 2

# Controllers found: 1

Any existing hot-spare drives of a different sparetype will be removed. Command completed successfully.

• The following example shows how to cancel the disk in slot 6 as a dedicated hot spare disk: # arcconf setstate 1 device 0 6 rdy

Controllers found: 1 Command completed successfully.

# 5.1.2.9 Setting the Work Mode of a RAID Controller Card

# **Command Function**

This command sets the work mode of a RAID controller card.

# **Syntax**

arcconf setcontrollermode <Controller#> <Controller Mode>

# **Syntax Descriptions**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
<controller mode=""></controller>	Work mode of the RAID con- troller card	<ul> <li>2: indicates HBA mode. This mode does not allow RAID array creation. All hard disks are reported to the OS as raw disks.</li> <li>3: indicates RAID mode. The RAID controller card only reports the disks that form a RAID array to the OS.</li> <li>5: indicates Mixed mode. The RAID controller card reports that the RAID disks that form a RAID array. If a disk has no RAID configuration information, the RAID controller card reports to the OS as a raw disk. The OS can directly operate the disk.</li> </ul>

# **Usage Guidelines**

None

# Example

• The following example shows how to set the work mode of a RAID controller card to RAID: # arcconf setcontrollermode 1 3 Controllers found: 1 Command completed successfully.

• The following example shows how to query the work mode of a RAID controller card:

# # arcconf getconfig 1

Controllers found: 1	
Controller information	
Controller Status	• Optimal
Controller Mode	: RAID (Hide RAW)
Channel description	: SCSI
Controller Model	: VT Adaptec SmartIOC2100 SDPSx V2.0

# 5.1.2.10 Setting the Read/Write Cache Ratio of a RAID Controller Card

# **Command Function**

This command sets the respective percentage of the read cache and write cache of a RAID controller card.

# **Syntax**

arcconf setcache <Controller#> cacheratio read write

# **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
read	Percentage of the read cache	0–100
write	Percentage of the write cache	0–100

#### **Usage Guidelines**

The sum of the percentage of the read cache and that of the write cache is 100%.

# Example

The following example shows how to set the percentage of the read cache to 50% and that of the write cache to 50%:

# arcconf setcache 1 cacheratio 50 50

Controllers found: 1

Command completed successfully.

# 5.1.2.11 Setting the Caching Policy

# **Command Function**

This command enables or disables the caching function for a virtual disk.

# Syntax

- arcconf setcache <Controller#> logicaldrive <LogicalDrive#> con
- arcconf setcache <Controller#> logicaldrive <LogicalDrive#> coff

# **Syntax Description**

Parameter	Description	Range
<controller#></controller#>	ID of a RAID controller card	-
<logicaldrive#></logicaldrive#>	ID of a virtual disk	-

#### **Usage Guidelines**

None

# Example

• The following example shows how to enable the caching function for virtual disk 0: # arcconf setcache 1 logicaldrive 0 con

Controllers found: 1

Cache mode is already set to Enabled.

Command aborted.

The following example shows how to disable the caching function for virtual disk 0:
 # arcconf setcache 1 logicaldrive 0 coff

Controllers found: 1

Command completed successfully.

# 5.1.2.12 Using Cache Without a Capacitor

# **Command Function**

This command enables the use of the cache of a RAID controller card without a capacitor.

# **I**Notice

If the cache of the RAID controller card is used when there is no capacitor, data may be lost if the RAID controller card is powered off. Therefore, you must use this command with caution.

#### **Syntax**

arcconf setcache <Controller#> nobatterywritecache enable

#### **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-

#### **Usage Guidelines**

None

# Example

The following example shows how to enable the use of the cache of a RAID controller card without a capacitor:

# arcconf setcache 1 nobatterywritecache enable

Controllers found: 1

WARNING : Enabling write caching on a cache module without a fully charged battery or capacitor could cause data loss in the event of a power failure.

Are you sure you want to continue? Press y, then ENTER to continue or press ENTER to abort: y

Command completed successfully.

# 5.1.2.13 Setting a Disk as a Pass-Through Disk

# **Command Function**

After a disk is set as a pass-through disk, the OS can directly manage it.

# Syntax

arcconf uninit <Controller#> [Channel# ID#] ... [nologs]

#### **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
[Channel# ID#]	Channel ID (slot number) of a disk	-

# **Usage Guidelines**

None

# Example

The following example shows how to set the disk in slot 5 as a pass-through disk: # arcconf uninit 1 0 5



# 5.1.2.14 Querying and Setting the Write Cache Policy for Disks

# **Command Function**

The following commands query and set the write cache policy for disks.

# **Syntax**

- arcconf getconfig <Controller#> logicaldrive ad
- arcconf setcache <Controller#> drivewritecachepolicy <drivetype> <cachepolicy> <drivetype> <cachepolicy>...

# **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
<drivetype></drivetype>	Type of disk for which you want to set the write cache policy	<ul> <li>Configured: sets the write cache policy for RAID member disks in RAID or mixed mode.</li> <li>Unconfigured: sets the write cache policy for non-RAID member disks in RAID or mixed mode.</li> <li>HBA: set the write cache policy for disks in HBA mode.</li> </ul>
<cachepolicy></cachepolicy>	Write cache policy	<ul> <li>0: Default (keeps the default status)</li> <li>1: Enabled (enables write caching)</li> <li>2: Disabled (disables write caching)</li> </ul>

# **Usage Guidelines**

None

### Example

• The following example shows how to set the write cache policy for disks in **Configured** status to **Enabled** and set the write cache policy for disks in **Unconfigured** status to **Disabled**:

# arcconf setcache 1	I drivewritecachepolicy Configured 1 Unconfigured 2
Controllers found: 1	

Enabling controller drive write cache can increase write performance but risks losing the data in the cache on sudden loss.

Command completed successfully.

• The following example shows how to query the write cache policy for disks: # arcconf getconfig 1 ad

Controllers found: 1		
Controller information		
Controller Statue	: Optimal	
Controller Mode	:Mixed	
Channel description	:SCSI	
Physical Drive Write Cache Policy	′ Information	
Configured Drives	:Enabled	
Unconfigured Drives	:Disabled	
HBA Drives	:Default	

# 5.1.2.15 Setting the Status of a Disk Locating Indicator

# **Command Function**

This command turns on or off a disk locating indicator.

# Syntax

- arcconf identify <Controller#> all [TIME <BlinkTime>] [STOP] [nologs]
- arcconf identify <Controller#> logicaldrive <logicaldrive#> [TIME <BlinkTime>] [nologs]
- arcconf identify <Controller#> device <Channel# ID#> [TIME <BlinkTime>] [nologs]

# **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
[TIME <blinktime>]</blinktime>	Time period (in seconds) that the locating indicator is lit for	-
[STOP]	Specifies that the locating indicator is off	-
<logicaldrive#></logicaldrive#>	ID of a virtual disk	-
<channel# id#=""></channel#>	Channel ID (slot number) of a physical disk	-

# **Usage Guidelines**

None

# Example

• The following example shows how to light the locating indicators of disks in RAID group 1 for 5 seconds:

# arcconf identify 1 logicaldrive 1 time 5

```
Controllers found: 1
Only devices managed by an enclosure processor may be identified
Command completed successfully.
```

 The following example shows how to light the locating indicators of disks in slot 7 for 30 seconds:

# arcconf identify 1 device 0 7 time 30

```
Controllers found: 1
Only devices managed by an enclosure processor may be identified
Command completed successfully.
```

• The following example shows how to turn off the locating indicators of disks in all slots: # arcconf identify 1 all stop

```
Controllers found: 1
No devices are blinking.
Command aborted.
```

# 5.1.2.16 Modifying the RAID Stripe Size

# **Command Function**

This command modifies the RAID stripe size.

# **Syntax**

arcconf modify <Controller#> from <LogicalDrive#> to stripesize <STRIPE> <Size> <RAID#> <Channel# ID#> [Channel# ID#] ... [noprompt] [nologs]

Parameter	Description	Range
<controller#></controller#>	ID of a RAID controller card.	-
<logicaldrive#></logicaldrive#>	ID of the virtual disk to be set.	-
<stripe></stripe>	Stripe size to be set.	16, 32, 64, 128, 256, 512, and 1024. Unit: KB.
<size></size>	Size of the virtual disk. The <b>max</b> parameter can be used to specify all the available space of the virtual disk.	Unit: MB.
<raldependence <ra="">RAID#&gt;</raldependence>	RAID level of the virtual disk.	-
<channel# id#=""> [Channel# ID#]</channel#>	Channel ID (slot number) of the vir- tual disk.	-

# **Syntax Description**

# **Usage Guidelines**

- The noprompt parameter is used in the command to indicate forcible execution.
- If the **nologs** parameter is specified, this command is not executed when data is stored in the virtual disk.
- The stripe size and RAID capacity cannot be modified at the same time.
- When the RAID capacity is set to the maximum value and the stripe size needs to be modified, the **max** parameter cannot be used in the command to represent a number.



For example, the **Changing the size and the stripe size simultaneously is not allowed** message is displayed if the following command is executed to modify the stripe size: # arcconf modify 1 from 1 to stripesize 256 max 0 0 3 The following command can be executed to modify the stripe size: # arcconf modify 1 from 1 to stripesize 256 915683 0 0 3

# Example

The following example shows how to modify the stripe size to 128 KB without adding any hard disk:

# arcconf modify 1 from1 to stripesize 128 1831388 1 0 4 0 5

```
Controllers found: 1
Reconfiguration of a logical device is a long process. Are you sure you want to continue?
Press y, then ENTER to continue or press ENTER to abort: y
Reconfiguring logical device: test
Command completed successfully.
```

# 5.1.2.17 Setting the Initialization Function for a Physical Disk

# **Command Function**

The following two commands set the initialization function for a physical disk and query the task status of the physical disk.

# **Syntax**

- arcconf task start <Controller#> device <Channel# ID#> <task> [PATTERN <erasePattern>][noprompt]
- arcconf task stop <Controller#> device <Channel# ID#>

# **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
<channel# id#=""></channel#>	Channel ID (slot number) of a disk	-
<task></task>	Task type	secureerase: securely erases disk data
[PATTERN <erasepat- tern&gt;]</erasepat- 	Initialization type	<ul> <li>1: zero initialization, which initializes all blocks as zero</li> <li>2: random zero initialization, which randomly initializes blocks as zero</li> <li>2: random zero initialization, which randomly initializes blocks as zero</li> <li>4: enables the physical devices (HDDs and SSDs) to change the encryption key to prevent correct decryption of previously stored information.</li> <li>5: block erasing and clearing method, applicable to SSDs only</li> </ul>

Parameter	Description	Setting	
		• 6: overwrites user data with specific pattern	
		data, applicable to HDDs only	

# Usage Guidelines

Because the command uses the **noprompt** parameter to indicate forcible execution, which omits the reconfirmation operation during the setting process. Therefore, the **noprompt** parameter is not recommended.

# Example

• The following example shows how to initialize the disk in slot 5:

# arcconf task start 1 device 0 5 secureerase

```
Controllers found: 1
Secure erase of a Hard drive is a long process.
Warning: Rebooting the machine would stop the Secure erase task.
Are you sure you want to continue?
Press y, then ENTER to continue or press ENTER to abort: y
Secure Erasing Channel 0, Device 5.
Command completed successfully.
[root@localhost home]#
```

• The following example shows how to query task status:

# arcconf getstatus 1

Controllers found: 1		
Physical Device Task:		
Channel,Device	:	0,5
Task ID	:	100
Current operation	:	Secure Erase(Zero)
Status	:	In Progress
Priority	:	High
Percentage complete	:	Θ
Command completed successfully.		
[root@localhost home]#		

# 5.1.2.18 Setting the Priority of a Background Task

# **Command Function**

This command sets and applies the priority of a background task.

# Syntax

- arcconf setpriority <Controller#> priority [current]
- arcconf setpriority <Controller#> [Task ID#] <New Priority> [current]

# **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
[Task ID#]	Task type	<ul><li>rebuild: rebuild</li><li>expand: expansion</li></ul>
<new priority=""></new>	Task priority	<ul> <li>high: high priority</li> <li>medium: medium priority</li> <li>low: low priority</li> </ul>

# **Usage Guidelines**

None

#### Example

The following example shows how to set and apply the priority of a background rebuild task to medium:

# arcconf setpriority 1 rebuild medium

Controllers	found:	1
Command com	oleted	successfully.
[root@local	host ho	me]#

# 5.1.2.19 Querying Disk Array Rebuild Status

# **Command Function**

This command queries the rebuild status of disk arrays on a RAID controller card.

# **Syntax**

arcconf getstatus [Controller#]

#### **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-

# **Usage Guidelines**

None

# Example

The following example shows how to query the rebuild status of disk arrays on RAID controller card 1:

# arcconf getstatus 1



For a description of the fields in the command output, refer to Table 5-7.

#### Table 5-7 Description of the Fields in the Command Output

Field	Description
Logical Device	ID of the virtual disk
Current operation	Current operation
Status	Status
Priority	Priority
Percentage complete	Completion percentage

# 5.1.2.20 Setting Consistency Check Status

# **Command Function**

This command enables the consistency check function.

# Syntax

arcconf consistencycheck <Controller#> <On [Delay]|Off> [noprompt] [nologs]

# **Syntax Description**

Parameter	Description	Setting
<controller#></controller#>	ID of a RAID controller card	-
<on [delay] off=""></on>	Consistency check status	<ul><li>on: enabled</li><li>off: disabled</li></ul>

# **Usage Guidelines**

None

# Example

The following example shows how to enable the automatic consistency check function:

# arcconf consistencycheck 1 on

Controll	ers foun	d: 1	
Command	complete	d succes	sfully.

# 5.1.2.21 Upgrading Firmware

# **Command Function**

This command upgrades the firmware of a RAID controller card.

# **Syntax**

arcconf romupdate controller\_id fwfile

# **Syntax Description**

Parameter	Description	Setting
controller_id	ID of a RAID controller card	-
fwfile	Name of the .bin file required for firmware upgrade	-

# **Usage Guidelines**

None

# Example

The following example shows how to upgrade the firmware of a RAID controller card:

# arcconf romupdate 1 SmartFWx100.bin

Controllers found: 1

Are you sure you want to continue? Press y, then ENTER to continue or press ENTER to abort: y Updating controller 1 firmware... Succeeded You must restart the system for firmware updates to take effect.

Command completed successfully.

# 5.1.2.22 Collecting Firmware Logs

# **Command Function**

This command collects firmware logs of a RAID controller card.

#### Syntax

arcconf savesupportarchive

#### **Syntax Description**

None

```
Usage Guidelines
```

None

# Example

The following example shows how to collect firmware logs of a RAID controller card: # arcconf savesupportarchive

	Firmware	:	saves	Firmware logs
	GUI	:	saves	GUI logs
	Arcconf	:	saves	Arcconf logs
	StorLib	:	saves	StorLib logs
	Basecode	:	saves	Basecode logs
	Redfish	:	saves	Redfish logs
۲he	path is not sp	e	ified,	Using the default.
The	logs are saved	Ιi	n rele	vant folders in /var/log/Support

```
Command completed successfully.
```

# 5.2 Configuring RAID Through the VROC

Intel<sup>®</sup>VROC is a hybrid RAID storage solution for NVMe SSDs directly connected to CPUs. With the support of NVMe VROC Key, the VROC can create virtual RAID arrays on a CPU to implement the RAID function.

The advantage of the VROC is that it combines the RAID function and the strong performance of NVMe SSDs. That is, it can directly connect the NVMe SSDs to the PCIe channel of a CPU without the need to use the RAID HBA, avoiding the complexity and power consumption of traditional hardware.

# 5.2.1 Preparations

Before you configure RAID through the VROC, you need to make the following preparations:

- Make sure the cables, NVMe SSDs and NVMe VROC Key are installed correctly.
- Make sure that the server CPU supports the VROC function.
- Make sure that the model of the NVMe VROC Key matches the brand model of the NVMe SSDs. For the specifications of the NVMe VROC Key, refer to Table 5-8.

Model	Brand	Supported RAID Level	Supported NVMe SSD
VROCPREMMOD 951606	Intel	RAID 0/1/5/10	Third-party NVMe SSDs except for those of the Intel brand
VROCSTANMOD 951605	Intel	RAID 0/1/10	Third-party NVMe SSDs except for those of the Intel brand
VROCISSDMOD 956822	Intel	RAID 0/1/5/10	NVMe SSDs of the Intel brand

### Table 5-8 NVMe VROC Key Specifications



NVMe SSDs include those of the Intel brand and third-party ones. The NVMe SSDs are directly connected to CPUs through PCIe channels to implement high-rate read and write operations.

# 5.2.2 Enabling the VMD Function

# Abstracts

VMD is an Intel NVMe SSD deployment solution. It supports online upgrade and replacement of NVMe SSDs from the PCIe bus on the server CPU. Therefore, if the VMD function is enabled, the operation and maintenance of the NVMe SSDs can be completed online without interrupting the kernel services.

#### Steps

1. Start the server system, and press the **F2/DEL** key as prompted. The **Aptio Setup** screen is displayed, see Figure 5-2.

#### Figure 5-2 Aptio Setup Screen

	Aptio Setup	- AMI			
Main Advanced	Platform Configuration	Socket	Configuration	Server Mgmt	•
					1
BIUS Information					
BIOS Version	09.00.00.01				
Build Date	05/15/2022				
Product Name	N/A				
Serial Number	N/A				
Asset Tag	N/A				
Platform Informa	tion				
Platform	TypeArcherCityR	P			-
Processor	806F3 - SPR-SP	Dx	++: Select	Screen	
PCH	EBG AO SKU - BO		↑↓: Select	Item	
RC Revision	76.D27		Enter: Sele	ect	
BIOS ACM	1.0.4		+/-: Change	e Opt.	
SINIT ACM	1.0.3		F1: General	. Help	
			F2: Previou	s Values	
Memory Informati	on		F3: Optimiz	ed Defaults	
Total Memory	16384 MB		▼ F4: Save &	Exit	
			ESC: Exit		
	Version 2.22.1283 Copyr	ight (C)	2022 AMI		
				AE	B

2. Use the arrow keys to select **Socket Configuration**, and press **Enter**. The **Socket Configuration** screen is displayed, see Figure 5-3.

# Figure 5-3 Socket Configuration Screen

Aptio Setup – AM Main Advanced Platform Configuration <mark>Soc</mark>	I ket Configuration <mark>Server Mgmt ♪</mark>
<ul> <li>Processor Configuration</li> <li>Common RefCode Configuration</li> <li>Uncore Configuration</li> <li>Memory Configuration</li> <li>IIO Configuration</li> <li>Advanced Power Management Configuration</li> </ul>	Displays and provides option to change the IIO Settings ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.22.1283 Copyright	(C) 2022 AMI AB

3. Use the arrow keys to select **IIO Configuration**, and then press **Enter**. The **IIO Configuration** screen is displayed, see Figure 5-4.

#### Figure 5-4 IIO Configuration Screen



Use the arrow keys to select Intel® VMD technology, and then press Enter. The Intel® VMD technology screen is displayed, see Figure 5-5.

# Figure 5-5 Intel® VMD Technology Screen

Aptio Setup – AMI Socket	Configuration
Intel VMD technology 	Enable/Disable Intel® Volume Management Device Technology.
<ul> <li>Intel® VMD Support [Disable]</li> <li>Intel VMD for Volume Management Device on Socket 0</li> <li>Intel VMD for Volume Management Device on Socket 1</li> </ul>	
	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit ESC: Exit</pre>
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5. Use the arrow keys to select Intel® VMD Support, and press Enter. In the displayed dialog box, switch Disabled to Enabled, and press Enter to save the configuration, see Figure 5-6

.

# Figure 5-6 Confirming the Configuration



Press Esc multiple times until the Socket Configuration screen is displayed, see Figure 5-7.

# Figure 5-7 Socket Configuration Screen

Main Ad	vanced Platform	Aptio Setup Configuration	– AMI Socket (	Configuration Server Mgmt	Þ
<ul> <li>Processor</li> <li>Common Re</li> <li>Uncore Co</li> <li>Memory Co</li> <li>IIO Confi</li> <li>Advanced</li> </ul>	Configuration fCode Configurat nfiguration guration Power Management	ion Configuration		Displays and provides option to change the IIO Settings	
	Version	2.22.1283 Copyr	ight (C)	2022 AMI AB	3

- 7. Press **F4**. In the displayed dialog box, select **Yes**, and press **Enter** to exit. The server system is restarted automatically
- 8. After power-on, press F2//DEL. The Aptio Setup screen is displayed, see Figure 5-8.

# Figure 5-8 Aptio Setup Screen

Main Advanced Pla	Aptio Setup tform Configuration	– AMI Socket	Configuration	Server Mgmt 🕨
BIOS Information				
BIOS Version	09.00.00.01			
Build Date	05/15/2022			
Product Name	N/A			
Serial Number	N/A			
Asset Tag	N/A			
Platform Information				
Platform	TypeArcherCityP	P	-	
Processor	806F3 - SPR-SP	Dx	++: Select	Screen
PCH	EBG AO SKU - BO	1	↑↓: Select	Item
RC Revision	76.D27		Enter: Sele	ect
BIOS ACM	1.0.4		+/-: Change	e Opt.
SINIT ACM	1.0.3		F1: General	. Help
			F2: Previou	us Values
Memory Information			F3: Optimiz	ed Defaults
Total Memory	16384 MB		▼ F4: Save &	Exit
			ESC: Exit	
Von	cion 2 22 1202 Conur	ight (D)	DADD AMT	
ven	510H 2.22.1200 LUPY	ignit (L)	2022 HHI	AB

Use the arrow keys to select Advanced. On the displayed Advanced screen (see Figure 5-9), the Intel(R) Virtual RAID on CPU option is displayed, indicating that the VMD function is enabled for the BIOS.

#### Figure 5-9 Advanced Screen

	Aptio Setup -	- AMI		
	Main Advanced Platform Configuration	Socket Configuration Server Mgmt		
	Serial Port Console Redirection	▲ This formset allows the		
	SIO Common Setting	user to manage Intel(R)		
	SIO Configuration	Virtual RAID on CPU		
	Option ROM Dispatch Policy			
	PCI Subsystem Settings			
•	USB Configuration			
	Network Stack Configuration			
	CSM Configuration			
	NVMe Configuration			
Þ	Emulation Configuration			
	PXE Configuration	++: Select Screen		
		î↓: Select Item		
۶	Tls Auth Configuration	Enter: Select		
	All Cpu Information	+/-: Change Opt.		
Þ	RAM Disk Configuration	F1: General Help		
Þ	Intel(R) Virtual RAID on CPU	F2: Previous Values		
		F3: Optimized Defaults		
Þ	Driver Health	▼ F4: Save & Exit		
		ESC: Exit		
-				
	version 2.22.1283 copyright (C) 2022 AMI			
		AB		

# 5.2.3 Creating a RAID Volume

# Abstract

You can create RAID volumes at different levels as required.

The operations for creating RAID volumes at different levels are similar. This procedure uses creating a RAID 0 volume as an example.

# Prerequisite

- Sufficient NVMe SSDs are installed on the server.
- The VMD function is enabled. For details, refer to "5.2.2 Enabling the VMD Function".

# Context

For a description of the number of disks required to create a RAID volume, refer to Table 5-9.

# Table 5-9 Number of Disks Required for Creating a RAID Volume

RAID Level	Description
RAID 0	RAID 0 requires at least one disk.
RAID 1	RAID 1 requires at least two disks.

RAID Level	Description		
	Disks with different capacities can be used in a RAID 1 volume, but the logical capaci-		
	ty of each member disk depends on the space of the disk with the smallest capacity.		
RAID 5	RAID 5 requires at least three disks.		
RAID 10	RAID 10 requires at least four disks. A RAID 10 volume consists of multiple RAID 1 volumes (at least two).		

# Steps

 On the Aptio Setup screen, use the arrow keys to select Advanced > Intel(R) Virtual RAID on CPU, and press Enter. The Intel(R) Virtual RAID on CPU screen is displayed, see Figure 5-10.

# Figure 5-10 Intel(R) Virtual RAID on CPU Screen

Aptio Setup – AM Advanced	11
Intel(R) VROC 8.0.0.1318 VMD Driver Upgrade key: Intel-SSD-only No RAID volumes on the system Intel VROC Managed Controllers: ► All Intel VMD Controllers	Select to see more information about the Intel VMD Controllers
	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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 Use the arrow keys to select All Intel VMD Controllers, and press Enter. On the displayed All Intel VMD Controllers screen (see Figure 5-11), all the NVMe SSDs mounted to the CPU are displayed.

# Figure 5-11 All Intel VMD Controllers Screen

Aptio Setup – AMI Advanced	
All Intel VMD Controllers	This page allows you to create a RAID volume
▶ Create RAID Volume	
Non-RAID Physical Disks:	
<ul> <li>INTEL SSDPF2KX038TZ SN:BTAC150000P73P8AGN, 3576.98GB</li> <li>Poot 4:2 Slot 122 CPU0, VMD4, PD5 84:00 0</li> </ul>	
<ul> <li>INTEL SSDPF2KX038TZ SN:BTAC150000PA3P8AGN, 3576 9868</li> </ul>	<pre>→+: Select Screen fl: Select Item</pre>
Port 4:1, Slot 121, CPUO, VMD4, BDF 82:00.0	Enter: Select
INTEL SSDPE2KX020TB SN:BTLJ724309KM2P0BGN, 1863.02GB	+/-: Change Opt. K/M: Scroll Help Area
Port 4:0, Slot 120, CPUO, VMD4, BDF 81:00.0	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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	AB

3. Use the arrow keys to select **Create RAID Volume**. The screen for creating a RAID volume is displayed, see Figure 5-12.

# Figure 5-12 Creating a RAID Volume

Advanced	Aptio Setup – AMI	
Create RAID Volume		Enter a unique volume name that does not
Name:	Volume0	contain space at the
RAID Level:	[RAIDO(Stripe)]	beginning or backslash
Enable RAID Spanned over VMD Controllers:		and is 16 characters or less.
Select Disks:		
INTEL SSDPF2KX038TZ SN:BTAC150000P73P8AGN,	[]	
3576.98GB Port 4:3		→+: Select Screen
CPU0 VMD4		↑↓: Select Item
INTEL SSDPF2KX038TZ		Enter: Select
SN:BTAC150000PA3P8AGN,		+/-: Change Opt.
3576.9868 Port 4:1		K/M: Scroll Help Area
CPUU VMD4		F1: General Heip
		F3: Botimized Defaults
		F4: Save & Exit
Vanciar	2 22 1205 Copupidat (	(C) 2022 ANT
Version	1 2.22.1200 Dupyr1811 (	(0) 2022 HNIAB

4. Use the arrow keys to select **Name**, and then press **Enter**. On the displayed screen, set the name of the RAID volume, see Figure 5-13.

# Figure 5-13 Setting the RAID Volume Name



5. Use the arrow keys to select **RAID Level**, and then press **Enter**. From the displayed shortcut menu, select the desired RAID level, see Figure 5-14.

#### Figure 5-14 Selecting a RAID Level



(Optional) When the NVMe SSDs used to create the RAID volume are distributed on different CPUs or VMDs, use the arrow keys to select Enable RAID Spanned over VMD Controllers, press Enter, and select X from the displayed shortcut menu to enable the Enable RAID Spanned over VMD Controllers option, see Figure 5-15.

# Figure 5-15 Enabling the Enable RAID Spanned over VMD Controllers Option

Advanced	Aptio Setup – AMI	
Create RAID Volume Name: RAID Level: Enable RAID Spanned over VMD Controllers:	VolumeOss [RAIDO(Stripe)] [ ]	Enable RAID Spanned over VMD Controllers: For Data RAID only, boot not supported.
Select Disk INTEL SSDPF SN:PHAX2181 1788.50GB CPU0 VMD4	RAID Spanned over VMD Cor	een m
SN:BTAX137501BL1P9BGN, 1788.50GB Port 5:10 CPU0 VMD4 Strip Size:	[128KB]	<ul> <li>+/-: Change Opt.</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> <li>ESC: Exit</li> </ul>
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For the distribution of NVMe SSDs on different VMDs and different CPUs on a 12-disk backplane with default wiring, see Figure 5-16.

# Figure 5-16 Distribution of NVMe SSDs on Different VMDs and Different CPUs

CPU1 VMD3	CPU1 VMD3	CPU1 VMD4	CPU0 VMD4
CPU1 VMD3	CPU1 VMD4	CPU1 VMD4	CPU0 VMD4
CPU1 VMD3	CPU1 VMD4	CPU0 VMD4	CPU0 VMD4

 Use the arrow keys to select the NVME SSD for creating the RAID volume from the Select Disks list, press Enter, and select X from the displayed shortcut menu, see Figure 5-17.

# Figure 5-17 Selecting an NVMe SSD

Advanced	Aptio Setup – AMI	
Create RAID Volume Name: RAID Level: Enable RAID Spanned over VMD Controllers:	VolumeOss [RAIDO(Stripe)] [X]	X – to Select Disk
INTEL SSDPF2KX019T1M SN X C INTEL SSDPF2KX019T1 SN:BTAX137501BL1P9BGN, 1788.50GB Port 5:10 CPU0 VMD4 Strip Size:	:PHAX2181022K1P9BGN, 1788.	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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8. Use the arrow keys to select **Strip Size**, and then press **Enter**. From the displayed shortcut menu, select the desired RAID stripe size, see Figure 5-18.

# Figure 5-18 Selecting Stripe Capacity



# Note

If you create RAID 1, there is no Strip Size option.

9. Use the arrow keys to select **Capacity(GB)**, and then press **Enter**. From the displayed shortcut menu, select the desired capacity for the RAID logical disk, see Figure 5-19.

# Figure 5-19 Selecting Capacity for RAID

Advanced	Aptio Setup – AMI	
RAID Level: Enable RAID Spanned over VMD Controllers:	[RAIDO(Stripe)] [X]	<ul> <li>Capacity is an approximation in GB. Enter desired volume size. 0 will be treated</li> </ul>
Select Disks: INTEL SSDPF2KX019T1M SN:PHAX2181022K1P9BGN, 1788 5068 Port 5:11	[X]	as Maximum Size. Approximate Maximum size=3576.98. Default
CPU0 VMD4 INTEL SSDPF2KX019T1 SN:BTAX137501BL1P9BGN, 1788.50GB Port 5:10 CPU0 VMD4	[X	++: Select Screen fl: Select Item Enter: Select
Strip Size: Capacity (GB):	[128KB] 3398.13	F1: General Help F2: Previous Values
▶ Create Volume		<ul> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> <li>ESC: Exit</li> </ul>
Versio	on 2.22.1283 Copyright	(C) 2022 AMI AB

10. Use the arrow keys to select Create Volume, and then press Enter. The confirmation

screen for RAID volume creation is displayed.



If the capacity of the selected disks for creating a RAID volume is different, a warning message is displayed. If **Yes** is selected, the system automatically selects the minimum disk capacity to create a RAID volume.

11. Use the arrow keys to select Yes, and then press Enter to create the RAID volume. After

successful creation, the All Intel VMD Controllers screen is displayed, see .

#### Figure 5-20 RAID Volume Created Successful

Aptio Setup – AMI Advanced	
All Intel VMD Controllers ▶ Create RAID Volume RAID Volumes: ▶ test1, RAIDO(Stripe), 3398.13GB, Normal	This page allows you to create a RAID volume
Non-RAID Physical Disks: INTEL SSDPE2KX020T8 SN:BTLJ724309KM2P0BGN, 1863.02GB Port 4:0, Slot 120, CPU0, VMD4, BDF 81:00.0	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
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# 5.2.4 Querying RAID Volume Information

# Abstract

This procedure describes how to query the information about a RAID volume created on a RAID controller card, including the RAID volume name, level, capacity, and status. You can query RAID volume information in the following two ways:

- BIOS screens
- Linux OS screens

#### Prerequisite

- The VMD function is successfully enabled. For details, refer to "5.2.2 Enabling the VMD Function".
- A RAID volume is created successfully. For details, refer to "5.2.3 Creating a RAID Volume".

# Steps

- Querying RAID Volume Information on BIOS Screens
  - On the Aptio Setup screen, use the arrow keys to select Advanced > Intel(R) Virtual RAID on CPU > All Intel VMD Controllers, and press Enter. The All Intel VMD Con-
trollers screen is displayed. The existing RAID volumes are displayed in the **RAID Volumes** area, see Figure 5-21.

#### Figure 5-21 All Intel VMD Controllers Screen

Aptio Setup – AMI Advanced				
All Intel VMD Controllers ▶ Create RAID Volume RAID Volumes:	This page allows you to create a RAID volume			
<ul> <li>Non-RAID Physical Disks:</li> <li>INTEL SSDPE2KX020T8 SN:BTLJ724309KM2P0BGN, 1863.02GB Port 4:0, Slot 120, CPU0, VMD4, BDF 81:00.0</li> </ul>	++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit			
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2. Use the arrow keys to select the RAID volume to be queried, and press **Enter**. The RAID volume information is displayed, see Figure 5-22. For a description of the parameters, refer to Table 5-10.

#### Figure 5-22 RAID Volume Information

	Advanced	Aptio Setup – AMI	
-			
	RAID VOLUME INFO		Select to see more
	Volume Actions		RAID Volume
N	Delete		
	Name:	test1	
	RAID Level:	RAID1(Mirror)	
	Strip Size:	N/A	
	Size:	3398.13GB	
	Status:	Normal	4
	Bootable:	Yes	→+: Select Screen
	Block size:	512	↑↓: Select Item
			Enter: Select
	RAID Member Disks:		+/-: Change Opt.
	INTEL SSDPF2KX038TZ SN:B	TAC150000P73P8AGN,	K/M: Scroll Help Area
	3576.98GB		F1: General Help
	Port 4:3, Slot 123, CPU	D, VMD4, BDF 84:00.0	F2: Previous Values
			F3: Optimized Defaults
			F4: Save & Exit
Ļ			

#### Version 2.22.1285 Convright (C) 2022 AMT

#### Table 5-10 Parameter Descriptions for RAID Volume Information

Parameter	Description
Name	Name of the RAID volume
RAID Level	Level of the RAID volume
Size	Strip size, namely, the size of the stripe data block written into each disk
Size	Stripe size of a disk group, namely, the data block set written on all disks
Status	Disk group status
Bootable	Indicates that the RAID volume is bootable
Block Size	Size of each data block
RAID Member Disks	Member disks of the RAID volume

- Querying RAID Volume Information on Linux OS Screens
  - 1. Enter the cat /proc/mdstat command in the Linux operating system to display the status of all running RAID volumes, see Figure 5-23.

#### Figure 5-23 RAID Volume Status

[root@localhost home]# cat /proc/mdstat
Personalities : [raid10]
md126 : active raid10 nvme4n1[3] nvme5n1[2] nvme6n1[1] nvme7n1[0] 1855842304 blocks super external:/md127/0 64K chunks 2 near-copies [4/4] [UUUU]
[>] resync = 0.9% (1809/920/1855842304) finish=152.4min speed=200903K/sec

For a description of the RAID volume status parameters, refer to Table 5-11.

#### Table 5-11 Parameter Descriptions for RAID Volume Status

Parameter	Description
Personalities : [raid10]	Created RAID volume.
md126	Logical drive letter of the RAID volume.
active / inactive	Whether the RAID volume is activated.
nvme4nl[3] nvme5nl[2] nvme6nl[1] nvme7nl[0]	NvmeXnI[Y] indicates the location of the logical disk in the RAID volume.
1855842304 Blocks super external	The available space of the RAID volume is 387072 blocks.
64k chunks	The size of chunks is 64 K.
[4/4] [UUUU]	The RAID volume requires four logical disks, and the four logical disks are operating properly. If a logical disk is not operating properly, "_" is dis- played in the U position.
resync=0.9%	Rebuild completion percentage of the current RAID volume.
finish=152.4 Min	Expected rebuild completion time of the RAID vol- ume.
speed=200903k/sec	RAID volume rebuild speed.

2. Enter the mdadm - -detai -platform command to display the RAID volume information created under the Intel(R) Virtual RAID on CPU option, see Figure 5-24. Figure 5-24 RAID Volume Information

[root@localhost home]# mdadmdetail-platform
mdadm: imsm capabilities not found for controller: /sys/devices/pci0000:00/0000:00:17.0 (type SATA)
<pre>mdadm: imsm capabilities not found for controller: /sys/devices/pci0000:00/0000:00:11.5 (type SATA)</pre>
Platform : Intel(R) Virtual RAID on CPU
Version : 7.5.0.1152
RAID Levels : raid0 raid1 raid10 raid5
Chunk Sizes : 4k 8k 16k 32k 64k 128k
2TB volumes : supported
2TB disks : supported
Max Disks : 48
Max Volumes : 2 per array, 24 per controller
3rd party NVMe : supported
I/O Controller : /sys/devices/pci0000:c9/0000:c9:00.5 (VMD)
NVMe under VMD : /dev/nvme6nl (PHLN032301G91P6AGN)
NVMe under VMD : /dev/nvme5n1 (A071F599)
NVMe under VMD : /dev/nvme4n1 (PHLN0322003E1P6AGN)
NVMe under VMD : /dev/nvme7n1 (BTLJ034503E81P0FGN)
I/O Controller : /sys/devices/pci0000:64/0000:64:00.5 (VMD)
NVMe under VMD : /dev/nvme0nl (YMC27T6JA212360029)
NVMe under VMD : /dev/nvme3nl (YMC27T6JA21210003C)
NVMe under VMD : /dev/nvme2n1 (YMC21T9JA212100038)
NVMe under VMD : /dev/nymeini (YMC21T9JA212360010)
I/O Controller : /sys/devices/pci0000:e2/0000:e2:00.5 (VMD)
NVMe under VMD : /dev/nvmellnl (BTLJ034602X91P0FGN)
NVMe under VMD : /dev/nvme9n1 (YMC23T8JA212360086)
NVMe under VMD : /dev/nvme10n1 (BILN81360A721P5AGN)
NVMe under VMD : /dev/nvme8n1 (YMC2318JA2123600AK)

For a description of the RAID volume information parameters, refer to Table 5-12.

Parameter	Description
Version	Version number of the NVMe VROC Key
RAID Levels	RAID level supported by the NVMe VROC Key
Chunk Sizes	Data block size supported by the NVMe VROC Key
2TB volumes	Supported, indicating that a 2 TB RAID volume is supported
2TB disks	Supported, indicating that a 2 TB disk is support- ed
Max Disks	Maximum number of disks supported
Max Volumes	<ul> <li>→ Maximum number of volumes supported by each RAID level</li> <li>→ Maximum number of volumes supported by each RAID controller card</li> </ul>
3rd party NVME	Supported, indicating that the NVMe VROC Key supports third-party NVMe SSDs except for those of the Intel brand

#### Table 5-12 Parameter Descriptions for RAID Volume Information

3. Enter the **lsblk** command to query the drive letter of the RAID logical disk, see Figure 5-25.

[root@localhost ~]# lsblk						
NAME	MAJ:MIN	RM	SIZE	R0	TYPE	MOUNTPOINT
sda	8:0	Θ	446.6G	Θ	disk	
—sda1	8:1	Θ	600M	Θ	part	/boot/efi
—sda2	8:2	Θ	1G	Θ	part	/boot
└─sda3	8:3	Θ	445G	Θ	part	
⊢rhel-root	253:0	Θ	50G	Θ	lvm	/
-rhel-swap	253:1	Θ	4G	Θ	lvm	[SWAP]
└_rhel-home	253:2	Θ	391G	Θ	lvm	/home
sr0	11:0	1	1024M	Θ	rom	
nvme0nl	259:0	Θ	5.8T	Θ	disk	
nvme4nl	259:1	Θ	1.5T	Θ	disk	
└_md126	9:126	Θ	1.7T	Θ	raid10	
nvmelnl	259:2	Θ	1.5T	Θ	disk	
nvme3n1	259:3	Θ	5.8T	Θ	disk	
nvme2n1	259:4	Θ	1.5T	Θ	disk	
nvme7nl	259:5	Θ	931.5G	Θ	disk	
└_md126	9:126	Θ	1.7T	Θ	raid10	
nvme6n1	259:6	Θ	1.5T	Θ	disk	
└_md126	9:126	Θ	1.7T	Θ	raid10	
nvme9n1	259:7	Θ	2.9T	Θ	disk	
nvmellnl	259:8	Θ	931.5G	Θ	disk	
nvme8n1	259:9	Θ	2.9T	Θ	disk	
nvmel0nl	259:10	Θ	1.5T	Θ	disk	
nvme5n1	259:11	Θ	14T	Θ	disk	
└_md126	9:126	Θ	1.7T	Θ	raid10	

4. Enter the mdadm -D /dev/md126 command to query the drive letter of the md126 volume, see Figure 5-26.

Figure 5-25 Drive Letter

Figure 5-26 Drive Letter of md126

[root@localhost hom /dev/md126:	ne]# mdadm	-D /dev/m	d126		
Container	: /dev/md	/imsm0, mer	mber 0		
Raid Level	: raıd10				
Array Size	: 1855842	304 (1769.8	87 G1B 1900.38	3 GB)	
Used Dev Size	: 9279211	52 (884.93	GiB 950.19 GE	3)	
Raid Devices	: 4				
Total Devices	: 4				
State	: clean,	resyncing			
Active Devices	: 4	, ,			
Working Devices	: 4				
Failed Devices	: 0				
Spare Devices	: 0				
Layout	: near=2				
Chunk Size	: 64K				
Consistency Policy	: resync				
, , ,	,				
Resync Status	: 1% comp	lete			
UUID	: ab38b8d	3:0409a522	:8c903f50:5992	20651	
Number Maior	Minor	RaidDevice	e State		
3 259	1	Θ	active sync	set-A	/dev/nvme4n1
2 259	11	1	active sync	set-B	/dev/nvme5n1
1 259	6	2	active sync	set-A	/dev/nyme6n1
0 259	5	3	active sync	set-B	/dev/nvme7n1
[root@localhost hom	ne]#		de care o spine		,,

For a description of the drive letter information of md126, refer to Table 5-13.

|--|

Parameter	Description
Container	Logical disk
Raid Level	RAID Level
Array Size	RAID array size
Used Dev Size	Available capacity of the RAID array
Raid Devices	Number of disks for creating the RAID array
Total Devices	Number of all disks
State	RAID status
Active Devices	Number of active disks
Working Devices	Number of operating disks
Failed Devices	Number of damaged disks
Spare Devices	Number of hot spare disks

Parameter	Description
Layout	RAID check rule parameter
Chunk Size	Data block size
Consistency Policy	If resync is displayed, the data synchronization is completed.
Resync Status	RAID data synchronization progress
Number	Number of a member disk in the RAID array

## 5.2.5 Deleting a RAID Volume

#### Abstract

When a server no longer needs a RAID volume, you can delete the RAID volume to release the disk space.



The data that is lost during deletion of the RAID volume cannot be restored. Therefore, you must make sure that you have backed up important data before deleting the volume.

#### Prerequisite

A RAID volume is created successfully. For details, refer to "5.2.3 Creating a RAID Volume".

#### Steps

 On the Aptio Setup screen, use the arrow keys to select Advanced > Intel(R) Virtual RAID on CPU, and press Enter. The Intel(R) Virtual RAID on CPU screen is displayed, see Figure 5-27.

#### Figure 5-27 Intel(R) Virtual RAID on CPU Screen

Advanced	- 142
<pre>Intel(R) VROC 8.0.0.1318 VMD Driver Upgrade key: Intel-SSD-only Intel VROC Managed Volumes:   test1, RAID1(Mirror), 3398.13GB, Initialize Intel VROC Managed Controllops:</pre>	Select to see more information about the Intel VMD Controllers
▶ All Intel VMD Controllers	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
Version 2.22.1285 Copyright (C)	) 2022 AMI AB

2. Use the arrow keys to select **All Intel VMD Controllers**, and press **Enter**. On the displayed **All Intel VMD Controllers** screen (see Figure 5-28), the existing RAID volumes are displayed in the **RAID Volumes** area.

#### Figure 5-28 All Intel VMD Controllers Screen

Aptio Setup – AMI Advanced	
All Intel VMD Controllers	Select to see more
▶ Create RAID Volume	RAID Volume
RAID Volumes: ▶ test1, RAID1(Mirror), 3398.13GB, Initialize	
Non-RAID Physical Disks:	
INTEL SSDPE2KX020T8 SN:BTLJ724309KM2P0BGN, 1863.02GB	++: Select Screen
Port 4:0, Slot 120, CPU0, VMD4, BDF 81:00.0	14: Select Item Enter: Select
	+/-: Change Opt. K/M: Scroll Help Area
	F1: General Help F2: Previous Values
	F3: Optimized Defaults F4: Save & Exit
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 Use the arrow keys to select the RAID volume to be deleted, and then press Enter. On the displayed RAID VOLUME INFO screen, the information about the RAID volume to be deleted is displayed, see Figure 5-29.

#### Figure 5-29 RAID VOLUME INFO Screen

Advanced	Aptio Setup — AMI	
RAID VOLUME INFO		
Volume Actions ▶ Delete		
Name: RAID Level: Strip Size: Size: Status: Bootable: Block size: RAID Member Disks: NITEL SSDPF2KX038T 3576.98GB Port 4:1, Slot 12	test1 RAID1(Mirror) N/A 3398.13GB Initialize Yes 512 72 SN:BTAC150000PA3P8AGN, 1, CPU0, VMD4, BDF 82:00.0	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>
V.	ersion 2.22.1285 Copyright (C)	2022 AMI

4. Use the arrow keys to select **Delete**, and then press **Enter**. The confirmation screen for RAID volume deletion is displayed, see Figure 5-30.

Aptio Set	up — AMI
Delete Delete the RAID volume? ALL DATA ON VOLUME WILL BE LOST!	Deleting a volume will reset the disks to non–RAID.
► Yes ► No	<pre></pre>
Version 2.22.1283 Co	oyright (C) 2022 AMI AB

#### Figure 5-30 Confirmation Screen for RAID Volume Deletion

 Use the arrow keys to select Yes, and then press Enter to delete the RAID volume. After successful deletion, the All Intel VMD Controllers screen is displayed, see Figure 5-31. The RAID volume disappears.

#### Figure 5-31 All Intel VMD Controllers Screen

All Intel VMD Controllers	This page allows you to
Create RAID Volume	CLEATE & KHID VUIUME
Non-RAID Physical	
INTEL SSDPE2KX020T8 SN:BTLJ724309KM2P0BGN,	
Port 4:0, Slot 120, CPU0, VMD4, BDF 81:00.0	
INTEL SSDPF2KX038TZ SN:BTAC150000PA3P8AGN,	++: Select Screen
3576.98GB	↑↓: Select Item
PORT 4:1, SIOT 121, CPU0, VMD4, BDF 82:00.0	Enter: Select
3576.98GB	K/M: Scroll Help Area
Port 4:3, Slot 123, CPU0, VMD4, BDF 84:00.0	F1: General Help
	F2: Previous Values
	F3: Optimized Defaults

## **5.3 Common Operations**

## 5.3.1 Setting the Boot Mode to Legacy

#### Abstract

You can set the boot mode of BIOS to **Legacy** in accordance with the actual operation requirements.

#### Prerequisite

The operation terminal is already connected to the real-time desktop of the server through the remote console of the management software.

Steps



Restarting the server may cause system service interruption.

1. Restart the server. The screen as shown in Figure 5-32 is displayed.

Figure 5-32 BIOS Restart Screen



 During the POST process, press F2/DEL as prompted. The BIOS configuration utility is started, see Figure 5-33.

#### Figure 5-33 BIOS Configuration Utility Screen

Aptio Setup - AMI					
Main Advanced	Platform Configuration	SOCKET CO	nfiguration	Server Mgm	
BIOS Information BIOS Version	09.00.00.01	4			
Build Date	07/12/2022				
Product Name Serial Number Asset Tag Access Level	N/A N/A N/A Administrator				
Platform Informa Platform Processor PCH	tion TypeArcherCityR 806F3 – SPR–SP EBG A0/A1/B0/B1 80	P Dx . SKU -	++: Select †↓: Select Enter: Sele +/-: Change	Screen Item ct	
RC Revision BIOS ACM SINIT ACM	80.D21 1.0.A 1.0.A	•	K/M: Scroll F1: General F2: Previou F3: Optimiz F4: Save &	Help Area Help s Values ed Defaults Exit	
	Version 2.22.1285 Copyr	ight (C) 2	022 AMI		AB

 Use arrow keys to select Boot > Boot option filter, and then press Enter. The Boot option filter dialog box is displayed, see Figure 5-34.



4. Use the arrow keys to select **Legacy only**, and then press **Enter** to set the boot mode of the BIOS to **Legacy**, see Figure 5-35.

## Figure 5-34 Boot Option Filter Dialog Box



Aptio Setup – AMI ◀ Security <mark>Boot</mark> Save & Exit			
Boot Configuration Boot option filter Endless Boot Support Setup Prompt Timeout Bootup NumLock State Quiet Boot	[Legacy only] [Enabled] 3 [On] [Disabled]	<ul> <li>This option controls Legacy/UEFI ROMs priority</li> </ul>	
FIXED BOOT ORDER Prior Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #4 Boot Option #5 Optimized Boot	ities [Hard Disk] [Network] [USB] [CD/DVD] [Other Device] [Disabled]	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save &amp; Exit</pre>	
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Figure 5-35 Setting the Boot Mode to Legacy

5. Press F4 or use the arrow keys to select Save & Exit > Save Changes and Exit, and then press Enter. The Save & Exit Setup dialog box is displayed, see Figure 5-36.

#### Figure 5-36 Save & Exit Setup Dialog

∢ Security Boot Save	Aptio Setup · & Exit	- AMI	
Save Options Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and R Save Changes Discard Changes	(it Save & Exit ) Save configuration	Setup —	Exit system setup after saving the changes.
Default Options Restore Defaults Save as User Defaults Restore User Defaults Boot Override Slot5 Port1:Intel(R) E for 10GbE SFP+ (PXE IF	Yes thernet Controller	NO X710	Select Screen Select Item r: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Vers.	on 2.22.1285 Copyr	ight (C) 20	022 AMI AB

6. Use the arrow keys to select **Yes**, and press **Enter**. The boot mode is set to **Legacy**, and the server is restarted automatically.

## 5.3.2 Setting the Boot Mode to UEFI

#### Abstract

You can set the boot mode of BIOS to UEFI in accordance with the actual operation requirements.

#### Prerequisite

The operation terminal is already connected to the real-time desktop of the server through the remote console of the management software.

Steps



Restarting the server may cause system service interruption.

1. Restart the server. The screen as shown in Figure 5-37 is displayed.

Figure 5-37 BIOS Restart Screen



 During the POST process, press F2/DEL as prompted. The BIOS configuration utility is started, see Figure 5-38.

## Figure 5-38 BIOS Configuration Utility Screen

Main Advanced	Aptio Setup Platform Configuration	– AMI Socket Configuration	n Server Mgmt ▶
BIOS Information BIOS Version Build Date Product Name Serial Number Asset Tag Access Level	09.00.00.01 07/12/2022 N/A N/A N/A Administrator		
Platform Informa Platform Processor PCH RC Revision BIOS ACM SINIT ACM	tion TypeArcherCityR 806F3 – SPR–SP EBG A0/A1/B0/B1 B0 80.D21 1.0.A 1.0.A	P ++: Select Dx 11: Select SKU - Enter: Sel +/-: Chang K/M: Scrol F1: Genera F2: Previo ▼ F3: Optim. F4: Save 8	: Screen t Item lect ge Opt. Ll Help Area al Help ous Values ized Defaults & Exit
	Version 2.22.1285 Copyr	ight (C) 2022 AMI	AB

 Use arrow keys to select Boot > Boot option filter, and then press Enter. The Boot option filter dialog box is displayed, see Figure 5-39.



#### Figure 5-39 Boot Option Filter Dialog Box

4. Use the arrow keys to select **UEFI only**, and then press **Enter** to set the boot mode of the BIOS to **UEFI**, see Figure 5-40.

Aptio Setup – AMI ◀ Security Boot Save & Exit				
Boot Configuration Boot option filter Endless Boot Support Setup Prompt Timeout Bootup NumLock State Quiet Boot Embedded Shell Boot	(UEFI only) [Enabled] 3 [On] [Disabled] [Disabled]	▲ This option controls Legacy/UEFI ROMs priority		
FIXED BOOT ORDER Prior: Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #4 Boot Option #5 Optimized Boot Delete Boot Option	ties [Hard Disk] [Network] [USB] [CD/DVD] [Other Device] [Disabled]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. K/M: Scroll Help Area F1: General Help F2: Previous Values ▼ F3: Optimized Defaults F4: Save &amp; Exit</pre>		
Versio	on 2.22.1285 Copyright	(C) 2022 AMI AB		

Figure 5-40 Setting the Boot Mode to UEFI

5. Press F4 or use the arrow keys to select Save & Exit > Save Changes and Exit, and then press Enter. The Save & Exit Setup dialog box is displayed, see Figure 5-41.

#### Figure 5-41 Save & Exit Setup Dialog



6. Use the arrow keys to select **Yes**, and press **Enter**. The boot mode is set to **UEFI**, and the server is restarted automatically.

# Glossary

## BBU

- Battery Backup Unit

## BIOS

- Basic Input/Output System

## BMC

- Baseboard Management Controller

## CLI

- Command Line Interface

## CPU

- Central Processing Unit

## CRC

- Cyclic Redundancy Check

## DG

- Disk Group

## HBA

- Host Bus Adapter

## HDD

- Hard Disk Drive

## I/O

- Input/Output

## ID

- Identification

## 10

- Input & Output

#### JBOD

- Just a Bunch of Disk

## LD

- Logical Disk

## NAS

- Network Attached Storage

#### NVMe

- Non-Volatile Memory Express

#### OS

- Operating System

#### BIOS

- Basic Input/Output System

## PC

- Personal Computer

#### PCle

- Peripheral Component Interconnect Express

#### PMC

- PCI Mezzanine Card

## POST

- Power-On Self-Test

### RAID

- Redundant Array of Independent Disks

## SAS

- Serial Attached SCSI

#### SATA

- Serial ATA

## SSD

- Solid State Drive

## SSH

- Secure Shell

## UEFI

- Unified Extensible Firmware Interface

## VD

- Virtual Drive

## VMD

- Volume Management Device

## VROC

- Virtual RAID on CPU