RocketRAID 3700 Series

SAS 12Gb/s PCI-Express 3.0 x8 RAID Controller
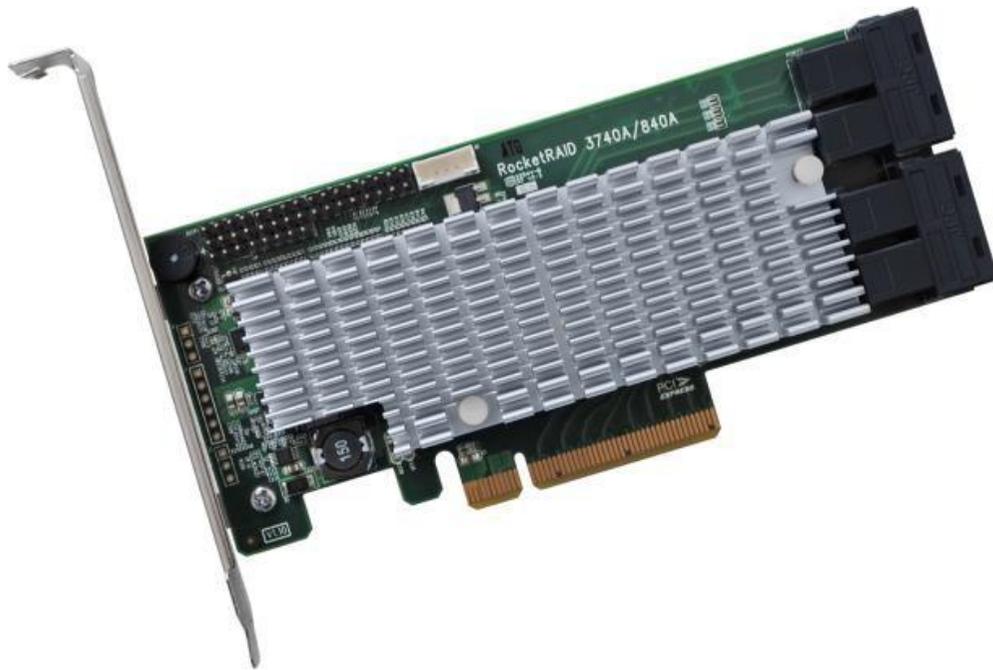
User's Guide
v1.06

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Notice

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FCC Part 15 Class B Radio Frequency Interference statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protectionagainst harmful interference in a residential installation. This equipment generates uses and canradiate radio frequency energy and, if not installed and used in accordance with the instructions,may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Union Compliance Statement
This Information Technologies Equipment has been tested and found to comply with the followingEuropean directives:

- European Standard EN55022 (1998) Class B
- European Standard EN55024 (1998)

Table of Contents

1. HighPoint RocketRAID 3700 Overview

RocketRAID 3700 series host bus adapters are the world's most price competitive 12G SAS/SATA RAID controllers, and deliver unprecedented end-to-end Generation 3.0 PCI Express transfer performance with Professional class RAID Storage reliability andmanagement capabilities.

RocketRAID 3700 series host bus adapters capitalize on HighPoint's two decades of RAID and storage technology to deliver professional grade RAID storage at a fraction of the cost of conventional host RAID solutions. Each adapter is powered by our industry proven RAID technology, superior Gen 3.0 PCIe express transfer bandwidth, and up to sixteen dedicated 12Gb/s SAS channels, which support robust, high-performance RAID 0, 1, 5 ,6, 10, 50 and JBOD configurations of SAS or SATA hard drives ofany disk format, including 512, 512e and 4Kn.

RocketRAID 3700 Technical Specifications	
Bus Interface	8-lane, 8 GT/s PCI Express 3.0 Compliant
Number of Channel / Port	16x 12Gb/s SAS / 6Gb/s SATA Channels
Data Transfer Rates	Up to 12Gb/s per port
Port Type	SFF-8643 mini-SAS HD and SFF-8644 mini-SAS HD
Number of Devices	16x SAS/SATA Hard Drive/SSD
Form Factor	Low Profile (Half-Height)
Dimensions	5.97*2.68*0.06 (in)
Weight	0.26lbs
RAID Level Support	RAID 0,1,5,6,10,50 & JBOD RAID 6 is not supported on macOS Bootable RAID 6 arrays are not supported
Operating System	Windows 11,10 Windows Server 2022, 2019, 2016 Microsoft Hyper-V Linux (Support Linux Driver auto Compile) Redhat/Ubuntu/Debian/Fedora/Proxmox (Kernel 3.10 and later) Arch Linux (Kernel 5.17.5 and above) Unraid 6.9.2 *Only supports 64bit operating system.*
RAID Feature Suite	
Flash ROM for Upgradeable BIOS	
Storage Health Inspector	
Redundant RAID Configurations	
BIOS PnP (plug and play) and BBS (BIOS boot specification) support	
Bootable RAID Array	
EFI for Mac Platform	
Multiple RAID Partitions supported	
Storage Configurations Support Details	
Multiple RAID Adapters supported	
Online Array Roaming	
Online RAID Level Migration (ORLM)	
Online Capacity Expansion (OCE)	
RAID Quick Initialization for fast array setup	
Drive hot plug support	
Global Hot Spare Disk support	
Automatic and configurable RAID Rebuilding Priority	
Auto resume incomplete rebuilding after power on or reboot system	
Disk Format compatible: 512, 512e, 4Kn	
Larger than 2 TB Drive and RAID Array support	
Spin down Massive Arrays of Idle Disks support	
Native Command Queuing	
SAS TCQ	
Disk media scan and repair	
Device Error Recovery support	
Automatic remap and fix drive bad block for RAID array	

Cross-Sync Support (Not Support Cross RAID, support Windows, Linux)	
Write Back and Write Through	

Configuration Management Suites	User friendly Browser-based Management Interface Easy to use BIOS configuration Tool Linux Command Line Interface (CLI) – Scriptable configuration tool
Monitoring and Management Support	SGPIO, SES-2 and I2C (Drive LEDs supported: SGPIO, SES-2 and LED Header)
Operating Temperature	Work Temp: $+5°C \sim +55°C$. Storage Temp: $-20°C \sim +80°C$ Relative Humidity: 5% $\sim$ 60% non-condensing.
Operating Voltage	12 V / 3.3 V, Power: 14W (12V 1A, 3.3V 0.5A)
MTBF (Mean Time Before Failure)	920,585 Hours
Certification Approval	CE FCC RoHS REACH WEEE

2. Board Layout & Hardware Installation
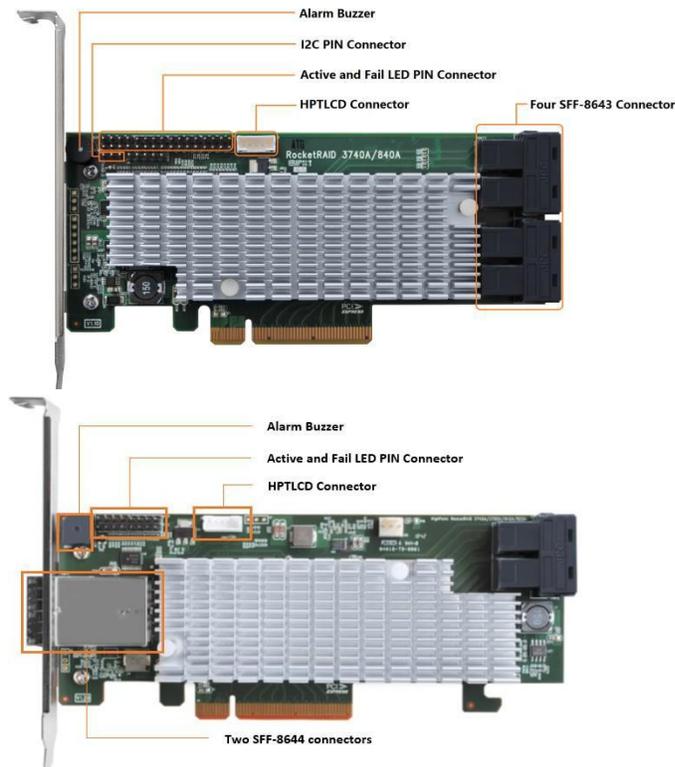
SFF-8643 and SFF-8644 connector

Each SFF-8643 and SFF-8644 connector supports 4 device channels. Connect the hard disks or disk backplane to theRAID controller using the appropriate data cables.

Active/FAIL LED PIN connector:

LED pins are provided for Active/Fail status for each of the device channels.
For more information about LED functionality and connection requirements, please refer to the document below:
https://filedn.com/lG3WBCwKGHT7yNuTsFCwXy0/HighPoint-Download/Document/Guide/RocketRAID/General%20Guide/LED_connection.pdf

 Note: RR3740C, RR840C and RR2840C do not support this Active/FAIL LED PIN connector Function.

Alarm Buzzer

Audible alarm will sound if a disk failed status occurs.

I2C Pin Connector

The I2C Pin connector can be used to connect an enclosure device with I2C protocol for enclosure management.

HPTLCD Connector

Connector for the optional HPTLCD module.

Hardware Installation

Take RR3740C as an example：

Step 1: Remove your system cover.

Step 2: Insert the RR3720C card into an open PCIe 3.0/4.0 x16/x8 slot on the motherboard.

Step 3: After you have inserted the RR3740C card, you can connect the SFF-8643 cables.

Step 4: Connect the RR3740C to the SATA hard drives's using the appropriate SFF-8643 cables. The SATA port should be connected to the SATA hard drives's port. The 15 pin SATA power connector connect the system's power supply.

Step 5: Close the system cover and power up the system.

 Note: Please make sure the cables are securely connected to the RR3740C's device ports and the SATA hard drives or backplane. Loose

 connections can lead to a variety of problems including instability, slower than expected performance and dropped disks.

3. What's in the Box

Make sure the following items are included in your purchase:
- RR3700 controller card
- Low Profile Bracket
- Quick Installation Guide

4. Using the RocketRAID 3700

4.1. Using the RocketRAID Series HBA BIOS（Legacy）

4.1.1 RocketRAID BIOS Setting Utility

The RocketRAID controller BIOS utility is an interface that provides management commands and controller related settings. After installing the RAID controller and powering on the system, the RAID controller BIOS should post during the system's boot procedure.

Different motherboards will provide different Legacy settings. Please consult your motherboard's user manual for more information.

Set Legacy setting using the SuperMicro X11DPi-NT motherboard as an example.

1. Set "Boot Mode Select" to "Dual"
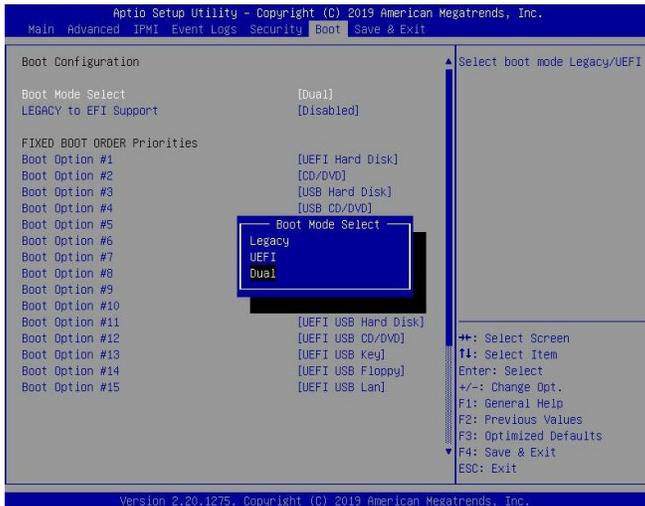
2. Under "Advanced->PCIe/PCI/PnP Configuration->, change "CPUx Slot x PCI-E OPROM" to "Legacy". "x" represents the PCIE slot assignment. For this example, the RR3720 is installed into "CPU1 Slot 2"
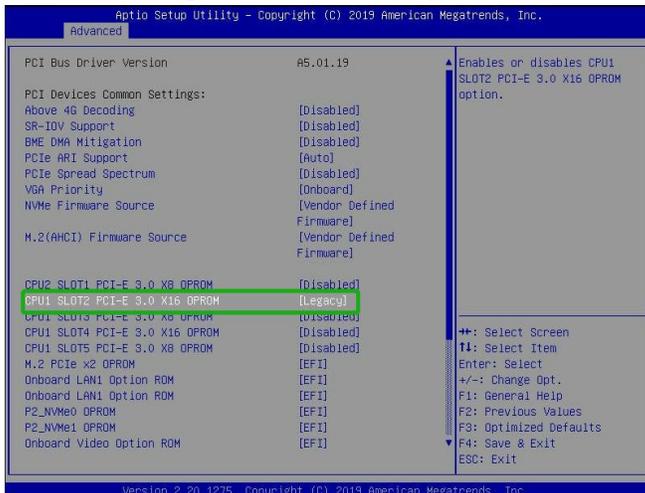
3. Reboot, use **Ctrl + H** key to log-in to the BIOS setting utility. The BIOS setting utility can be used for RAID management. The BIOS Utilitywill display information about hard drives attached to the adapter. Make sure all attached drives are detected by this utility. If any of the hard drives is not detected, power down the system and check the power and cable connections.

Note: The following screenshots depict the RocketRAID 3700 BIOS utility. However, all RocketRAID models utilize the same interface.

```
          RocketRAID 3740 BIOS Setting Utility v1.1.6
          (c) 2022 HighPoint Technologies, Inc.All rights reserved

Scan Devices. Please wait ...




















Help
Press <Ctrl><H> to run BIOS Setting Utility
```
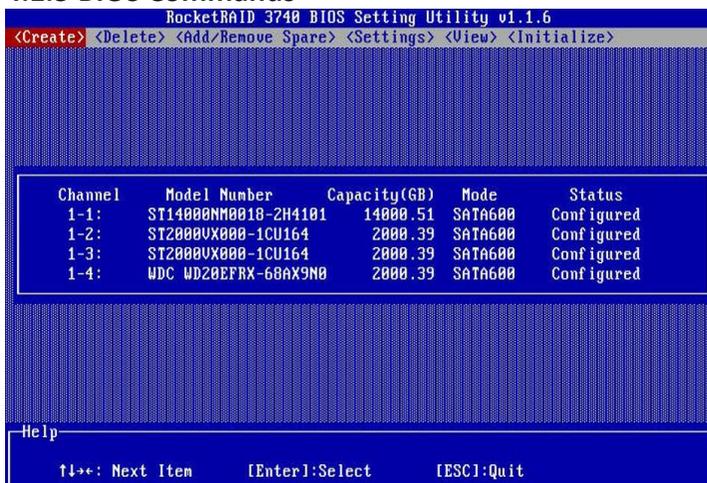
4.1.2 Using the BIOS Utility

The following keys are utilized by the RocketRAID BIOS utility:
Arrow keys – Use these to move between different menu items.
Enter – Open the selected toolbar command/execute the selected command.
Esc – Move back to the previous menu, cancel the selected operation, or exit the BIOS Utility.

4.1.3 BIOS Commands

```
          RocketRAID 3740 BIOS Setting Utility v1.1.6
<Create> <Delete> <Add/Remove Spare> <Settings> <View> <Initialize>






     Channel    Model Number      Capacity(GB)   Mode      Status
      1-1:    ST14000NM0018-2H4101    14000.51  SATA600   Configured
      1-2:    ST2000VX000-1CU164       2000.39  SATA600   Configured
      1-3:    ST2000VX000-1CU164       2000.39  SATA600   Configured
      1-4:    WDC WD20EFRX-68AX9N0     2000.39  SATA600   Configured







Help
  ↑↓→←: Next Item      [Enter]:Select      [ESC]:Quit
```

Create: This command is used to create the RAID array.
Delete: This command is used to delete the selected RAID array.
Add/Remove Spare: This command is used to assign hard disks to function as spare disks. The controller is capable of usingspare disks to automatically rebuild broken or faulted RAID arrays.
Settings: This command opens the settings menu (To selecting the boot disk/array, staggered drive spin up etc.)
View: This command is used to view hard disk and RAID information.
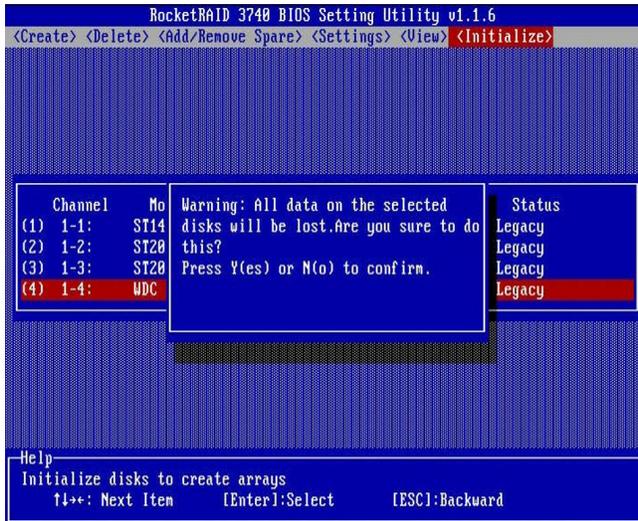**Initialize**: This command is used to prepare disks for use with RAID arrays.
Note：Disks must be initialized before they can be used to create arrays.

4.1.4 Creating RAID Arrays

Initializing Disks:

Before creating a RAID array, the disks must be initialized. Disk initialization writes necessary RAID configuration information to the hard disks. Select the Initialize command from the toolbar, and press the Enter key.

```
                RocketRAID 3740 BIOS Setting Utility v1.1.6
 <Create> <Delete> <Add/Remove Spare> <Settings> <View> <Initialize>




      Channel    Mo  Warning: All data on the selected    Status
  (1)  1-1:    ST14  disks will be lost.Are you sure to do Legacy
  (2)  1-2:    ST20  this?                                 Legacy
  (3)  1-3:    ST20  Press Y(es) or N(o) to confirm.       Legacy
  (4)  1-4:    WDC                                         Legacy






 ─Help─
  Initialize disks to create arrays
    ↑↓→←: Next Item    [Enter]:Select     [ESC]:Backward
```
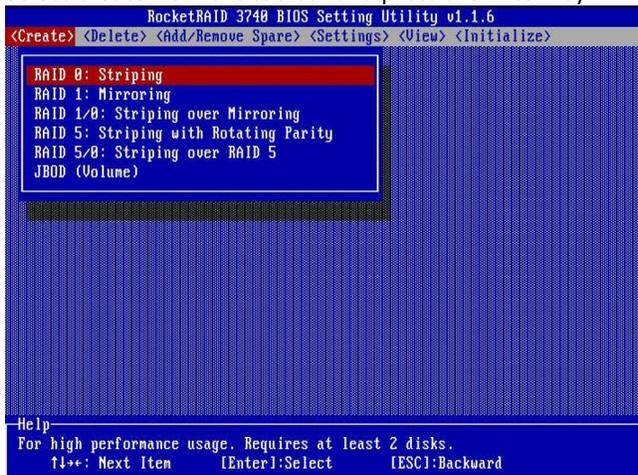
Highlight the target disks using the arrow keys, and then press the Enter key. A numeral will be displayed before each selected disk. Once all target disks have been selected, press ESC key. The utility will display a warning, and ask you to press Y (yes) to initialize, or N (no) to cancel. Once initialized, these disks can be used to create RAID arrays. These disks will be displayed as "Initialized" (under Status).

Warning: Initialization will destroy all pre- existing data on the selected hard disks. Only initialize disks that do not contain critical data.

Create Arrays:

Select Create from the toolbar and press the Enter key.

```
                RocketRAID 3740 BIOS Setting Utility v1.1.6
 <Create> <Delete> <Add/Remove Spare> <Settings> <View> <Initialize>

   RAID 0: Striping
   RAID 1: Mirroring
   RAID 1/0: Striping over Mirroring
   RAID 5: Striping with Rotating Parity
   RAID 5/0: Striping over RAID 5
   JBOD (Volume)












 ─Help─
  For high performance usage. Requires at least 2 disks.
    ↑↓→←: Next Item    [Enter]:Select     [ESC]:Backward
```

1. Use the arrow keys to select the RAID level and press the Enter key.
2. Use the arrow keys to highlight the Array Name option and press the Enter key. The array name dialogue box will appear. Use the keyboard to input a new Array Name, and press the Enter key.

Note: The Array Name command is optional – it is not necessary to name the array. The array can be named at a later time, and the name of the array can be changed at any time.

3. On the Create menu, use the arrow keys to highlight the Select Devices item and press the Enter key. A device list will appear, and display all available hard disk drives.
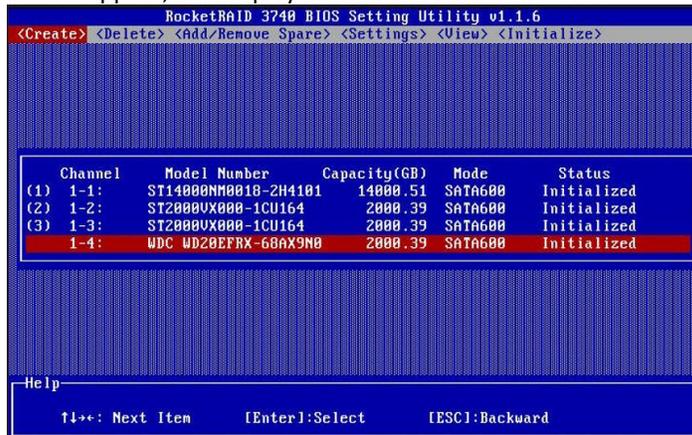
4. Highlight the target disks that you want to use, and press the Enter key to select them. A numeral will be displayed before each selected disk. This number designates disk order. After all of the disks have been selected and press the ESC key to return to the Create Menu.

5. Next, Use the↓ arrow key to highlight the Capacity (GB) option and press the Enter key. The total available capacity will be displayed. Press the Enter key if you wish to use all available space. If you wish to reserve disk space for additional arrays/single disks, use the keyboard to input the amount of space (in GB) you wish to setaside for this particular array, and press the Enter key.
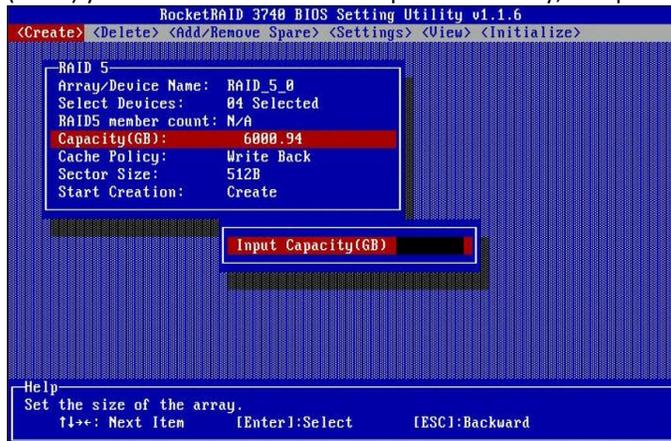

Note: Multiple arrays can be created using the same set of hard disk drives. The Capacity option allows you to set aside disk space that be used to create another array, set as a spare disk, or partitioned to act as a single disk (by the operating system).

6. For redundant RAID arrays (RAID 5, 50), select the Cache Policy:
   Write Back – Provides higher write performance for redundant RAID arrays. Data is at risk when there is a power failure, system kernel panic and unresponsive abnormal conditions.
   Write Through – Writes directly to the disks (may reduce the risk of data loss during a critical failure, but at the cost of lower performance).
7. **Sector Size** – Also known as "Variable Sector Size". Use this option if you are using an older 32-bit Windows operating system. This allows older operating systems to support volumes over 2TB in size. Do not use if the operating system already supports large volumes (such as GPT).

8. To complete the creation procedure, use the arrow key to highlight the Start Creation item and press the Enter key.

The Window will show 2 options when creating a RAID 5 array: Background Initialization and No initialization.
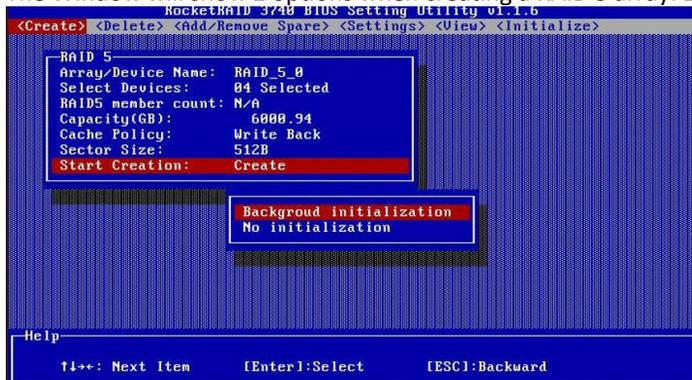
Background initialization:

The RAID array is accessible while disk initialization is being performed.

A. This option will delete all content on the disks.

B. The initialization time will be longer when compared to "Foreground" but the logical drives can be used during the initialization process.

No initialization:

The No initialization option is recommended for use when rescuing an original array of for testing purposes. This option will not make any changes to the data area of each disk. When you select this option, a pop-up window will display; press Y (yes) to create the array, or N (no) to cancel the creation process.

4.1.5 Delete Arrays

Highlight the Delete command from the toolbar, and press the Enter key.

The BIOS utility will display a list of available RAID arrays. Select the array you wish to delete, and press the Enter key.
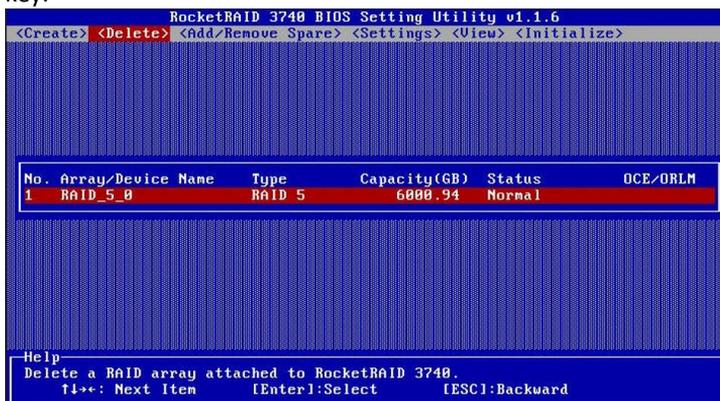

The utility will display a warning message. Press Y (yes) to delete the array, or select N (no) to cancel.

Warning: All data stored on the array will be lost – do not delete if the array contains critical data.

4.1.6 Add/Remove Spare Disks

The Add/Remove Spare command is used to assign a hard disk to act as a Spare Disk. Spare Disks are used to automatically rebuild Redundant RAID arrays (RAID 1, 5, 10) in the case of disk failure. As with creating RAID arrays, disks must be initialized before they can be used as spares. To set a hard disk to act as a Spare Disk, use the arrow keys to select the target disk from the list of initialized disks, and press the Enter key. To remove the Spare Disk setting from a hard disk, highlight the spare disk, and press the Enter key. Generally, single disks are designated to act as spares (disks that are not configured into RAID arrays). However, in some instances, disks that are members of RAID arrays may also be designated to act as a spare. If the disks in question are part of a RAID array that did not utilize the full available capacity at the time of creation, these disks may be used as spares. Disk status changed

from Initialized to Configured (Spare).
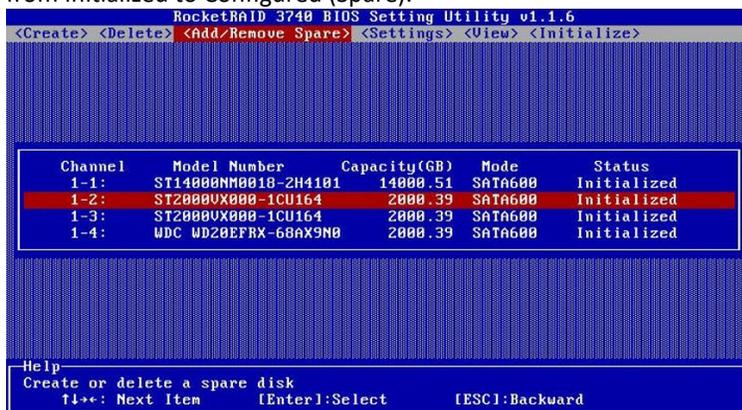
4.1.7 Settings

To access the Settings menu, highlight the Settings command from the toolbar, and press the Enter key. There are Select Boot Device and Parameter Setting options in the menu.
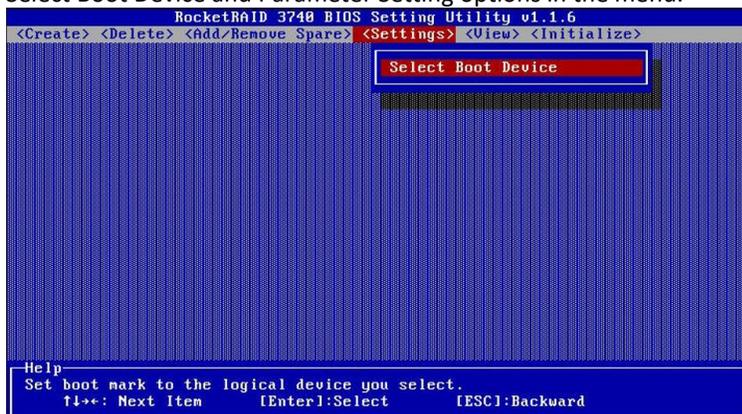
Select Boot Device:

Select which disk or array will act as the boot disk, if the motherboard BIOS instructs the card to act as the boot device.

- When booting up the system, press **CTRL** + **H** during the HighPoint RocketRAID splash screen to enter the BIOS RAID creation utility.
- Navigate to **Settings** using arrow keys.
- Press **Enter.**
- Press **Enter** again.
- Select the desired RAID array.
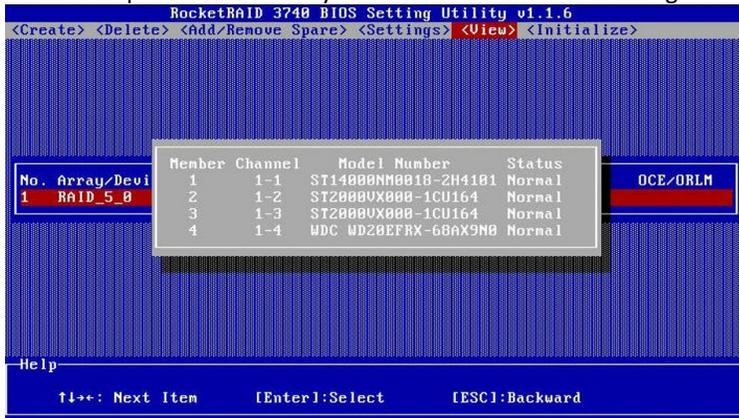- You will return to the main screen once the **boot flag** is set

4.1.8 View

The View menu provides two options:

Devices – This option will display information for each disk hosted by the HBA.

```
                RocketRAID 3740 BIOS Setting Utility v1.1.6
 <Create> <Delete> <Add/Remove Spare> <Settings> <View> <Initialize>




    Channel       No.    Array/Device Name  Capacity(GB)      tatus
    1-1:           1       RAID_5_0            2000.31         figured
    1-2:        Max Free(GB):     12000.13                    figured
    1-3:        Total Free(GB):   12000.13                    figured
    1-4:                                                      figured




─Help─────────────────────────────────────────────────────────────
      ↑↓→←: Next Item      [Enter]:Select      [ESC]:Backward
```
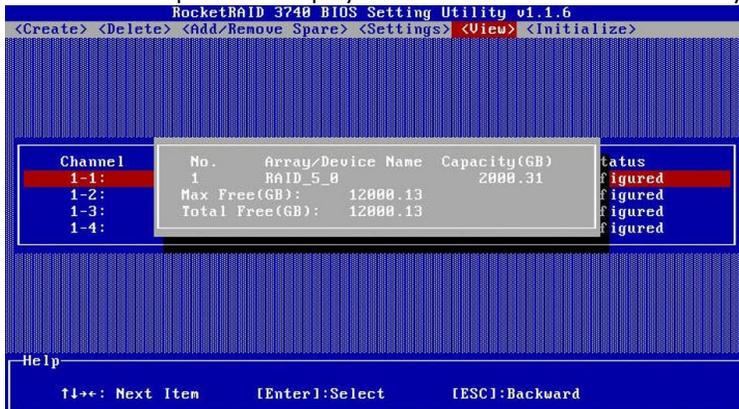
RAID Array – This option will display information about each RAID array hosted by the HBA. Highlight the target device and press the Enter key to view details about the configuration.
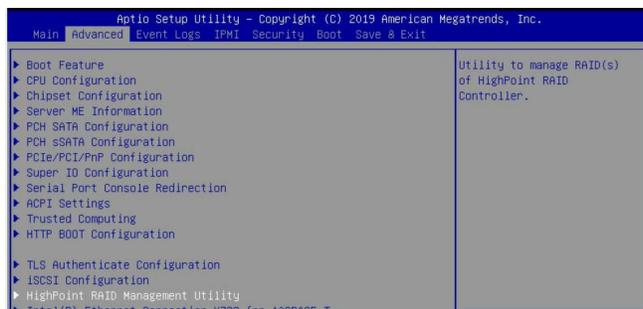
```
                RocketRAID 3740 BIOS Setting Utility v1.1.6
 <Create> <Delete> <Add/Remove Spare> <Settings> <View> <Initialize>




                Member Channel    Model Number     Status
No. Array/Devi    1     1-1   ST14000NM0018-2H4101 Normal    OCE/ORLM
1   RAID_5_0      2     1-2   ST2000VX000-1CU164   Normal
                  3     1-3   ST2000VX000-1CU164   Normal
                  4     1-4   WDC WD20EFRX-68AX9N0 Normal




─Help─────────────────────────────────────────────────────────────
      ↑↓→←: Next Item      [Enter]:Select      [ESC]:Backward
```

4.2. Using the RocketRAID Series HBA UEFI (UEFI HII)

Note: After setting 'UEFI Setting', if there is no 'HighPoint RAID Management Utility' option in the motherboard BIOS, the motherboard does not support UEFI HII, please replace the other two methods.

### 4.2.1 RocketRAID UEFI Setting Utility

The RocketRAID UEFI utility is an interface that provides management commands and controller related settings. After installing the RAID controller and powering on the system, the RAID controller UEFI should post during the system's boot procedure.

```
             Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
      Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

    ▶ Boot Feature                              Utility to manage RAID(s)
    ▶ CPU Configuration                         of HighPoint RAID
    ▶ Chipset Configuration                     Controller.
    ▶ Server ME Information
    ▶ PCH SATA Configuration
    ▶ PCH sSATA Configuration
    ▶ PCIe/PCI/PnP Configuration
    ▶ Super IO Configuration
    ▶ Serial Port Console Redirection
    ▶ ACPI Settings
    ▶ Trusted Computing
    ▶ HTTP BOOT Configuration

    ▶ TLS Authenticate Configuration
    ▶ iSCSI Configuration
    ▶ HighPoint RAID Management Utility
    ▶ Intel(R) Ethernet Connection X722 for 10GBASE-T –
```

13

Different motherboards will provide different UEFI settings. Please consult your motherboard's user manual for more information.

Set UEFI setting with SuperMicro X11DPH-T motherboard as an example.
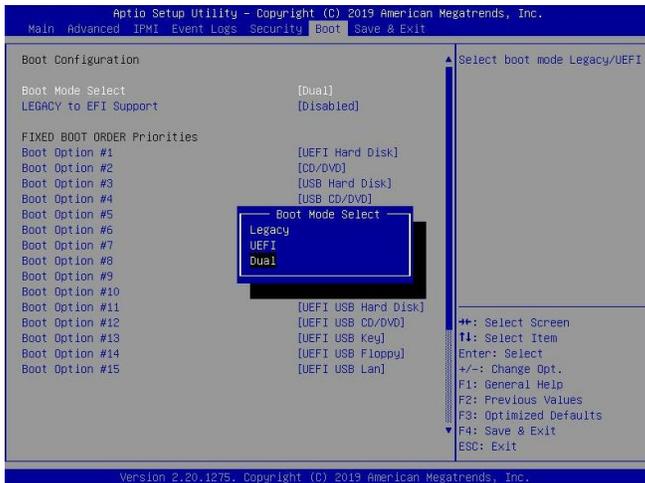
1. Set "Boot Mode Select" to "Dual"

2. Under "Advanced->PCIe/PCI/PnP Configuration->, change "CPUx Slot x PCI-E OPROM" to "EFI". "x" represents the PCIE slot assignment. For this example, the RR3740 is installed into "CPU2 Slot 2"
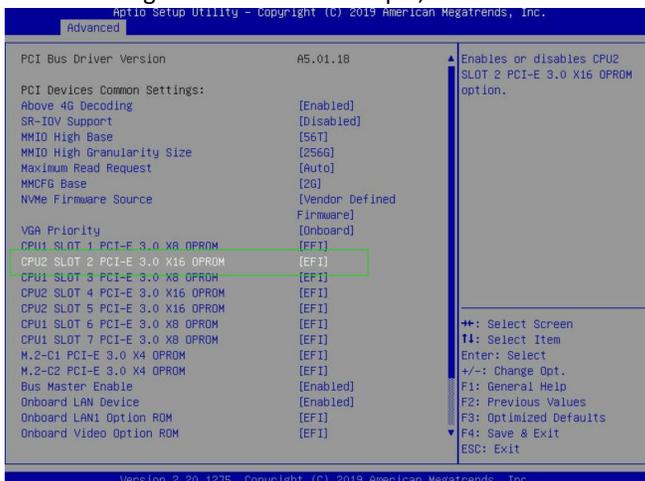
3. Reboot into the motherboard BIOS, "**HighPoint RAID Management Utility**" appears in the Advanced options.
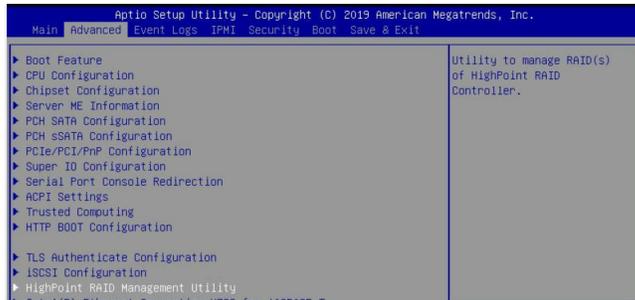
4.2.2 Using the UEFI Utility

The following keys are utilized by the RocketRAID UEFI utility:

Arrow keys – Use these to move between different menu items.
Enter – Open the selected toolbar command/execute the selected command.
N or Esc – Move back to the previous menu, cancel the selected operation, or exit the BIOS Utility.

4.2.3 UEFI Commands

```
Controller Information                       PCI Express Speed:
21:0:0 RocketRAID 3740 SAS Controller          Current: 8GT/s
Physical Device Information (ENTER to toggle locater)   Designed: 8GT/s
1/1 ST12000NE0007-2GT116, Normal             PCI Express Width:
1/2 ST6000VN0041-2EL11C, Normal                Current: x4
1/3 ST14000NM0018-2H4101, Normal               Designed: x8
1/4 TOSHIBA MD04ACA600, Normal               Ver: v1.0.7
>>> Turn off all locater(s) <<<              Sep  1 2022 13:26:07
Logical Device Information
  [   ] RAID0_01D79703 (RAID0), 12001GB Disabled
▶ Create RAID ...
▶ Delete RAID ...
Utility built on             Jul 28 2022 17:49:11
```

Create: This command is used to create the RAID array.
Delete: This command is used to delete the selected RAID array.

4.2.4 Create RAID Arrays

Using UEFI Utility with ASUS WS X299 motherboard as an example

1. Select **Create RAID...** from the HighPint RAID Management Utility.
2. On the Create menu. A device list will appear, and display all available hard disk drives.
3. Select RAID type from dropdown list. Use the up and down keys of the keyboard or the mouse to select the RAID type and press the Enter key.

```
Specify RAID type, member disks and RAID capacity to Create
RAID
Select RAID type from dropdown list       [_____]
Select disk(s) to be used to create RAID:
1/1 ST12000NE0007-2GT116              [Disabled]
1/2 ST6000VN0041-2EL11C              [Disabled]
1/3 ST14000NM0018-2H4101             [Disabled]
1/4 TOSHIBA MD04ACA600               [Disabled]
Desired RAID Capacity (G ┌── Select RAID type from dropdown list ──┐
Press to Create RAID     │ _____                                  │
Return to main window    │ JBOD                                    │
                         │ RAID0                                   │
                         │ RAID1                                   │
                         │ RAID5                                   │
                         │ RAID5 (Write Through)                   │
                         │ RAID10                                  │
                         └─────────────────────────────────────────┘
                                                  ↑↓: s
```

Supported RAID Type：JBOD/ RAID0/RAID1/RAID5/RAID5(Write Through)/ RAID10

4. Select disk(s) to be used to create RAID. Select the disk that needs to create RAID, and the status of the disk changes from **off** to **on**, which means that the disk has been selected.
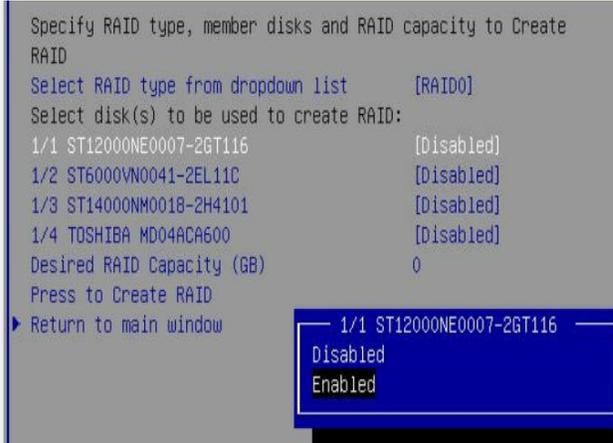
Note：Disks don't need to be initialized before they can be used to create arrays.

5. After all of the disks have been selected, you can decide how much storage capacity will be assigned to the array using.
    If you wish to reserve disk space for additional arrays/single disks, use the keyboard to input the amount of space (in GB) you wish to setaside for this particular array.
6. Next, select, **press to create RAID** to complete the RAID Array creation. A pop-up window prompt: **Are you sure to create RAID0 with specified disk(s). Press 'Y' to confirm. 'N' / 'ESC' to ignore.**
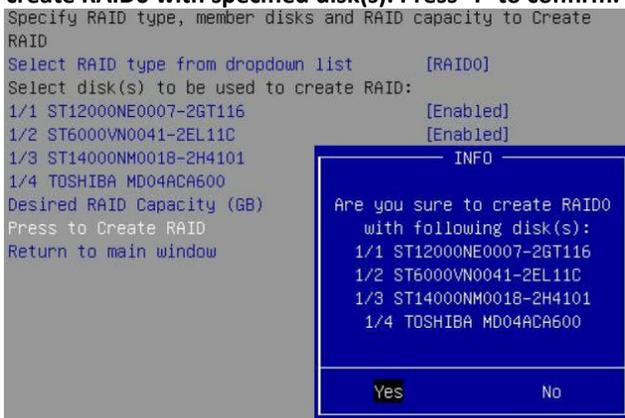
7. A pop-up window will state that **RAID*** creation succeeded. Press any key to continue**. Press any key to confirm the operation again.

Note: Multiple arrays can be created using the same set of hard disk drives. The Capacity option allows you to set aside disk space

that be used to create another array, set as a spare disk, or partitioned to act as a single disk.

4.2.5 Delete RAID Arrays

Highlight the Delete command from the toolbar, and press the Enter key.

The UEFI utility will display a list of available RAID arrays.

1. Select the array you wish to delete, and press the **Enter** key.

```
Select RAID and press ENTER to delete
 [VD 0] RAID0_01DDA10D (RAID0), 16003GB Normal
```

2. The utility will display a warning message. Press '**Y**' to delete the array, or select '**N' / 'ESC'** to cancel.

```
Select RAID and press ENTER to delete
 [VD 0] RAID0_01DDA10D (RAID0), 16003GB Normal
 Return to main window



                          ─── WARNING ───

                  Are you sure to delete RAID:
                        RAID0_01DDA10D

                  Yes                      No
```

3. Press any key to confirm the operation again.

```
Select RAID and press ENTER to delete
 [VD 0] RAID0_01DDA10D (RAID0), 16003GB Normal
▶ Return to main window



                          ─── INFO ───

                  RAID0_01DDA10D deletion succeeded.


                            Ok
```

Warning: All data stored on the array will be lost – do not delete if the array contains critical data.

4.2.6 Toggle Locater LEDs

Toggle Locater LEDs function is used to locate the Hard Drive or SSD position.

Note: This function can only be used on motherboards with backplanes that support SGPIO.

1. Select the disk to be located and press **Enter,** When the **<Locator>** appears behind the disk, it means that the toggle locater LED is successful. At this point, the backplane light of the slot where the disk is located starts blinking.

```
Physical Device Information (ENTER to toggle locater)
1/1 ST12000NE0007-2GT116, Normal<Locater>
1/2 ST6000VN0041-2EL11C, Normal
1/3 ST14000NM0018-2H4101, Normal
1/4 TOSHIBA MD04ACA600, Normal
>>> Turn off all locater(s) <<<
Logical Device Information
```

2. Press Enter again, the **<Locator>** disappear, and the back panel light of the slot where the hard disk is located is off.

```
Physical Device Information (ENTER to toggle locater)
1/1 ST12000NE0007-2GT116, Normal
1/2 ST6000VN0041-2EL11C, Normal
1/3 ST14000NM0018-2H4101, Normal
1/4 TOSHIBA MD04ACA600, Normal
>>> Turn off all locater(s) <<<
Logical Device Information
```

3. You choose to locate one or more disks, you can use the **Turn off all locater(s)** to turn off the lights together.

```
Physical Device Information (ENTER to toggle locater)
1/1 ST12000NE0007-2GT116, Normal
1/2 ST6000VN0041-2EL11C, Normal
1/3 ST14000NM0018-2H4101, Normal
1/4 TOSHIBA MD04ACA600, Normal
>>> Turn off all locater(s) <<<
```

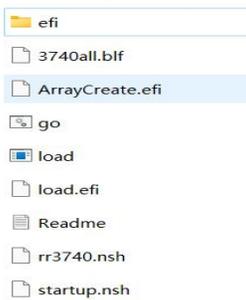## 4.3. Using the Rocket Series HBA UEFI Command Line (UEFI CLI Tool)

4.3.1 UEFI Setting Utility

1. **Preparing the USB Flash Drive：**

   When preparing the USB flash dive, make sure to format the USB partition as FAT32. If another file system is used, the USB drive may not be properly recognized, and will not appear as an option under the motherboard's UEFI BIOS menus.

2. **Preparing the UEFI Package：**

   The package must be unzipped directly to the root of the bootable USB flash drive (do not extract the contents to a new folder). All of the following items must be present in the root of the USB flash drive. For example (**RR3740**)

   ```
   efi
   3740all.blf
   ArrayCreate.efi
   go
   load
   load.efi
   Readme
   rr3740.nsh
   startup.nsh
   ```

   Note: If the above content is not present in the root directory, the UEFI boot device will not be properly recognized

3. Insert the USB flash drive into the appropriate USB port.

4. **Under the Boot Mode settings, select UEFI.**

   Note, Under the Boot Mode settings, select UEFI. Note, different motherboards will provide different UEFI related settings. Please consult your motherboard's user manual for more information.
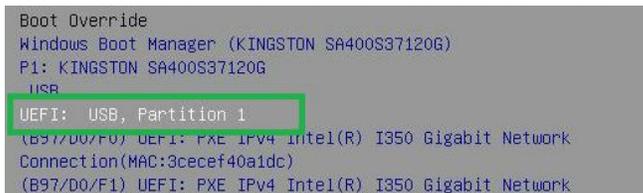
   With SuperMicro X11DPi-NT motherboard as an example.

   01. Set "Boot Mode Select" to "Dual";

02. Under "Advanced->PCIe/PCI/PnP Configuration->, change "CPUx Slot x PCI-E OPROM" to "**EFI**". "x" represents the PCIE slot assignment. For this example, the RR3720 is installed into "CPU2 Slot
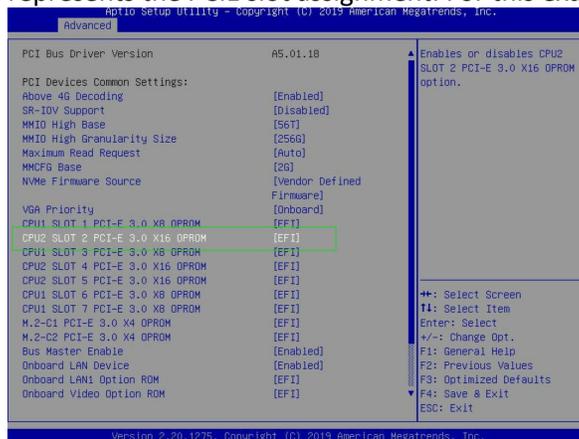
5. Boot from the UEFI USB flash drive and enter the UEFI interface;

6. At the prompt, enter the following command to change the resolution:
   mode 100 31

7. Query the files in the USB flash drive and enter the command: **dir**

8. Next, enter the following command to enter the RAID creation utility:
   ArrayCreate.efi

```
FS0:\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20211014)
==== Controller information:
 PCI Location: 21:00:00
        Vendor: HighPoint Technologies, Inc.
        Product: RocketRAID 3740 SAS Controller

==== Physical device list(count 6):
1/1 ST6000VN0041-2EL11C-ZA190V1D, 6001175MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/2 TOSHIBA MD04ACA600-47T7KEX9FFQC, 6001175MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/3 ST14000NM0018-2H4101-ZHZ12MTS, 14000452MB(MaxFree 14000452MB), Normal [RA][WC][NCQ]
1/4 ST12000NE0007-2GT116-ZCH02K31, 12000138MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/5 ST2000VX000-1CU164-W1E8N3QT, 2000398MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/7 ST12000NM0008-2H3101-ZHZ0B90W, 12000138MB(MaxFree 0MB), Normal [RA][WC][NCQ]

==== Logical device list(count 5):
 1 1/1 ST6000VN0041-2EL11C-ZA190V1D, 6001175MB(MaxFree 0MB), Normal [RA][WC][NCQ]
 2 1/2 TOSHIBA MD04ACA600-47T7KEX9FFQC, 6001175MB(MaxFree 0MB), Normal [RA][WC][NCQ]
 3 1/4 ST12000NE0007-2GT116-ZCH02K31, 12000138MB(MaxFree 0MB), Normal [RA][WC][NCQ]
 4 1/5 ST2000VX000-1CU164-W1E8N3QT, 2000398MB(MaxFree 0MB), Normal [RA][WC][NCQ]
 5 1/7 ST12000NM0008-2H3101-ZHZ0B90W, 12000138MB(MaxFree 0MB), Normal [RA][WC][NCQ]
------------------------------------------------------------------------------
```

4.3.2 UEFI CLI Commands

```
Supported command: help/info/quit/exit/create/delete.
```

H/h/help: Show generic help about this utility.
info: Display physical device list and logical device list
Q/q/quit/exit: Quit the application
create: This command is used to create the RAID array.
delete: This command is used to delete the selected RAID array.

4.3.3 Create RAID Arrays

Note: R3720/3740 only support RAID0/1/5/10/50/JBOD
Create Array Type (JBOD/RAID0/RAID1/10) Member Disk list (1/1, 1/2|*) Capacity (100|*)

Examples
<<< create RAID0 * *
<<< create RAID0 *
<<< create RAID0
  create RAID0 array with all disks and with maximum capacity

```
>>> Please specify command to execute:
<<< create RAID0 * *
    Creating array: RAID0_4431B782.
    Array created successfully.
==============================================================================
>>> Please specify command to execute:
<<< create RAID0 *
    Creating array: RAID0_3AB50C2A.
    Array created successfully.
==============================================================================
>>> Please specify command to execute:
<<< create RAID0
    Creating array: RAID0_60B7ACD9.
    Array created successfully.
==============================================================================

==== Physical device list(count 5):
1/2 ST2000VX000-1CU164-Z1E2HYQB, 2000313MB(MaxFree 0MB), Normal
1/5 WDC WD60EFRX-68MYMN1-WD-WX31DB48X74A, 6001075MB(MaxFree 4000762MB), Normal [RA][WC][NCQ]
1/6 ST14000NM0018-2H4101-ZHZ0ZN64, 14000452MB(MaxFree 12000138MB), Normal [RA][WC][NCQ]
1/7 ST4000VN008-2DR166-WDH109Q0, 4000694MB(MaxFree 2000381MB), Normal [RA][WC][NCQ]
1/8 TOSHIBA DT01ACA300-Y731JVGAS, 3000504MB(MaxFree 1000190MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
 1 [VD0-0] RAID0_60B7ACD9 (RAID0), 10001569MB (Stripe 64KB), Normal
    1/2 ST2000VX000-1CU164
    1/5 WDC WD60EFRX-68MYMN1
    1/6 ST14000NM0018-2H4101
    1/7 ST4000VN008-2DR166
    1/8 TOSHIBA DT01ACA300
------------------------------------------------------------------------------
>>> Please specify command to execute:
<<< _
```

<<< create RAID1 1/5,1/6 10
  create RAID1 array with disk 1/5 and 1/6 and with 10GB capacity.

```
>>> Please specify command to execute:
<<< create RAID1 1/5,1/6 10
    Creating array: RAID1_000041A7.
    Array created successfully.
================================================================

==== Physical device list(count 4):
1/5 WDC WD60EFRX-68MYMN1-WD-WX31DB48X74A, 6001075MB(MaxFree 5991075MB), Normal [RA][WC][NCQ
1/6 ST14000NM0018-2H4101-ZHZ0ZN64, 14000452MB(MaxFree 13990452MB), Normal [RA][WC][NCQ]
1/7 ST4000VN008-2DR166-WDH109Q0, 4000694MB(MaxFree 4000694MB), Normal [RA][WC][NCQ]
1/8 TOSHIBA DT01ACA300-Y731JVGAS, 3000504MB(MaxFree 3000504MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
 1 [VD0-0] RAID1_000041A7 (RAID1), 10000MB (Stripe 64KB), Normal
     1/5 WDC WD60EFRX-68MYMN1
     1/6 ST14000NM0018-2H4101
-----------------------------------------------------------------
```

<<< create RAID5 * 40
  create RAID5 array with all disks and with 40GB capacity.

```
>>> Please specify command to execute:
<<< create RAID5 * 40
    Creating array: RAID5_000041A7.
    Array created successfully.
================================================================

==== Physical device list(count 7):
1/2 Samsung SSD 850 PRO 256GB-S25UNX0H609767K, 255953MB(MaxFree 249286MB), Normal [RA][WC][NCQ]
1/3 ST1000NM0033-9ZM173-21W0MJFM, 1000123MB(MaxFree 993456MB), Normal [RA][WC][NCQ]
1/4 ST1000NM0033-9ZM173-21W10XEW, 1000123MB(MaxFree 993456MB), Normal [RA][WC][NCQ]
1/5 Samsung SSD 860 PRO 256GB-S42WNF0K401266V, 255953MB(MaxFree 249286MB), Normal [RA][WC][NCQ]
1/6 Samsung SSD 850 PRO 256GB-S25UNX0H610665M, 255953MB(MaxFree 249286MB), Normal [RA][WC][NCQ]
1/7 Samsung SSD 860 PRO 256GB-S42WNF0K4022322, 255953MB(MaxFree 249286MB), Normal [RA][WC][NCQ]
1/8 Samsung SSD 850 PRO 256GB-S25UNX0H609750P, 255953MB(MaxFree 249286MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
 1 [VD0-0] RAID5_000041A7 (RAID5), 40000MB (Stripe 64KB), Normal
     1/2 Samsung SSD 850 PRO 256GB
     1/3 ST1000NM0033-9ZM173
     1/4 ST1000NM0033-9ZM173
     1/5 Samsung SSD 860 PRO 256GB
     1/6 Samsung SSD 850 PRO 256GB
     1/7 Samsung SSD 860 PRO 256GB
     1/8 Samsung SSD 850 PRO 256GB
-----------------------------------------------------------------
>>> Please specify command to execute:
```

<<< create RAID10 *
  create RAID10 array with all disks and with maximum capacity.

```
>>> Please specify command to execute:
<<< create RAID10 *
    Creating array: RAID10_10D63AF1.
    Array created successfully.
================================================================

==== Physical device list(count 4):
1/5 WDC WD60EFRX-68MYMN1-WD-WX31DB48X74A, 6001075MB(MaxFree 3000571MB), Normal [RA][WC][NCQ]
1/6 ST14000NM0018-2H4101-ZHZ0ZN64, 14000452MB(MaxFree 10999948MB), Normal [RA][WC][NCQ]
1/7 ST4000VN008-2DR166-WDH109Q0, 4000694MB(MaxFree 1000190MB), Normal [RA][WC][NCQ]
1/8 TOSHIBA DT01ACA300-Y731JVGAS, 3000504MB(MaxFree 0MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
 1 [VD0-0] RAID10_10D63AF1 (RAID0), 6001008MB (Stripe 64KB), Normal
    RAID10_10D63AF1 (RAID1), 3000504MB (Stripe 64KB), Normal
        1/5 WDC WD60EFRX-68MYMN1
        1/6 ST14000NM0018-2H4101
    RAID10_10D63AF1 (RAID1), 3000504MB (Stripe 64KB), Normal
        1/7 ST4000VN008-2DR166
        1/8 TOSHIBA DT01ACA300
-----------------------------------------------------------------
```

<<< create RAID50,3
   create RAID50 array with all disks and with sub member count 3.

```
>>> Please specify command to execute:
<<< create RAID50,3 1/2,1/3,1/4,1/5,1/6,1/7
    Creating array: RAID50_967BA7E7.
    Array created successfully.
========================================================================

==== Physical device list(count 7):
1/2 Samsung SSD 850 PRO 256GB-S25UNX0H609767K, 255953MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/3 ST1000NM0033-9ZM173-Z1W0MJFM, 1000123MB(MaxFree 744170MB), Normal [RA][WC][NCQ]
1/4 ST1000NM0033-9ZM173-Z1W10XEW, 1000123MB(MaxFree 744170MB), Normal [RA][WC][NCQ]
1/5 Samsung SSD 860 PRO 256GB-S42WNF0K401266V, 255953MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/6 Samsung SSD 850 PRO 256GB-S25UNX0H610665M, 255953MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/7 Samsung SSD 860 PRO 256GB-S42WNF0K402232Z, 255953MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/8 Samsung SSD 850 PRO 256GB-S25UNX0H609750P, 255953MB(MaxFree 255953MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
1 [VD0-0] RAID50_967BA7E7 (RAID0), 1023812MB (Stripe 64KB), Normal
    RAID50_967BA7E7 (RAID5), 511906MB (Stripe 64KB), Normal
        1/2 Samsung SSD 850 PRO 256GB
        1/3 ST1000NM0033-9ZM173
        1/4 ST1000NM0033-9ZM173
    RAID50_967BA7E7 (RAID5), 511906MB (Stripe 64KB), Normal
        1/5 Samsung SSD 860 PRO 256GB
        1/6 Samsung SSD 850 PRO 256GB
        1/7 Samsung SSD 860 PRO 256GB
------------------------------------------------------------------------
>>> Please specify command to execute:
```

<<< create JBOD 1/5,1/6 *
   create RAID1 array with disk 1/5 and 1/6 and with maximum capacity.

```
>>> Please specify command to execute:
<<< create JBOD 1/5,1/6 *
    Creating array: JBOD_4431B782.
    Array created successfully.
========================================================================

==== Physical device list(count 4):
1/5 WDC WD60EFRX-68MYMN1-WD-WX31DB48X74A, 6001075MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/6 ST14000NM0018-2H4101-ZHZ0ZN64, 14000452MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/7 ST4000VN008-2DR166-WDH109Q0, 4000694MB(MaxFree 4000694MB), Normal [RA][WC][NCQ]
1/8 TOSHIBA DT01ACA300-Y731JVGAS, 3000504MB(MaxFree 3000504MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
1 [VD0-0] JBOD_4431B782 (JBOD), 20001528MB (Stripe 64KB), Normal
    1/5 WDC WD60EFRX-68MYMN1
    1/6 ST14000NM0018-2H4101
------------------------------------------------------------------------
```

4.3.4 Delete RAID Arrays

delete {array ID}

Example
<<< delete 1
   delete the first array from Logical device list.
<<< delete 2
   delete the second array from Logical device list.

```
==== Logical device list(count 2):
1 [VD0-0] JBOD_4431B782 (JBOD), 20001528MB (Stripe 64KB), Normal
    1/5 WDC WD60EFRX-68MYMN1
    1/6 ST14000NM0018-2H4101
2 [VD0-1] RAID1_1C06DAC8 (RAID1), 3000504MB (Stripe 64KB), Normal
    1/7 ST4000VN008-2DR166
    1/8 TOSHIBA DT01ACA300
------------------------------------------------------------------------
>>> Please specify command to execute:
<<< delete 2
    Deleting array: RAID1_1C06DAC8 idx 1 1e
<<<<<< hpt_delete_array: id 1e options 2
    Array deleted successfully.
========================================================================

==== Physical device list(count 4):
1/5 WDC WD60EFRX-68MYMN1-WD-WX31DB48X74A, 6001075MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/6 ST14000NM0018-2H4101-ZHZ0ZN64, 14000452MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/7 ST4000VN008-2DR166-WDH109Q0, 4000694MB(MaxFree 4000694MB), Normal [RA][WC][NCQ]
1/8 TOSHIBA DT01ACA300-Y731JVGAS, 3000504MB(MaxFree 3000504MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
1 [VD0-0] JBOD_4431B782 (JBOD), 20001528MB (Stripe 64KB), Normal
    1/5 WDC WD60EFRX-68MYMN1
    1/6 ST14000NM0018-2H4101
------------------------------------------------------------------------
```

4.3.5 Info command

<<< info
    display physical device list and logical device list

```
>>> Please specify command to execute:
<< info
========================================================================

==== Physical device list(count 4):
1/5 WDC WD60EFRX-68MYMN1-WD-WX31DB48X74A, 6001075MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/6 ST14000NM0018-2H4101-ZHZ0ZN64, 14000452MB(MaxFree 0MB), Normal [RA][WC][NCQ]
1/7 ST4000VN008-2DR166-WDH109Q0, 4000694MB(MaxFree 4000694MB), Normal [RA][WC][NCQ]
1/8 TOSHIBA DT01ACA300-Y731JVGAS, 3000504MB(MaxFree 3000504MB), Normal [RA][WC][NCQ]

==== Logical device list(count 1):
 1 [VD0-0] JBOD_4431B782 (JBOD), 20001528MB (Stripe 64KB), Normal
     1/5 WDC WD60EFRX-68MYMN1
     1/6 ST14000NM0018-2H4101
--------------------------------------------------------------------------
```

4.4. Driver & WebGUI Installation

4.4.1 Driver and WebGUI Installation (Windows)

Download and prepare the Windows Driver and WebGUI from the product download page.
RocketRAID 3700:
http://www.highpoint-tech.com/USA_new/series_rr3700a-Download.htm

1. After installing the RAID controller, boot to the Windows operating system.
2. Windows should automatically detect the card as a new "RAID Controller" under device manager.
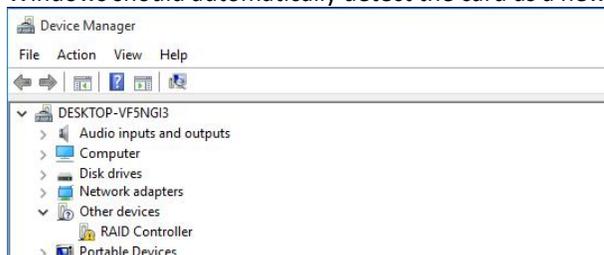
3. Extract the Windows driver and double click on the Setup.exe in the driver folder.
4. Restart the system for the driver to be loaded completely.
5. The RocketRAID 3700 controller will be ready for use after Windows reboots.
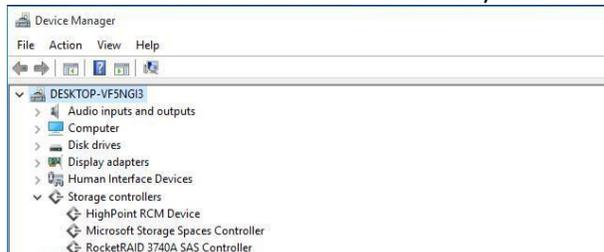
6. Extract the WebGUI package and double click the setup program to install.

4.4.2 Driver and WebGUI Installation (Linux)

Download and prepare the Driver and WebGUI from the product download page.
RocketRAID 3700:
http://www.highpoint-tech.com/USA_new/series_rr3700a-Download.htm

Refer to the README file and Installation Guide under the software folder for the appropriate installation procedure.

4.4.3 Driver and WebGUI Installation (Mac)

http://www.highpoint-tech.com/USA_new/series_rr3700a-Download.htm

1. Extract the Mac driver and double-click the package in the driver folder to install the driver program.
2. Restart the system for the driver to be loaded completely.
3. The RocketRAID 3700 controller will be ready please check the driver is installed.

23

Apple Icon > About this Mac... > System Report > PCI.

4. Extract the WebGUI package and double click the setup program to install.

4.5. Using the HighPoint WebGUI

Please refer to the Online Help guide for more information about using the WebGUI:
http://www.highpoint-tech.com/help/
Double click the Desktop ICON to start the Web browser. It will automatically log-in to the HighPointRAID Management.

The password can be set after the first log-in. To change the password, select **Setting>Security** from the menu bar.

4.5.1 Verify the Controller Status

The **Global View** Tab will display the overall status of the controller. The Virtual Disk is listed under **LogicalDevice Information**. The individual drives are listed under **Physical Device Information.**
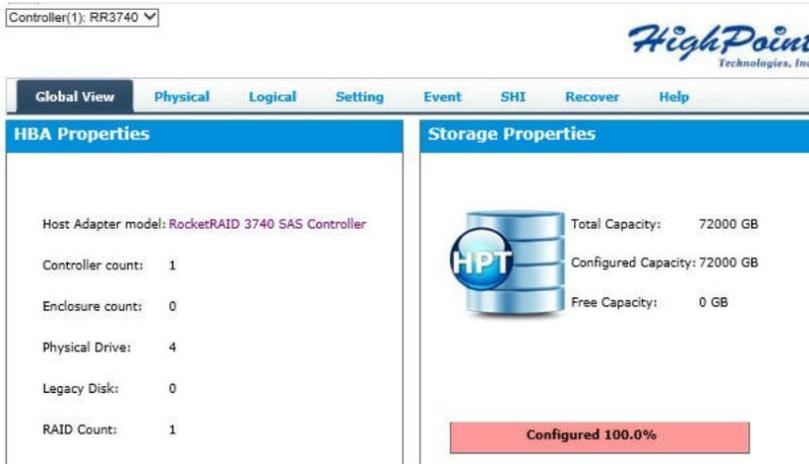
4.5.2 Creating an Array

To create an array:

1. Log into HRM
2. Select the proper **controller** from the drop down on the top left
3. Click **Logical**
4. Click **Create Array**
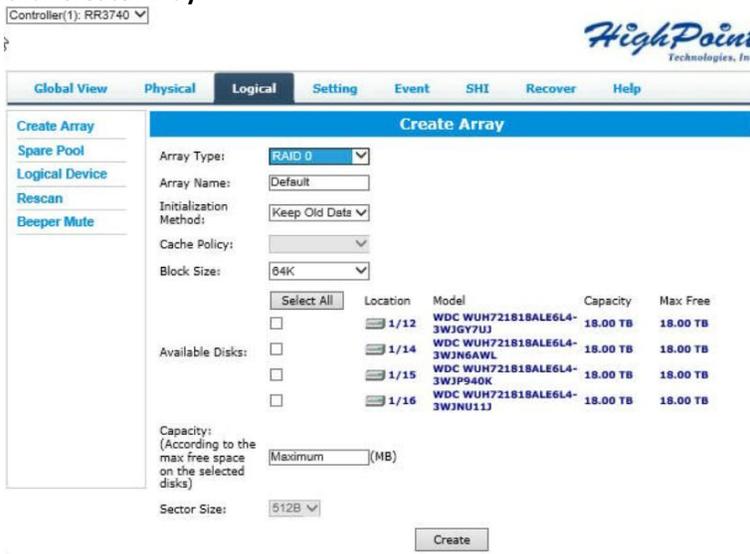
Array Type:
An array is a collection of physical disks that will be seen as one virtual drive by your Operating System (OS).

The RR3700 is capable of creating the following array types:
- RAID 0 — Striping
- RAID 1 — Mirroring

- RAID 5 – 1 drive redundant
- RAID 6 – 2 drive redundant
- RAID 10 — Striping Mirrored array
- RAID 50 – 1 drive redundant mirror

Each RAID level has its pros and cons based on the application you use it for (Note: Refer to RAID level Quick Reference)

Array Name: the name that will be displayed in Logical Device Information (Default: RAID_<level>_<array number>)

Initialization Method: Initialization of a disk sets all data bits to 0, essentially clearing all the data on the drive. It is important to initialize disks as previous data physically stored on the drive may interfere with new data.

- **Keep Old Data:** This option skips the initialization process and all data on each physical disk of the array will be untouched.
- **Quick Init**: This option grants immediate access to the RAID array by skipping the initialization process, but it will delete all data. Note: Skipping initialization is generally not recommended as residual data on disks may interfere with new data in the future.
- **Foreground**: The array initialization process will be set at high priority. During this time array is not accessible, but the initialization process will complete much faster. (Recommended)
- **Background**: The array initialization process will have a lower priority. During this time the array will be accessible, but the initialization process will take much longer to complete.

Note: Initializing takes a significant amount of time (approximately 2 hours per 1 TB when using hard drives). Foreground initializing the array will completely zero out the data on the disks, meaning the disk will be completely wiped and every bit on the disk will be set to 0. Background initialization means the array will still be created, and you can still write new data onto the array. But when your array requires rebuilding, residual data left behind may interfere with the process.

Cache Policy (Default: Write Back)

Write Back – Any data written to the array will be stored as cache, resulting in better I/O performance at the risk of data failures due to power outages. Data will be stored as cache before it is physically written to the disk; when a power outage occurs, any data in the cache will be lost.

Write Through – Data written to an array is directly written onto the disk, meaning lower write performance for higher data availability. Without cache acting as a buffer, write performance will be noticeably slower but data loss due to power outages or other failures is significantly minimized.

Block Size (default: 64K)
[64K to 128K are the supported block sizes]
Adjusting the block size towards your disk usage can result in some performance gain.

In a typical RAID configuration, data of the virtual drive is striped (or spread across) the physical drives. Having a smaller array block size will increase the likelihood of accessing all physical drives when processing large I/O requests. Multiple physical drives working in parallel increases the throughput, meaning better performance.

For smaller I/O requests (512 bytes to 4 kilobytes), it is better to have each individual disks handle their own I/O request, improving the IOPS (I/O per second), rather than having one tiny I/O request being handled by multiple disks.

Capacity (Default: Maximum)

The total amount of space you want the RAID array to take up. When creating RAID levels, disk capacities are limited by the smallest disk.

An example of how disk capacities are limited by smallest disk.

- You have 2 drives connected to the enclosure.
- The first drive is 6 TB, the second is 4 TB
- After creating a RAID level 1 using both drives and maximum capacity, the first drive will have 2 TB, the second 0 TB of free capacity
- The free capacity on the second drive can be used to create a separate array with other drives.

You may also choose how much space each array will utilize. You can use the remaining space to create another array (up to 4 arrays are supported).

4.5.3 Adding Spare Disks

Spare disks are physical disks that will immediately replace critical disks in an array.
To add spare disks:
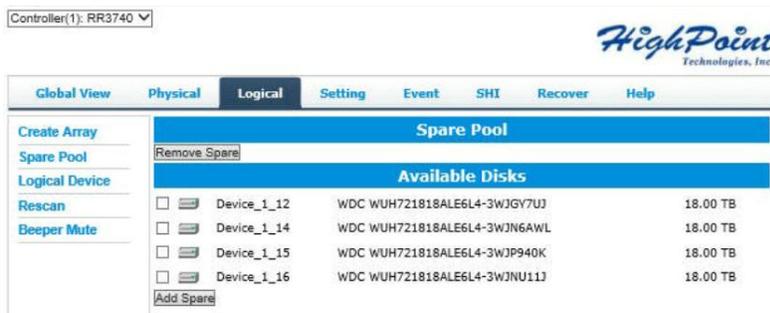
1. Log into the **HRM;**

2. Click **Logical;**

3. Click **Spare Pool:**

4. Check the box for the disk you want as a spare under **Available Disks.**

5. Click **Add Spare,** and confirm by selecting **OK** from the pop-up window**:**
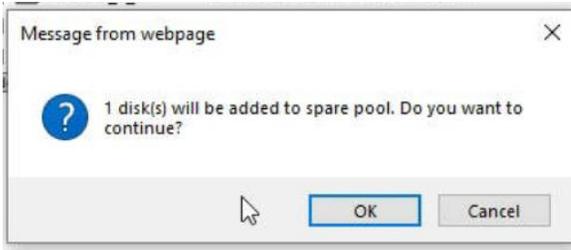
6. The disk has now been assigned as a spare. Click **OK** to confirm:
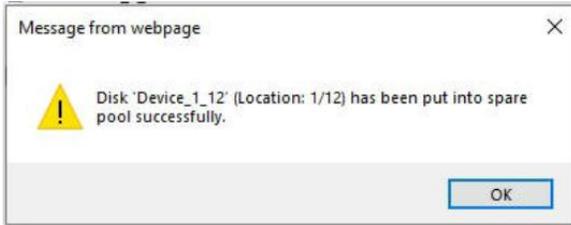
Disks added to the spare pool will be displayed under **Spare Pool** and can be removed by checking the box before the target drive, then click the **Remove Spare** button.

Physical drives marked as a spare will automatically be added to an array whenever there is a disk failure. This feature minimizes the chances of a data loss by reducing the time an array is in the critical status.

4.5.4 Obtaining Logical Device Information

The Logical device tab is the default page after clicking the Logical tab of the HRM. This page contains information about your RAID arrays and the individual disks your system detects.

Logical Device Information
Arrays you create and the properties associated with them will appear here.

Maintenance
Once an array has been created, the Maintenance menu provides options to maintain or edit it. To access the Maintenance menu, click the **Maintenance** button towards the right-hand side of the array name.

Array Information
Clicking on the maintenance button will show you the Array information box. Different array statuses (Normal, critical, disabled) will have different maintenance options.

4.5.5 Array Information &Maintenance Options: Normal Status

Arrays with the **Normal** status are healthy and functioning properly.

Arrays with the **Normal** status will have the following options:
Delete – deletes the selected RAID array

Verify – verifies the integrity of the RAID array

Rename – renames the RAID array.

4.5.6 Array Information & Maintenance Options: Critical Status
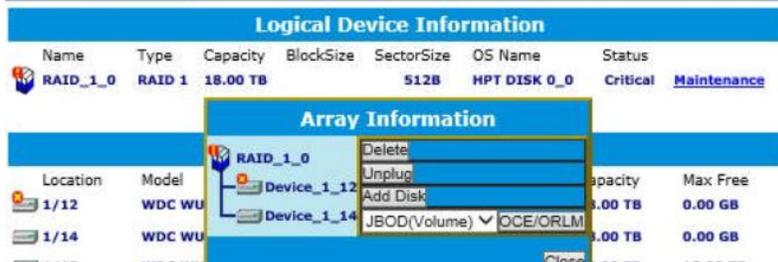
Arrays in the **Critical** status can be accessed and utilized, but are no longer fault tolerant. A Critical array should be rebuilt as soon as possible to restore redundancy.

A critical status array has all the **Normal** status options except the following:
- The Array can no longer be renamed
- **Add Disk** replaces the **Verify Disk** option

Once the array status changes to critical, the faulty disk will be taken offline and you can either:
- Reinsert the same disk
- Insert new disk

Reinserting the same disk should trigger the rebuilding status, since data on the disk would be recognized.

If you insert a new disk, clicking **Add Disk** will give you the option to select that disk and add it to the array.
If a spare disk is available, an array that has entered the critical state will begin rebuilding using the next available spare disk.

4.5.7 Array Information & Maintenance Options: Disabled Status
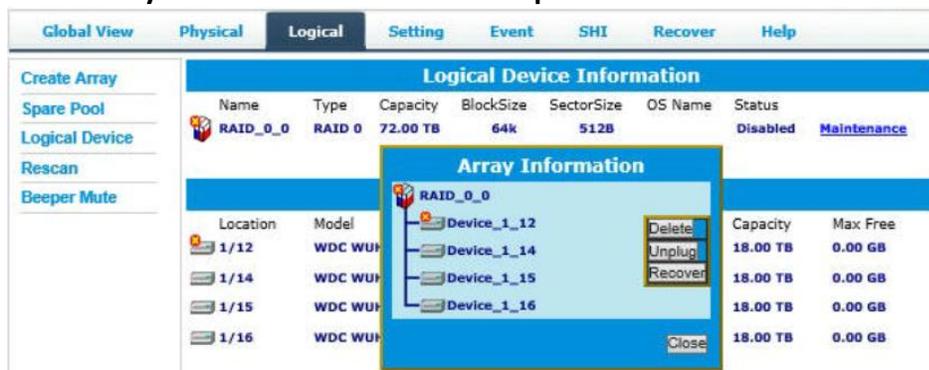
An array with the **Disabled** status means that the RAID level does not have enough disks to function.

- Your data will be inaccessible
- Rebuilding will not trigger, since the RAID array does not have enough parity data to rebuild.

Arrays with the **Disabled** status will have the following options:
Delete – deletes the selected RAID array

Unplug – Hot-plug remaining member disks

Recover – Recover Normal RAID.

You need to delete the current **Disabled RAID** , and then insert the Offline Disk back. Refresh the page , Offline Disk becomes normal status, and Logical Device Information appears **Disabled RAID**. Click the **Recover** to recover the original Normal RAID.
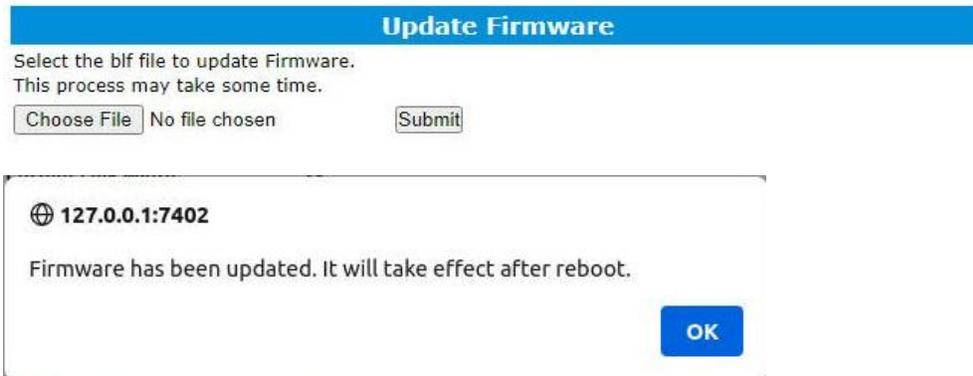
4.5.8 Physical Controller Information

- **Model Name**— model name of the driver connected
- **EFI Version** — the UEFI version of the controller
- **Vendor** — the controller's owner
- **Maximum Link Width —** PCIe width occupied by the motherboard
- **Current Link Width —** PCIe width occupied by drivers
- **Maximum Link Speed —** Maximum rate supported by the motherboard
- **Current Link Speed —** Rate of current bandwidth
- **SN —** the controller's Serial Number
- **Temperature —** the controller's current temperature
- **BIOS Version —** the controller's current BIOS Version
- **EFI Version —** the controller's current EFI Version
- **PCB Version —** the controller's current PCB Version
- **MCU Version —** the controller's current MCU Version

4.5.9 Update Firmware

You can select the BIOS file to be updated by clicking the browse button, and then click Submit to complete.

4.5.10   Physical device Information

- **Location —** which controller and port the drive is located
- **Model—** model number of the drive connected
- **Capacity—** total capacity of the drive
- **MaxFree—** total capacity that is not configured
- **Status—** Current state of drive
- **Interface—** Current interface of drive
- **Type—** Current type of drive

Rescan

Clicking rescan will force the drivers to report the array status. For any disk(s) you hot plug into the device; do not click rescan until all physical drives are detected and appear under Logical Device Information.

4.5.11 System Setting

Using this tab, you can change the following:
- Enable auto-rebuilding
- Enable rebuilding on error
- Enable audible alarm
- Set Spindown Idle Disk(minutes)
- Restrict to localhost
- Set rebuild priority
- Change port number
- Change temperature unit
- Change HRM password
- Enable collecting system logs

System Setting

Enable auto rebuild (default: Enabled)
When a physical drive fails, the controller will take the drive offline. Once you re-insert or replace the disk, the controller will not automatically rebuild the array unless this option is enabled.

Enable continue rebuilding on error (default: Enabled)
When enabled, the rebuilding process will ignore bad disk sectors and continue rebuilding until completion. When the rebuild is finished, the data may be accessible but may also be inconsistent, due to any bad sectors that were ignored during the procedure. If this option is enabled, HighPoint recommends checking the event log periodically for bad sectors warnings.

Enable audible alarm (default: Enabled)

When the disk is dropped, the buzzer will beep. If this option is disable, you won't hear any sound.

Set Spindown Idle Disk(minutes) (default: Disabled)

If this option is disabled, the disk attached to the RR3740A will not stop spinning. If you set the time limit, the disk

will stop rotating according to the specified time when the system is not reading or writing.

Restrict to localhost access (default: Enabled)
Remote access to the controller will be restricted when enabled; other users in your network will be unable to remotely log in to the HRM.

Rebuild Priority (default: Medium)
You can specify the amount of system resources you want to dedicate to rebuilding the array. There are 5 levels of priority [Lowest, Low, Medium, High, Highest]

Port Number (default: 7402)
The default port that the HighPoint HRM listens on is 7402. You may change it to any open port.

Temperature Unit (default: $℉$)

Enable collecting system logs (default: Disabled)
The setting provides a switch to Enabled and Disabled the system log collection function, which is by Disabled default. You can choose to Enabled when you don't need it.

Password Settings
You can switch the expression of temperature units between $℉$ and $℃$ temperature units.

Changing your HRM password

Under Password Setting, type your new password, confirm it, then click **Submit**.
Recovering your HRM password

If you forget your password, you can delete the file hptuser.dat. Then you need to restart the computer and open the WEBGUI to set a new password

For **Windows** Users:

1. Open file explorer
2. Navigate to **C:/Windows/**
3. Delete **hptuser**.**dat**
4. Reboot

Email Setting

The following topics are covered under email:
SMTP Setting
Adding Recipients

You can instruct the controller to send an email out to the recipients of your choosing when certain events trigger (for more information, see Event Tab).

SMTP settings

SMTP Setting	
☐ Enable Event Notification	
Server Address (name or IP):	
Mail From (E-mail address):	
Login Name:	
Password:	
SMTP Port:	25
Support SSL:	☐
	Change Setting

To set up email alerts:

1. Check the Enable Event Notification box.

2. Enter the ISP server address name or SMTP name

3. Type in the email address of the **sender** (email account that is going to **send** the alert)

4. Type in the account name and password of the sender

5. Type in the SMTP port (default: **25**)

6. Check support SSL box if SSL is supported by your ISP (port value will change to **465**).

Note: After you click **Change Setting,** the password box will become blank.

How to Add Recipients

You can add multiple email addresses as receivers of a notice.

1. Type the email of the recipient in the **E-mail** text box
2. Type the name of the recipient in the **Name** text box
3. Check which type(s) of events will trigger an email using the respective **Event Level** check boxes.
4. (**Optional**) Click **test** to confirm the settings are correct by sending out a test email
5. Click **add** to add the 'recipient to recipient' list
6. The added recipient will display in under **Recipients**

The email will include the output recorded in the event log.
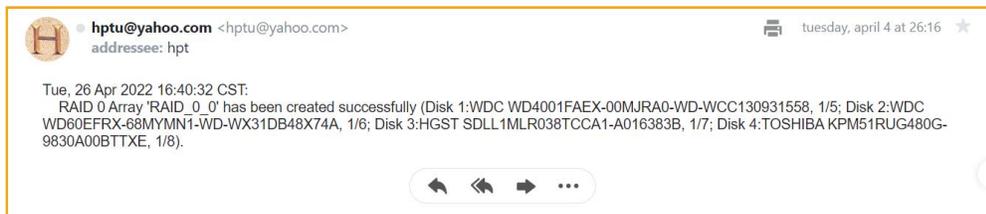
Example email message:

Figure 1. Example event log email

4.5.12   Event Tab

In the event tab, you can see log entries associated with the HighPoint device. The event log provides useful information when troubleshooting your set up.

In the event tab, there are four options available:
Download – Save the log file on your computer
Clear – Clears all log entries
Prev – View previous log page
Next – View next log page

4.5.13　SHI (Storage Health Inspector)

- S.M.A.R.T Attributes
- Schedule a task (Task list and Health Inspector Scheduler)

SHI outputs information collected using SMART (Self-Monitoring Analysis and Reporting Technology) Hard Drive Technology. The data provided on this tab helps you to anticipate any disk failures based on a variety of monitored hard disk properties.

How to Enable SMART Monitoring

To access SMART attributes of an individual disk:

1. Log in to the HRM
2. Select the proper controller using the drop-down menu on the top left
3. Click the **SHI** tab
4. Click **Detail** on the desired disk

How to Use the Health Inspector Scheduler

The **Health Inspector Scheduler** (**HIS**) enables you to schedule disk/array checkups to ensure disks/array are functioning optimally.

How to Create a New Verify Task

All Redundant RAIDs will appear under New Verify Task.

1. Log into the HRM.
2. Select the proper controller from the top left drop down.
3. Click **SHI.**
4. Click **Schedule.**
5. Select the array you want to schedule the verify task.
6. Type the name in **Task Name** entry box.
7. Choose whether you want to schedule.
8. One time verify task on specific date (YYYY-MM-DD) at (HH:MM:SS, 24-hr clock).
9. Or a specific schedule you can adjust based on Daily, Weekly, or Monthly options.
10. Click **Submit.**
11. Your entry will appear under **Tasks List.**

Note: New Verify Task box only appears if you have normal status arrays. If you have a critical array, New Rebuild Task will replace New Verify Task.

4.5.14 Help

Register Product
Diagnostic

Register Product takes you to the HighPoint **Online Web Support Porta**l. On this page you can create a new customerprofile where you can register your product, or post an online support ticket.

Diagnostic provides some basic information about the system and product.

It also provides one-click collection of controller information, and the collected content information is packaged into a compressed package and saved in the C drive. Log Location will show you where to save the log in detail.

CPU: Intel(R) Xeon(R) Silve

MotherBoard: Supermicro X11DPH-T

BIOS: American Megatrends
1072009

Disk: Samsung SSD 860 PR

Chipset: Intel

Message from webpage ✕

? Logs have been saved before.Are you sure to save the event
log?

[OK]   [Cancel]

Driver Name: ii3740a

Logs Location: Logs have been saved in following path:

C:\Program Files (x86)\HighPoint Technologies, Inc\HighPoint RAID Management\Servi
ce\webguiroot\HighPoint_hptnvme_1.2.27.0_2022.03.22_10.15.zip

Save Logs

HighPoint RAID Management
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4.6. Troubleshooting

This section provides guidelines to some problems you may encounter:

- Handling Critical Arrays
- Handling Disabled Arrays
- PC hangs when card is installed.

4.6.1 Handling Critical Arrays

When your disk status turns critical, your array as a whole is still accessible, but one or more disks is faulty (depending on your RAID level), and the array is in danger of failing.

	Bad sector is detected on a disk
Common scenarios for	**that is part of an array**
critical status	**Unrecoverable data during**
	rebuilding
	Defective port or cable
	interrupts rebuilding process

To recover from this situation

1. Backup your existing data.
2. Identify which disk is faulty.
   You can refer to the LED lights on the enclosure Refer to the HRM Logical taband
   Event tab.
3. Re-insert the faulty disk or replace with a new disk.
   The array will rebuild automatically if your auto-rebuild setting is enabled and you reseated the faulty disk.
   Note: Click **Rescan** if the array still does not rebuild automatically.
4. If the new disk is added and it does not automatically start rebuilding, you can manually add the disk in maintenance.

   Log into the HRM Click
   Logical Tab

   Click **Maintenance**>**Add Disk**> select the appropriate disk
5. Rebuild should now start.
   If rebuild does not start, click 'Rescan' on the left hand panel.

Note: Rebuilding an array takes on average 2 hours per 1 Terabyte of disk capacity. The process will scan through the entire disk, even if you have very little *used* disk space.

4.6.2 Rebuilding Stops Due to Bad Sectors

If rebuilding fails to complete due to bad disk sector errors (check in the Event Log), there is an option to continue rebuilding on error in the HighPoint HRM.

1. Log into the HRM
2. Click **Setting** tab
3. Under **System Setting**, change **Enable Continue Rebuilding on Error** to **Enabled**

This option will enable rebuilding to ignore bad sectors and attempt to make your data accessible. It is important to backup immediately after backup is complete and replace or repair the disks with bad sectors.

4.6.3 Critical array becomes disabled when you removed faulty disk

If this is the case, you may have removed the wrong disk. When you remove the wrong disk from a critical array, the array status may become disabled. Data is inaccessible for disabled arrays. Follow these steps to restore the array to the previous state.

1. Shut down your PC
2. Place all disks back to original configuration
3. Boot up PC

Your array should be back to Critical status. Identify the correct disk and rebuild from there.

4.6.4 Handling Disabled Arrays

If two or more disks in your array go offline due to an error or physical disconnection your array will become disabled. Disabled arrays are difficult to recover, so it is important to fix any critical status as soon as possible

4.6.5 Online Array Roaming

One of the features of all HighPoint RAID controllers is online array roaming. Information about the RAID configuration is stored on the physical drives. So if a card fails or you wish to switch cards, the RAID configuration data can still be read by another HighPoint card.

Table 1.HRM Icon Guide

	Critical – missing disk A disk is missing from the array bringing it to 'critical' status. The array is still accessible but another disk failure could result in data loss.
	Verifying The array is currently running a disk integrity check.
	Rebuilding The array is currently rebuilding meaning you replaced a failed disk or added a new disk to a 'critical' state array.
	Critical – rebuild required The array has all disks, but one disk requires rebuilding.
	Disabled The icon represents a disabled array, meaning more than one disk failed and the array is no longer accessible
	Initializing The array is initializing. The two types of initialization are Foreground and Background. (See Initialization)
	Uninitialized The array initialization process has been interrupted, and the process is incomplete.
	Not Initialized Disk is not initialized yet, and needs to be initialized before use
	OCE/ORLM Array is performing a OCE/ORLM operation
	OCE/ORLM has stopped The array expansion process has been stopped.
	Legacy An existing file system has been detected on the disk. These disks are classified as legacy drives. **Spare** The device is a spare drive, it will automatically replace any failed drive part of an array.
	Normal The array status is normal
	Initializing The array is initializing, either foreground or background initialization
	Initialization Stopped The initialization has been stopped. Current status is uninitialized.
	Critical – Inconsistency Data in the array is inconsistent and needs to be rebuilt.
	Critical – missing disk A disk has been removed or experienced failure, and user needs to reinsert disk or add a new disk.
	Rebuilding The array is currently rebuilding.
	Verifying

The array is performing a data consistency check. Array status will show 'verifying'.

	Disabled The array does not have enough disks to maintain the RAID level. A disabled array is not accessible.
	OCE/ORLM Array is expanding its capacity or migrating to a different raid level. Status will display 'Expanding/Migrating' OCE/ORLM stopped
	The 'Expansion/Migrating' process has been stopped. The status will display 'Need Expanding/Migrating'
	Critical – OCE/ORLM A disk member is lost during the OCE/ORLM process.
	Critical – OCE/ORLM - rebuild The expanding/migrating array requires a rebuild.

Table 2. RAID Level Reference Guide

Type	Description	Min. disks	Usable space	Advantage	Disadvantage	Application
JBOD	Just a bunch of disk	1	100%	Each drive can be accessed as a single volume	No fault tolerance - failure of one drive results in complete data loss	Backup
RAID 0	Disk Striping	2	100%	Offers the highest performance	No fault tolerance - failure of one drive results in complete data loss	Temporary file, performance driven application.
RAID 1	Disk Mirroring	2	50%	Provides convenient low-cost data redundancy for smaller systems and servers	Useable storage space is 50% of total available capacity. Can handle 1 disk failure.	Operating system, backup, and transaction database.
RAID 10	Disk Mirroring followed by stripe	4	50%	High read performance and medium write performance with data protection for up to 2-drive failures	Useable storage capacity equals total capacity of all drives in the array minus two	Fast database and application servers which need performance and data protection
RAID 5	Disk Striping with Rotating parity	3	67-87%	High read performance, and medium write performance with data protection with a single drive failure	Not recommended for database applications that require frequent/heavy write sessions. Can handle 1 disk failure.	Data archives, and ideal for application that require data protection
RAID 50	Disk Mirroring followed by RAID5	6	67-75%	High read performance, and medium write performance with data protection in case of up to two drives failure	Not recommended for applications that require frequent/heavy write sessions.	Data archives and ideal for application that requires data protection
RAID 6	Disk Striping with dual rotating parity	4	50-75%	High read performance, and medium write performance with data protection in case of up to two drives failure	Not recommended for applications that require frequent/heavy write sessions.	Data archives and ideal for application that requires data protection

5. Customer Support

If you encounter any problems while utilizing the RocketRAID series HBA, or have any questions about this or any other HighPoint Technologies, Inc. product, feel free to contact our Customer Support Department.

Web Support: http://www.highpoint-tech.com/websupport/

HighPoint Technologies, Inc. websites: http://www.highpoint-tech.com/USA_new/main.htm