RR37xx_8xx_28xx Controller
Windows Boot RAID
Installation Guide

Version 1.01

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Prerequisites for a Bootable RAID Configuration

The RR840/RR2840/RR3720/RR3740/RR3742 controllers can support bootable RAID arrays. After configuring an array using the UEFI RAID tool, you can install a Windows or Linux operating system to the RAID. In order to configure a bootable RAID array, you will need the following:

1. RAID controller. A PCIe 3.0/4.0 slot with x8 or x16 lanes.
2. The RR840/RR2840/RR3720/RR3740/RR3742 must be installed into a PCIe 3.0/4.0 slot with x8 or x16 lanes.
3. The motherboard needs to be booted into UEFI mode. Confirm that the motherboard boots in UEFI mode.
4. USB flash drive: FAT32 format. Make sure the file system of the USB flash drive is FAT32 format.
5. Secure Boot must be disabled.
6. Install an optical drive into the system (such as a DVD-ROM, DVD-RW or Blu-Ray drive).
7. Prepare the OS Installation disc (Windows 10 & later / Windows server 2016 & later, or a Linux Distribution that corresponds with the binary diver you intend to install). Download and burn an official copy of the latest ISO image of your preferred operating system to a DVD. This should be inserted into the optical drive when booting the system.
8. You will need a USB flash drive– the UEFI package and driver should be extracted to the root directory of this flash drive.
9. Remove all other drives during the OS installation process. Make sure only the controller, the USB flash drive, and the optical drive are installed into the system during this procedure. This includes any other USB hard drives, USB flash drives, memory sticks, or SAS/SATA drives. You can reattach these drives after the operating system has been successfully installed.
10. For Windows 10 /11 users, make sure to Disable Fast Boot.
11. **The following are the basic requirements for installing Windows 11 on your computer.** If your device does not meet these requirements, you may not be able to install Windows 11 on your device; If your device is already running Windows 10, you can use the PC Health Check app to evaluate compatibility.

Minimum system requirements

Read here for more information on system requirements and information on how some PCs might be able to update or change settings to meet the requirements.

Processor:	1 gigahertz (GHz) or faster with 2 or more cores on a compatible 64-bit processor or System on a Chip (SoC).	Graphics card:	Compatible with DirectX 12 or later with WDDM 2.0 driver.
Memory:	4 GB RAM.	Display Resolution:	High definition (720p) display that is greater than 9" diagonally, 8 bits per color channel.
Storage:	64 GB or larger storage device.	Internet connection:	Microsoft account and internet connectivity required for setup for Windows 11 Home.
System firmware:	UEFI, Secure Boot capable. Check here for information on how your PC might be able to meet this requirement.		Your device must be running Windows 10, version 2004 or later, to upgrade. Free updates are available through Windows Update in Settings>Update and Security.
TPM:	Trusted Platform Module (TPM) version 2.0. Check here for instructions on how your PC might be enabled to meet this requirement.		Certain features require specific hardware.[2] System requirements to run some apps will exceed the Windows 11 minimum device specifications. Check device compatibility information specific to the apps you want to install. Available storage on your device will vary based on installed apps and updates. Performance will scale with higher end, more capable PCs. Additional requirements may apply over time and for updates.

Please refer to the following link for detailed requirements：

Windows 11 Specs and System Requirements | Microsoft

UEFI BIOS Settings

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

Set UEFI setting with SuperMicro X11DAi-N motherboard as an example.
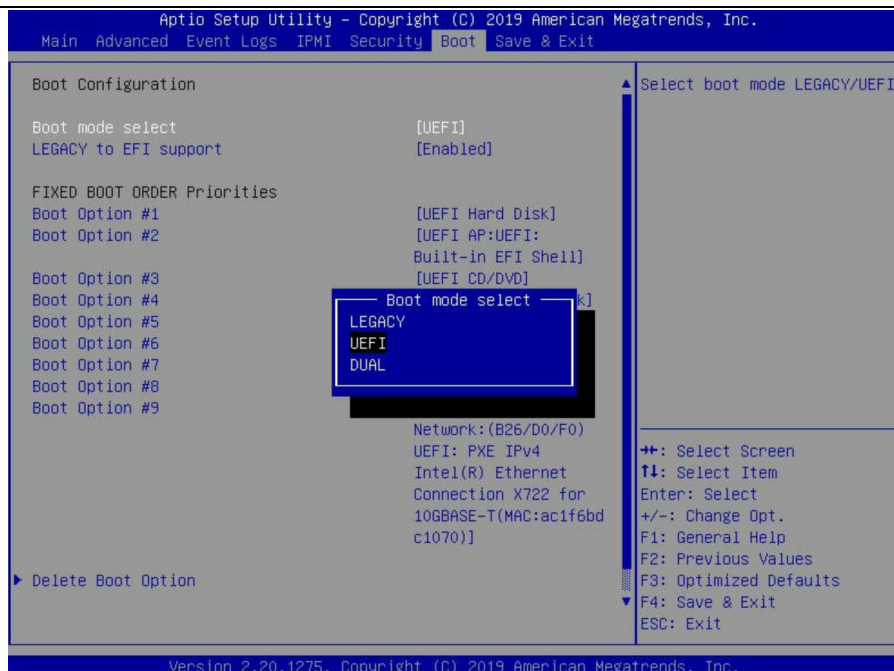
    a.   Set "Boot Mode Select" to "UEFI";
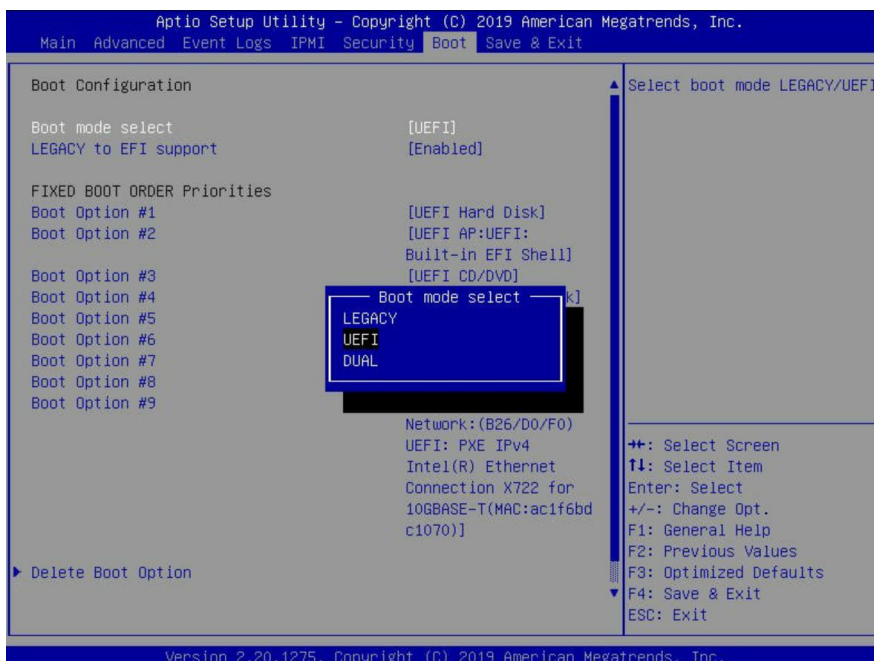
    b.   Under "Advanced->PCIe/PCI/PnP Configuration->, change "CPUx Slot x PCI-E OPROM" to "EFI". "x" represents the PCIE slot assignment. For this example, the RR3720 is installed into "CPU2 Slot 2"
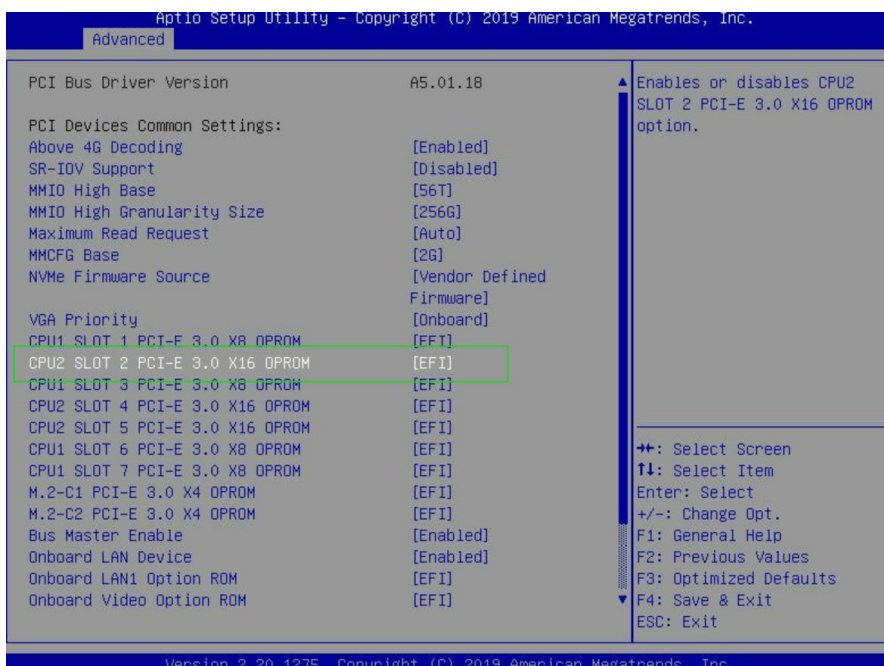
   c.   Set "Boot Mode Select" to "UEFI";

How to install Windows to the RAID Controller

Step 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.

Step 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 (**RR3720**)
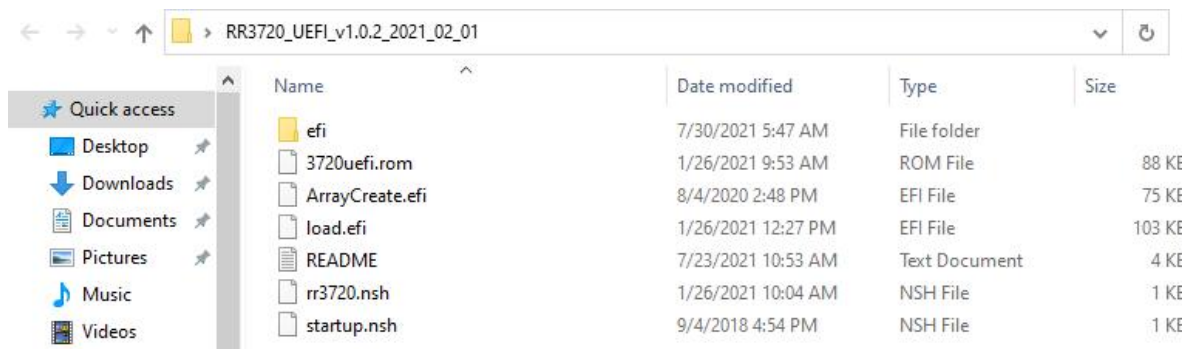
Note: If the above content is not present in the root directory, the UEFI boot device will not be properly recognized, and or you will be unable to create an array for OS installation.

Step 3 Creating the RAID Array

a. Insert the USB flash drive to the motherboard.

b. The screen should display information about the devices on the motherboard:

```
Find controller ID:3720, Location: 86:0:0
Start scanning devices...
[86:00 00/00] SATA Device probed.
[86:00 01/00] SATA Device probed.
[86:00 02/00] SATA Device probed.
[86:00 03/00] SATA Device probed.
============================================================
====   WARNING! Array(s) with OFFLINE disk(s) detected.   ====
============================================================
Press 'c' to continue system startup or
Press the POWER button to shut down the system.
System startup in 46 seconds.
Quit key 'c' received, continue system startup .....

HighPoint RocketRAID 37xx/8xx/28xx Controller UEFI driver version v1.0.2.0
```

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

```
Shell> echo -off
FS0:\> dir
Directory of: FS0:\
07/26/2021  13:52           469,206  RR3720_UEFI_v1.0.2_2021_02_01.zip
07/26/2021  15:26         2,532,898  RAID_Manager_Win_v2.13.3_18_03_16.zip
07/26/2021  13:53         2,913,317  RR37xx_8xx_28xx_Windows_10_2016_2019_HLK_Driver_v1.0.28.0.1
0_07_26.zip
07/26/2021  15:26  <DIR>     16,384  RR3720_UEFI_v1.0.2_2021_02_01
07/26/2021  15:27  <DIR>     16,384  RAID_Manager_Win_v2.13.3_18_03_16
07/26/2021  15:27  <DIR>     16,384  RR37xx_8xx_28xx_Windows_10_2016_2019_HLK_Driver_v1.0.28.0.1
0_07_26
02/01/2021  10:24  <DIR>     16,384  efi
01/26/2021  10:53             90,112  3720uefi.rom
08/04/2020  14:48             76,160  ArrayCreate.efi
01/26/2021  13:27            105,344  load.efi
02/01/2021  10:26              3,299  README.txt
01/26/2021  11:04                 21  rr3720.nsh
09/04/2018  16:54                240  startup.nsh
          9 File(s)    6,190,597 bytes
          4 Dir(s)
```

d. Enter the following command to flash the UEFI ROM to the RR3720 RAID Controller: **rr3720.nsh**

```
FS0:\> rr3720.nsh
FS0:\> load.efi 3720uefi.rom
Load Utility for Flash EPROM v1.1.1
 (built at Jan 26 2021 13:27:20)

Set flash size to 88K
Found adapter 0x37201103 at PCI 134:0:0
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
Erasing ......Suceeded
Flashing ....

Flashing Success (total retry 0)

Verifing ....

Passed !
FS0:\> _
```

When the message 'Passed ！' appears, the flash was successful.

e. At the prompt, enter the following command to change the resolution:

mode 100 31

```
FSO:\> mode
Available modes for console output device.
  Col    80 Row    25
  Col    80 Row    50  *
  Col   100 Row    31
  Col   200 Row    63
FSO:\> mode 100 31_
```

f. Next, enter the following command to enter the RAID creation utility:

ArrayCreate.efi

```
FSO:\> ArrayCreate.efi
Highpoint RAID utility for EFI v1.2.3
      Vendor: HighPoint Technologies,Inc.
      Product: RocketRAID 3720 Controller

==== Physical device list(count 4):
1/1 ST14000NM0018-2H4101-ZHZ12MTS, 14000452MB(MaxFree 14000452MB), Normal [WC]
1/2 ST2000VX000-9YW164-W1E1CKT1, 2000313MB(MaxFree 2000313MB), Normal [WC]
1/3 ST1000NM0033-9ZM173-Z1W0MCBT, 1000123MB(MaxFree 1000123MB), Normal [WC]
1/4 ST8000VX0002-1Z6112-ZA10PMG7, 8001456MB(MaxFree 8001456MB), Normal [WC]

==== Logical device list(count 0):
```

g. Next, create the array using the following command: **create RAID0**

This will create a RAID0 array using all of the HDDs, and configured for maximum capacity:

```
<<< create RAID0
    Creating array: RAID0_000041A7.
    Array created successfully.
===========================================================================

==== Physical device list(count 4):
1/1 ST14000NM0018-2H4101-ZHZ12MTS, 14000452MB(MaxFree 13000329MB), Normal [WC]
1/2 ST2000VX000-9YW164-W1E1CKT1, 2000313MB(MaxFree 1000190MB), Normal [WC]
1/3 ST1000NM0033-9ZM173-Z1W0MCBT, 1000123MB(MaxFree 0MB), Normal [WC]
1/4 ST8000VX0002-1Z6112-ZA10PMG7, 8001456MB(MaxFree 7001333MB), Normal [WC]

==== Logical device list(count 1):
1 [VD0] RAID0_000041A7 (RAID0), 4000493MB (Stripe 64KB), Normal
    1/1 ST14000NM0018-2H4101
    1/2 ST2000VX000-9YW164
    1/3 ST1000NM0033-9ZM173
    1/4 ST8000VX0002-1Z6112
```

You can now exit the utility. Enter the following command: exit.

Note: *For more additional commands, please refer to Appendix of this user guide.*
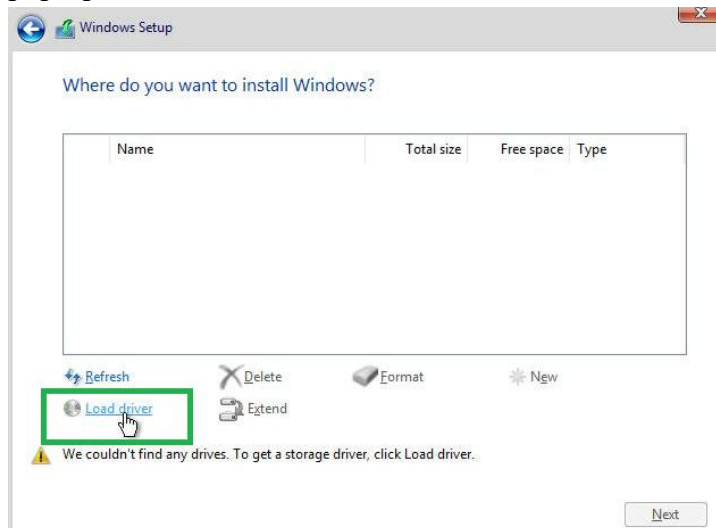
Step 4 Install Windows

a. Insert the Windows install DVD in your optical drive (DVD/Blu-ray, etc.) and then reboot your system.

b. The following RAID information should be displayed by the motherboard BIOS post screen:

c. Enter the Boot list, and select start from UEFI BOOT:

d. Install Windows, to "Where do you want to install Windows?"; Click "Load driver" ，in the pup-up window, click "Cancel";
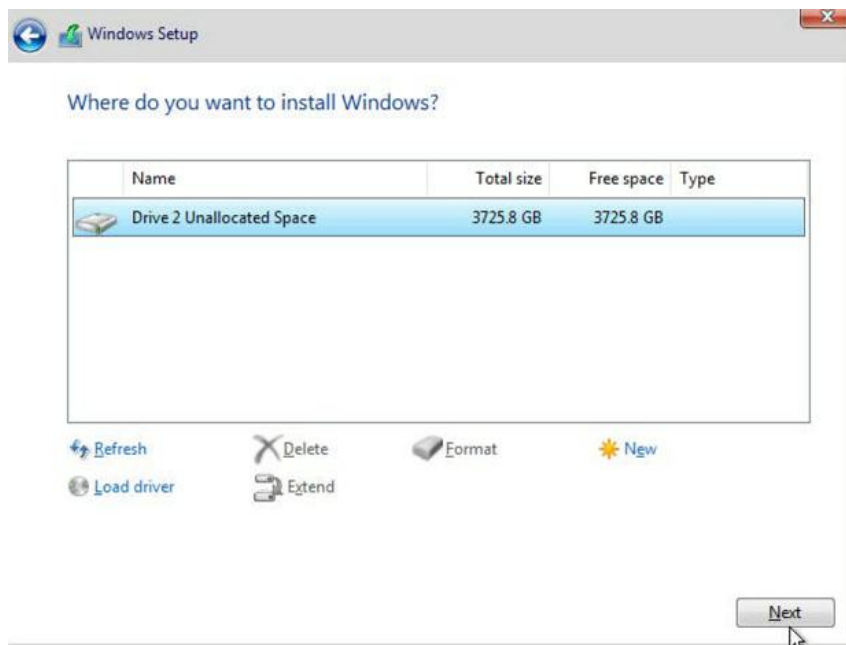

e. Next, insert the USB flash that contains the driver into the motherboard USB slot and click "Browse". Select the driver file as shown:
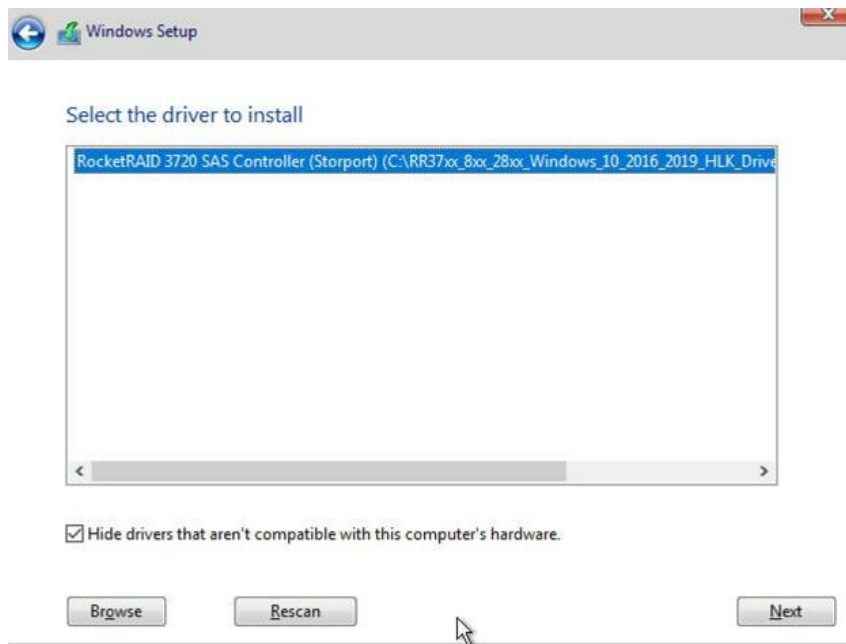
f. After loading the driver, return to the "Where do you want to install Windows?" interface. The previous Legacy disks will now be recognized as a RAID array:

g. After partitioning, continue and complete the Windows installation procedure.

Step 5 Disabling Hibernation

After Windows is installed, boot into the operating system and disable Hibernation. Hibernation fails when the system is installed on a RAID; this bug will slow down or prevent startup and disable sleep mode.

If you do not turn the hibernation functionality off, you may experience the following problems:

a) Shutdown time is extended by an additional 3-5 minutes.

b) You cannot shut down properly，you need to manually press the power switch button of the motherboard to power off the system.

Please use administrator privileges to turn off hibernation using the following command (Command Prompt utility): #**powercfg /h off**

```
Microsoft Windows [Version 10.0.19043.
(c) Microsoft Corporation. All rights

C:\Windows\system32>powercfg /h off
```

Enter the command to check that the quick shutdown is turned off: **powercfg / a**

```
Administrator: Command Prompt

C:\Windows\system32>powercfg /a
The following sleep states are not available on this system:
    Standby (S1)
        The system firmware does not support this standby state.
        An internal system component has disabled this standby state.
                Graphics

    Standby (S2)
        The system firmware does not support this standby state.
        An internal system component has disabled this standby state.
                Graphics

    Standby (S3)
        The system firmware does not support this standby state.
        An internal system component has disabled this standby state.
                Graphics

    Hibernate
        Hibernation has not been enabled.

    Standby (S0 Low Power Idle)
        The system firmware does not support this standby state.

    Hybrid Sleep
        Standby (S3) is not available.
        Hibernation is not available.

    Fast Startup
        Hibernation is not available.
```

Trouble shooting

No supporting host adapter is found

Take rr3720.nsh for example.

In the UEFI environment, run thecommand,"rr3720.nsh (Please see UEFI Read me for specific input content.)".

```
FS0:\> rr3720.nsh
FS0:\> load.efi 3720uefi.rom
Load Utility for Flash EPROM v1.1.1
 (built at Jan 26 2021 13:27:20)

Set flash size to 88K
No supporting host adapter is found.
FS0:\> _
```

Solutions: If you get the message, "No supporting host adapter is found." Try the following,

a. The error message is to remind the user that when the card cannot be found in UEFI. Make sure the HighPointRR Controller is installed into a PCIe slot with x8 or x16 lane.

b. In order to avoid this slot is broken, so replace the slot and test again.

No supported controller detected

In the UEFI environment, run the command, "ArrayCreate.efi".

```
FS0:\> ArrayCreate.efi
Highpoint RAID utility for EFI v1.2.3
No supported controller detected.
FS0:\> _
```

Solutions: If you get the message, "No supported controller detected." Try the following,

a. Check whether the Storage option ROM is 'Enabled' in the motherboard BIOS.

b. Check whether SATA/SAS is connected to the controller.

c. Replace the motherboard slot, enter the UEFI environment and re-enter the command.

If none of the above methods work, please provide UEFI log. You can submit a support ticket using our Online Support Portal, include a description of the problem in as much detail as possible.

Appendix

Support command: help/info/quit/exit/create/delete

- **Create Command**

Syntax

Create Array Type (RAID0/RAID1/10/5/50) 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.

<<< create RAID1 1/1, 1/3 10

Create RAID1 array with disk 1/1 and 1/3 and with 10GB capacity.

<<< create RAID10 *

Create RAID10 array with all disks and with maximum capacity.

<<< create RAID5 *

Create RAID5 array with all disks and with maximum capacity.

<<< create RAID50 1/1, 1/2, 1/3, 1/4 10

Create RAID50 array with disk 1/1, 1/2, 1/3 and 1/4 and with 10GB capacity.

- **Delete Command**

Syntax

delete {array ID}

Examples

<<< delete 1

Delete the first array from Logical device list.

<<< delete 2

Delete the second array from Logical device list.

- **Info Command**

Syntax

info

Display physical device list and logical list

- **Exit Command**

Syntax

Q/q/quit/exit

Quit the application

- **Help Command**

Syntax

H/h/help

This is help message.