

HighPoint RR2720A RAID Controller Linux RHEL Installation Guide

Copyright © 2023 HighPoint Technologies, Inc.

All rights reserved.

Last updated on April 12, 2023

Table of Contents

1 Overview	1
2 Installing Linux RHEL on RR2720A RAID controller	1
Step 1 Prepare Your Hardware for Installation	1
Step 2 Check System EFI Settings	1
Step 3 Flash UEFI Rom to RAID Controller	3
Step 4 Create Array	4
Step 5 Prepare the Driver Diskette	5
Step 6 Install RHEL	5
3 Monitoring the Driver	9
4 Installing RAID Management Software	9
5 Troubleshooting	10
6 Rebuilding Driver Module for System Update	10
7 Appendix A	11

1 Overview

The purpose of this document is to provide clear instructions on how to install Linux RHEL on the RR2720A RAID controller.

✧ Supported system: RHEL7.2/7.3/7.9/8.3/8.5/8.6/8.7/9.0/9.1

✧ Supported controller: RR2720A

2 Installing Linux RHEL on RR2720A RAID controller

If you would like to install Linux RHEL onto drives attached to RR2720A RAID controller, please perform the following operations:

Step 1 Prepare Your Hardware for Installation

After you attach your hard disks to RAID controller, you can use **EFI Utility** to configure your hard disks as RAID arrays, or just use them as single disks.

Before installation, you must remove all the Hard disks, which are not physically attached to RAID controller, from your system.

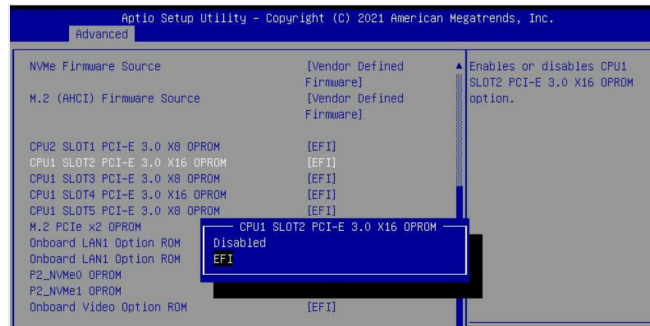
Note

RAID Controller support EFI boot. If you have other SCSI adapters installed, you must make sure the RR2720A controller EFI will be loaded firstly. If not, try to move it to another PCI slot. Otherwise you may be unable to boot up your system.

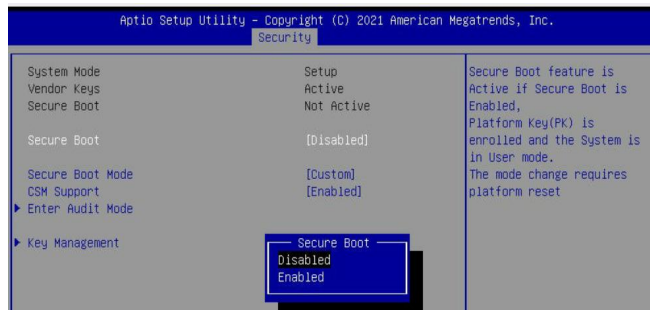
Step 2 Check System EFI Settings

In your system EFI SETUP menu, change **Boot Sequence** in such a way that the system will first boot from **EFI** CDROM or **EFI** a Bootable USB drive, after you finish installation, set RR2720A as the first boot device to boot up the system. Refer to your motherboard EFI manual to see how to set boot sequence.

1. Set UEFI setting with SuperMicro X11DPi-NT motherboard as an example.
 - a. **"Advanced->PCIe/PCI/PnP Configuration->CPUSlot PCI-E OPRM"** to **"EFI"**. Suppose RAID Controller is connected to motherboard CPU1 Slot 2 PCI-E X16, then you should set "CPU1 Slot 2 PCI-E X16 OPRM" to "EFI";

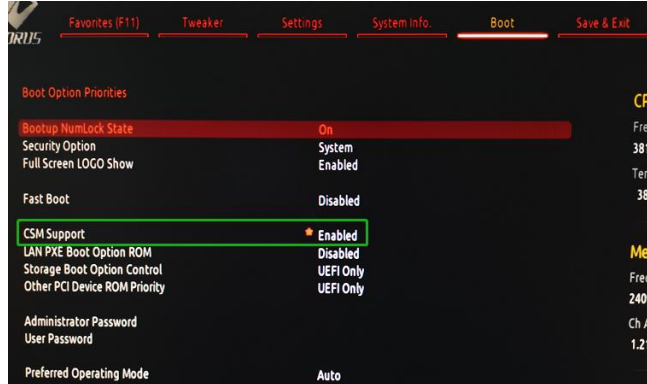


- b. Disable "Secure Boot", set "Attempt Secure Boot" to "Disabled".

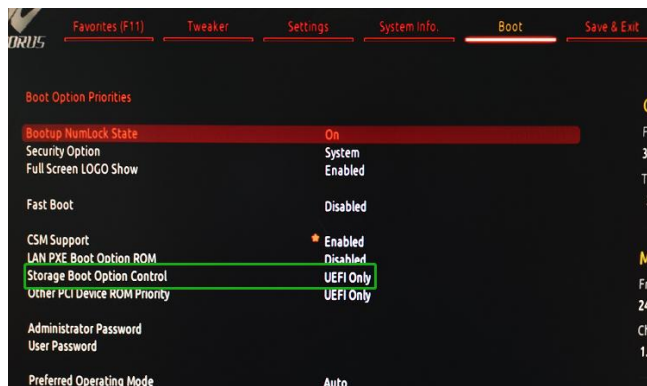


2. Set UEFI setting with GA-X570 AORUS MASTER motherboard as an example.

- a. Set " Boot->CSM Support " to "Enabled";

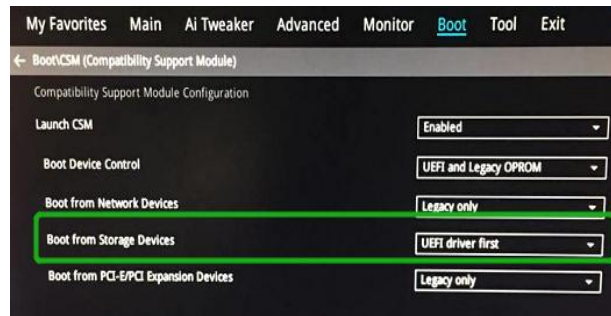


- b. And" Boot-> Storage Boot Option Control " to "UEFI Only";

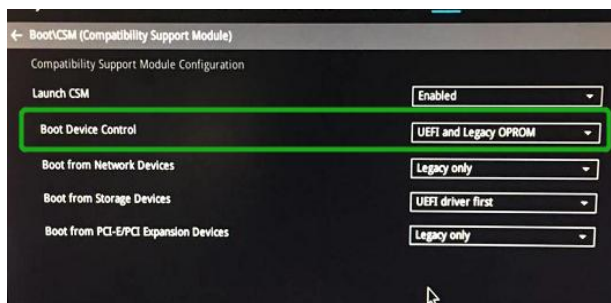


3. Set UEFI setting with ASUS PRIME X299 -DELUXE motherboard as an example:

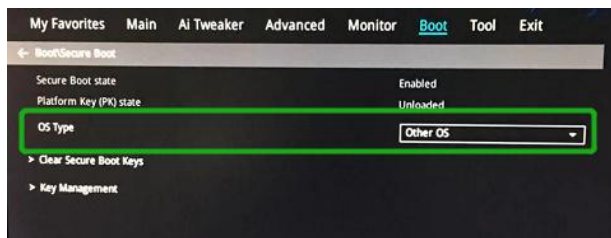
- a. Set "Boot from Storage Devices" to "UEFI driver first";



- b. And "Boot Device Control" to "UEFI Only" or "UEFI and Legacy OPRM";



- c. Set "OS Type" to "Other OS".

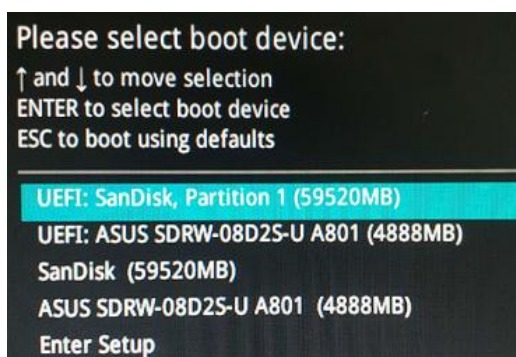


Step 3 Flash UEFI Rom to RAID Controller

For Example RR2720A:

Note: Make sure your USB flash partition format is FAT32.

- Unzip RR2720A UEFI package to root dir(/) of a USB flash drive, and insert the USB flash drive to the motherboard;
- Boot from the UEFI USB flash and enter the UEFI environment;



- c. Command with “rr2720.nsh”, flash UEFI rom to RR2720A Controller and reboot;

```
FS2:\> rr2720.nsh
FS2:\> load.efi 2720uefi.rom
Load Utility for Flash EPROM v1.1.3
(built at Oct 20 2021 16:39:13)

Found adapter 0x27201103 at PCI 1:0:0
Flash size 0x10000, File size 0xf600
Offset address 0x0
EPROM Vendor: WINBOND W25X40BV
Erasing .....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS2:\> _
```

Step 4 Create Array

- a. Attach two hard disks to RR2720A Controller;
- b. Boot, enter the motherboard’s Boot List and select start from UEFI USB flash:

```
Boot Override
UEFI: USB, Partition 1
(B97/D0/F0) UEFI PXE: IPv4 Intel(R) I350 Gigabit Network
Connection(MAC:3cecef40a1dc)
```

- c. Command “ArrayCreate.efi” to enter the Utility:

```
FS0:\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20211022)
==== Controller information:
  PCI Location: 46:00:00
  Vendor: HighPoint Technologies, Inc.
  Product: RocketRAID 272x Controller

==== Physical device list(count 2 of 2):
1/1 Samsung SSD 850 PRO 256GB-S25UNX0H609774X, 255953MB(MaxFree 255953MB), Normal [WC]
1/3 OC2-AGILITY3-OC2-I1A2312FL8HEW2B2, 59928MB(MaxFree 59928MB), Normal [WC]

==== Logical device list(count 0 of 0):
-----
>> Please specify command to execute:
<<< _
```

- d. Command “create RAID0”.
Create RAID0 array with all disks and with maximum capacity.

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

==== Physical device list(count 2 of 2):
1/1 Samsung SSD 850 PRO 256GB-S25UNX0H609774X, 255953MB(MaxFree 196024MB), Normal [WC]
1/3 OC2-AGILITY3-OC2-I1A2312FL8HEW2B2, 59928MB(MaxFree 0MB), Normal [WC]

==== Logical device list(count 1 of 1):
1 [VD0-0] RAID0_000041A7 (RAID0), 119856MB (Stripe 64KB), Normal
  1/1 Samsung SSD 850 PRO 256GB
  1/3 OC2-AGILITY3
-----
>>> Please specify command to execute:
<<< _
```

- e. Command “exit”;
- f. For more command usages, refer to [Appendix A](#).

Step 5 Prepare the Driver Diskette

The directory named hptdd can be created in the USB flash drive and the driver **RR272x_1x_RHEL8.7_x86_64_vx.x.x_xx_xx_xx.tgz** can be extracted in the hptdd directory. It will look like:

```
[root@localhost home]# tar zxvf RR272x_1x_rhel8.7_x86_64_v1.10.19_23_04_11.tgz
install.sh
modinfo
modules.alias
modules.cgz
modules.dep
modules.pcimap
pci.ids
pcitable
readme.txt
rhdd
rhel-install-step1.sh
rhel-install-step2.sh
[root@localhost home]#
```

Step 6 Install RHEL

For Example: RHEL8.7

- a. Before you do the following, verify the status of your network environment. To ensure a proper installation, it is recommended to disconnect the network and install the system in a network less environment.
- b. Insert the USB flash drive to the target system.
- c. Booting from Bootable USB drive (EFI mode).
- d. When the Installation screen appears, press 'e' to edit boot command line option.

```
Install Red Hat Enterprise Linux 8.7
Test this media & install Red Hat Enterprise Linux 8.7
Troubleshooting -->
```

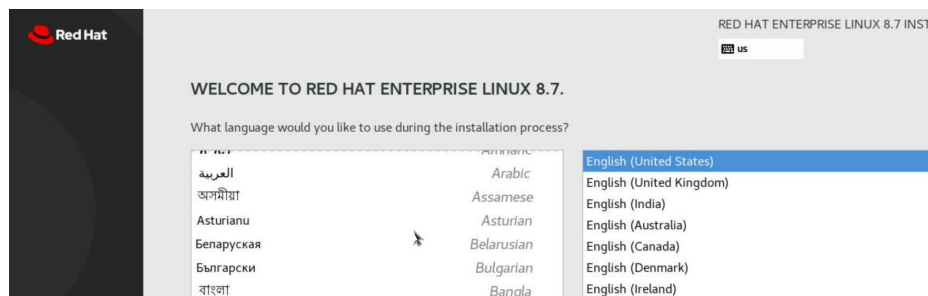
On the edit command window, move the cursor to the end of line "linuxefi /images / pxeboot...", and append "**mvsas.noprobe=1**" (double quotation mark are not include).

```
setparams 'Install Red Hat Enterprise Linux 8.7'

linuxefi /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=RHEL-8-7-0-BaseOS-x86_64 quiet mvsas\
,noprobe=1_
initrdefi /images/pxeboot/initrd.img
```

Press **CTRL+X** or **F10** to start the system.

- e. When the following window appears during the installation process,



Press **Ctrl+ALT+F2** to switch to the shell on console and press **Enter** to activate this console.

```
Red Hat Enterprise Linux 9.1 (Plow)
Kernel 5.14.0-162.6.1.el9_1.x86_64 on an x86_64

[anaconda root@localhost /]# _
```

And then execute following commands to copy the driver contents:

```
# mkdir /hptdd          ← Create mount point for USB flash drive
# mount /dev/sda1 /hptdd/ ← Mount the USB flash drive to /hptdd
# cp -a /hptdd/hptdd /tmp/ ← Copy driver installation file to system temporary
                           directory
# umount /dev/sda1      ← Unmount the USB flash drive
```

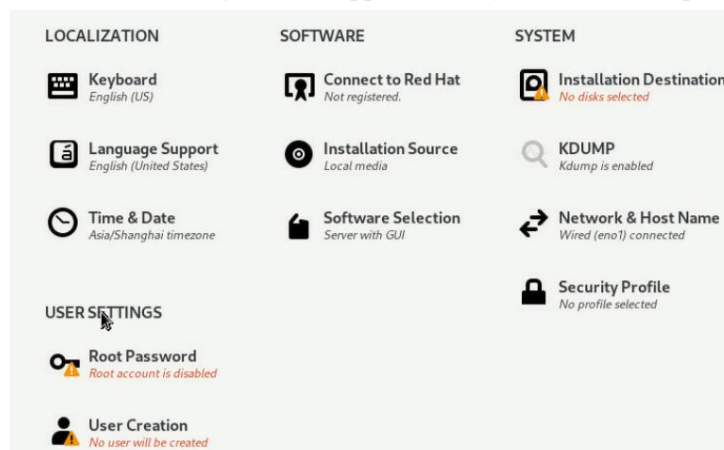
```
[anaconda root@localhost /]# mkdir /hptdd
[anaconda root@localhost /]# mount /dev/sda1 /hptdd/
[anaconda root@localhost /]# cp -a /hptdd/hptdd/ /tmp/
[anaconda root@localhost /]# umount /dev/sda1
```

When the USB flash drive is unmounted, please unplug the USB flash drive from the mainboard. And then execute following command to install driver to install the Linux RHEL.

```
# sh /tmp/hptdd/RHEL-install-step1.sh ← Load RR2720A driver.
```

```
[anaconda root@localhost /]# sh /tmp/hptdd/rhel-install-step1.sh
Driver Installation
Driver installation step 1 completed.
[anaconda root@localhost /]# restart-anaconda _
```

- f. Then press **ALT+F6** to switch back to installation screen and Choose language.
- g. When the following window appears during the installation process,



1) Set **Software Selection** and choose **Server with GUI**→**Development Tools**

☒ **Server with GUI**
An integrated, easy-to-manage server with a graphical interface.

☐ **Server**
An integrated, easy-to-manage server.

☐ **Minimal Install**
Basic functionality.

☐ **Workstation**
Workstation is a user-friendly desktop system for laptops and PCs.

☐ **Custom Operating System**
Basic building block for a custom RHEL system.

☐ **Virtualization Host**
Minimal virtualization host.

☐ **Legacy UNIX Compatibility**
Compatibility programs for migration from or working with legacy UNIX environments.

☐ **Console Internet Tools**
Console internet access tools, often used by administrators.

☐ **Container Management**
Tools for managing Linux containers

☒ **Development Tools**
A basic development environment.

☐ **.NET Development**
Tools to develop and/or run .NET applications

☐ **Graphical Administration Tools**
Graphical system administration tools for managing many aspects of a system.

☐ **Headless Management**
Tools for managing the system without an attached graphical console.

☐ **RPM Development Tools**
Tools used for building RPMs, such as rpmbuild.

☐ **Scientific Support**
Tools for mathematical and scientific computations, and parallel computing.

2) Select Installation Destination and click “**refresh**”, but if you didn't find this option, you can press **Ctrl+ALT+F2** to the shell and type
restart-anaconda

INSTALLATION DESTINATION

RED HAT ENTERPRISE LINUX 8.7 INSTALLATION

Done Help

Device Selection

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

Local Standard Disks

111.63 GiB

HPT DISK_0.0

111.63 GiB / 1.97 MiB free

Specialized & Network Disks

Add a disk...

Storage Configuration

Automatic Custom

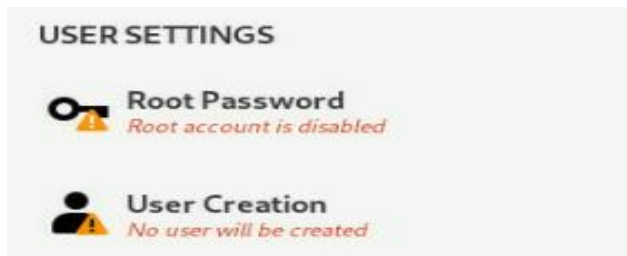
I would like to make additional space available.

Encryption

Encrypt my data. You'll set a passphrase next.

0 disks selected, 0 B capacity, 0 B free Refresh

then choose your own disk and begin installation.

3) Set **Root Password**

- h. When the screen shows that “Complete!”.



press **Ctrl+ALT+F2** to the shell and type the following commands:

```
# cp -r /tmp/hptdd /mnt/sysimage/tmp/hptdd
# chroot /mnt/sysimage
# sh /tmp/hptdd/RHEL-install-step2.sh
# rm -rf /tmp/hptdd
# exit
```

```
[anaconda root@localhost /]# cp -r /tmp/hptdd /mnt/sysimage/tmp/hptdd
[anaconda root@localhost /]# chroot /mnt/sysimage/
[anaconda root@localhost /]# sh /tmp/hptdd/rhel-install-step2.sh
Driver Installation
Updating 4.18.0-425.3.1.el8.x86_64...
Driver installation step 2 completed.
[anaconda root@localhost /]# rm -rf /tmp/hptdd/
[anaconda root@localhost /]# exit
exit
[anaconda root@localhost /]#
```

- i. Press **ALT+F6** and press **Reboot System**.
- j. If you want to boot from another kernel, please install the RR Series opensource driver after entering the system.
- k. Restart to enter the system, **please connect to the internet**:

Linux opensource driver link, open the following link to enter the "Software Download" page to download:

RR2700 Series: <https://www.highpoint-tech.com/rr272x-overview>

Extract driver package:

```
tar zxvf RR272x_1x_Linux_Src_vx.xx.xx_xx_xx_xx.tar.gz
```

Run the **.bin** file to install the driver package.

```
./rr272x_1x-linux-src_vxx.x.x_xx_xx_xx.bin or
```

```
sh rr272x_1x-linux-src_vxx.x.x_xx_xx_xx.bin
```

```
[root@localhost home]# ./rr272x_1x-linux-src-v1.11.0-23_03_17.bin
Verifying archive integrity... All good.
Uncompressing RR272x_1x Linux Open Source package installer.....
.....
Checking and installing required toolchain and utility ...
Found program make (/bin/make)
Found program gcc (/bin/gcc)
Found program perl (/bin/perl)
Found program wget (/bin/wget)
```

- l. Follow the prompts to complete the driver installation.

```
Executing: /usr/lib/systemd/systemd-sysv-install enable hptdrv-monitor
Created symlink /etc/systemd/system/default.target.wants/hptdrv-monitor.service
→ /usr/lib/systemd/system/hptdrv-monitor.service.

SUCCESS: Driver rr272x_1x is installed successfully for kernel 4.18.0-425.3.1.el
8.x86_64.
Please restart the system for the driver to take effect.
If you want to uninstall the driver from the computer, please run hptuninrr272x_
1x to uninstall the driver files.
remove conflicting module mvsas successfully
[root@localhost home]#
```

- m. After the installation is complete, you can perform system update operations.

3 Monitoring the Driver

Once the driver is running, you can monitor it through the Linux proc file system support. There is a special file under `/proc/scsi/ rr272x_1x`. Through this file you can view driver status and send control commands to the driver.

Note

The file name is the SCSI host number allocated by OS. If you have no other SCSI cards installed, it will be 0. In the following sections, we will use x to represent this number.

Using the following command to show driver status:

```
# cat /proc/scsi/ rr272x_1x /x
```

This command will show the driver version number, physical device list and logical device list.

4 Installing RAID Management Software

HighPoint RAID Management Software is used to configure and keep track of your hard disks and RAID arrays attached to RR2720A RAID controller. Installation of the management software is optional but recommended.

Please refer to HighPoint RAID Management Software documents for more information.

5 Troubleshooting

If you do not install the system or update the kernel according to the installation manual, the system will crash and you will not be able to enter. Please follow the steps below.

- a. Choose “Red Hat Enterprise Linux (4.18.0-425.3.1.el8.x86_64)” and enter the system

```
Red Hat Enterprise Linux (4.18.0-425.3.1.el8.x86_64) 8.7 (Ootpa)
Red Hat Enterprise Linux (0-rescue-646248983b6442378a833800d2a0081b) 8.7
System setup
```

- b. Install Linux Opensource driver.
- c. Linux Opensource driver link, open the following link to enter the "Software Download" page to download:

RR2700 Series: <https://www.highpoint-tech.com/rr272x-overview>

- d. Run the .bin file to install the driver package.

`./rr272x_1x-linux-src_vxx.x.x_xx_xx_xx.bin` or

`sh rr272x_1x-linux-src_vxx.x.x_xx_xx_xx.bin`

```
[root@localhost home]# ./rr272x_1x-linux-src-v1.11.0-23_03_17.bin
Verifying archive integrity... All good.
Uncompressing RR272x_1x Linux Open Source package installer.....
.....
Checking and installing required toolchain and utility ...
Found program make (/bin/make)
Found program gcc (/bin/gcc)
Found program perl (/bin/perl)
Found program wget (/bin/wget)
```

- e. Follow the prompts to complete the driver installation.

```
Executing: /usr/lib/systemd/systemd-sysv-install enable hptdrv-monitor
Created symlink /etc/systemd/system/default.target.wants/hptdrv-monitor.service
→ /usr/lib/systemd/system/hptdrv-monitor.service.

SUCCESS: Driver rr272x_1x is installed successfully for kernel 4.18.0-425.3.1.el
8.x86_64.
Please restart the system for the driver to take effect.
If you want to uninstall the driver from the computer, please run hptuninrr272x_
1x to uninstall the driver files.
remove conflicting module mvsas successfully
[root@localhost home]#
```

6 Rebuilding Driver Module for System Update

When the system updates the kernel packages, the driver module `rr272x_1x.ko` should be built and installed manually before reboot.

Please refer to the README file distributed with HighPoint RR2720A RAID Controller opensource package on how to build and install the driver module.

7 Appendix A

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

- **Create Command Syntax**

Create Array Type (RAID0/1/10/5/50) Member Disk list (1/1, 1/2|*)
Capacity (100|*)

Note:

The RR2720A controllers can support RAID0/1/10/5/50

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 RAID50,3 1/1, 1/2, 1/3, 1/4, 1/5, 1/6
```

Create RAID50 array with disk 1/1, 1/2, 1/3, 1/4, 1/5, 1/6 and with sub member count 3 and with maximum 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