

# **SSD7103 Controller**

## **Linux Ubuntu Desktop 20.04**

### **Installation Guide**

Version 1.00

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# 1 Overview

The purpose of this document is to provide clear instructions on how to install Linux Ubuntu Desktop on the SSD7103 controller.

For Ubuntu 20.04 Desktop (kernel: 5.4.0-26-generic)

Mirror link:

<http://releases.ubuntu.com/focal/ubuntu-20.04-desktop-amd64.iso>

## 2 Installing Linux Ubuntu Desktop on SSD7103 controller

If you would like to install Linux Ubuntu Desktop onto drives attached to SSD7103 controller, please perform the following operations:

### Step 1 Prepare Your Hardware for Installation

After you attach your NVMe SSD to SSD7103 controller, you can use SSD7103 **EFI Utility** to configure your NVMe SSD as RAID arrays, or just use them as single disks.

Before installation, you must remove all the NVMe SSD, which are not physically attached to SSD7103 controller, from your system.

#### Note

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**SSD7103 only support EFI boot.** If you have other SCSI adapters installed, you must make sure the SSD7103 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.

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### Step 2 Check System EFI Settings

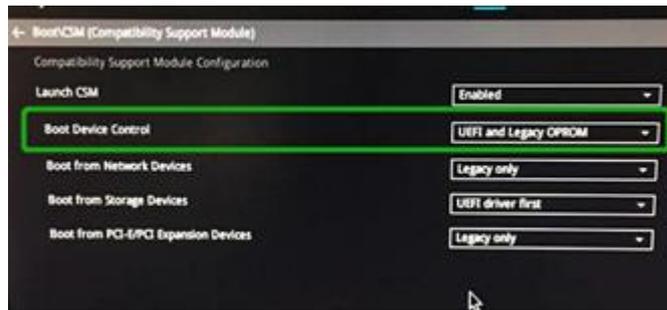
In your system EFI SETUP menu, change **Boot Sequence** in such a way that the system will first boot from **EFI CDROM**, and then from SSD7103 RAID. Refer to your motherboard EFI manual to see how to set boot sequence.

If your EFI settings do not support such a boot sequence, you can first set it to boot from EFI CDROM. After you finish installation, set SSD7103 RAID as the first boot device to boot up the system.

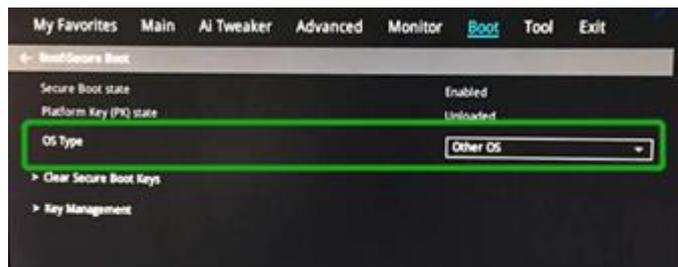
1. Set UEFI setting with ASUS PRIME X299 -DELUXE motherboard as an example:
  - a. Set "Boot from Storage Devices" to "UEFI driver first";



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

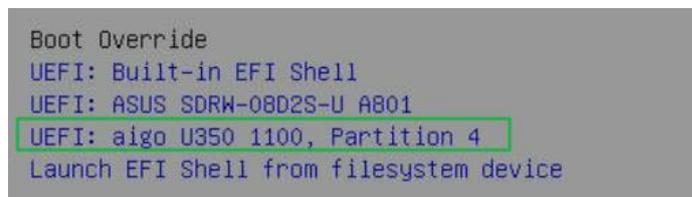


- c. Set "OS Type" to "Other OS".



### Step 3 Flash UEFI Rom to SSD7103

- a. Unzip SSD7103 UEFI package to root dir (/) of a USB flash driver, and insert the USB flash drive to the motherboard;
- b. Booting from the UEFI USB flash and enter the UEFI environment;



- c. Command with "SSD7103.nsh", flash UEFI rom to SSD7103 Controller and reboot;

```
FS0:\> SSD7103.nsh
FS0:\> load.efi 7103uefi.rom
Load Utility for Flash EPROM v1.0.4
(built at Apr 28 2019 16:51:40)

Found adapter 0x71031103 at PCI 67:0:0
Flash size 0x10000, File size 0xfe00
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
Erasing ....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS0:\> _
```

#### Step 4 Create Array

- a. Attach four NVMe SSD to SSD7103 Controller;

##### Note

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Make sure your USB flash partition format is FAT32.

---

- b. Enter the motherboard's Boot List and select start from UEFI USB flash:

```
Boot Override
UEFI: Built-in EFI Shell
UEFI: ASUS SDRW-08D2S-U A801
UEFI: aigo U350 1100, Partition 4
Launch EFI Shell from filesystem device
```

- c. Command "Arraycreate.efi" to enter the Utility:

```
FS0:\> ArrayCreate.efi
Highpoint RAID utility for UEFI v1.2.1
==== Controller information:
Vendor: HighPoint Technologies, Inc.
Product: SSD7103 (7103)

==== Physical device list(count 4):
1/1 WDS100T3X0C-00SJG0-184890621671, 1000123MB(MaxFree 1000123MB), Normal
1/2 WDS100T3X0C-00SJG0-184890620808, 1000123MB(MaxFree 1000123MB), Normal
1/3 WDS100T3X0C-00SJG0-184890621461, 1000123MB(MaxFree 1000123MB), Normal
1/4 WDS100T3X0C-00SJG0-184890621532, 1000123MB(MaxFree 1000123MB), Normal

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

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

```

>>> Please specify command to execute:
<<< create RAID0 1/1,1/2,1/3,1/4
Creating array: RAID0_000041A7.
Array created successfully.
=====

==== Physical device list(count 4):
1/1 HDS100T3X0C-00SJG0-184890621671, 1000123MB(MaxFree 0MB), Normal
1/2 HDS100T3X0C-00SJG0-184890620808, 1000123MB(MaxFree 0MB), Normal
1/3 HDS100T3X0C-00SJG0-184890621461, 1000123MB(MaxFree 0MB), Normal
1/4 HDS100T3X0C-00SJG0-184890621532, 1000123MB(MaxFree 0MB), Normal

==== Logical device list(count 1):
1 [VD1] RAID0_000041A7 (RAID0), 4000493MB (Stripe 512KB), Normal
1/1 HDS100T3X0C-00SJG0
1/2 HDS100T3X0C-00SJG0
1/3 HDS100T3X0C-00SJG0
1/4 HDS100T3X0C-00SJG0
=====

>>> Please specify command to execute:
<<< _

```

- e. Command “exit” to exit FEI interface and then shutdown;

```

>>> Please specify command to execute:
<<< exit
FS0:\> exit_

```

- f. For more command usages, refer to Appendix A.

## Step 5 Prepare the Driver Diskette

Extract **HighPoint\_NVMe\_Ubuntu\_20.04\_x86\_64\_vx.x.x\_xx\_xx\_xx.tar.gz** to top(/) directory of an USB flash drive. It will look like:

```

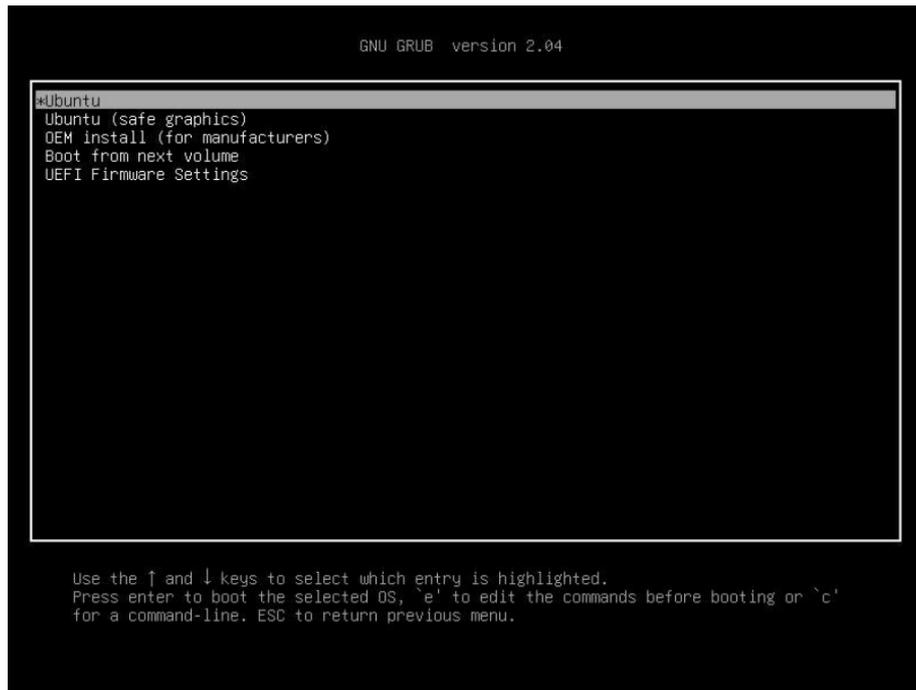
root@test-System-Product-Name:/home/test/Desktop# tar -zxvf HighPoint_NVMe_Ubuntu_20.04_x86_64_v1.2.14_2020_05_13.tar.gz
hptdd/
hptdd/hptdrv
hptdd/hptblock
hptdd/boot/
hptdd/boot/hptnvme5.4.0-26-genericx86_64.ko.gz
hptdd/postinst2.sh
hptdd/readme.txt
hptdd/preinst.sh
hptdd/60-persistent-storage-hptblock.rules
hptdd/postinst.sh

```

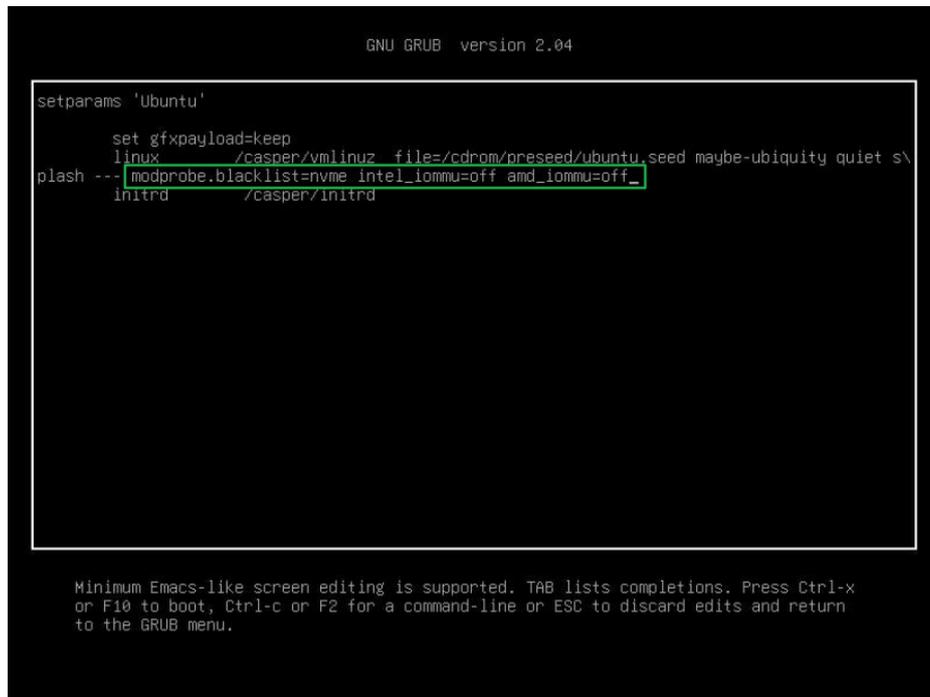
## Step 6 Install Linux Ubuntu Desktop

- a. Insert the USB flash drive to the target system.
- b. Booting from Installation DVD disc (EFI mode).
- c. When the Installation screen appears:

If you want to choose the default system installation, please select "Ubuntu" to install, press ‘e’ to edit boot command line option.



On the edit command window, move the cursor to the end of line “linux /casper/vmlinuz...”, and append "**modprobe.blacklist=nvme intel\_iommu=off amd\_iommu=off**" (double quotation mark are not include).

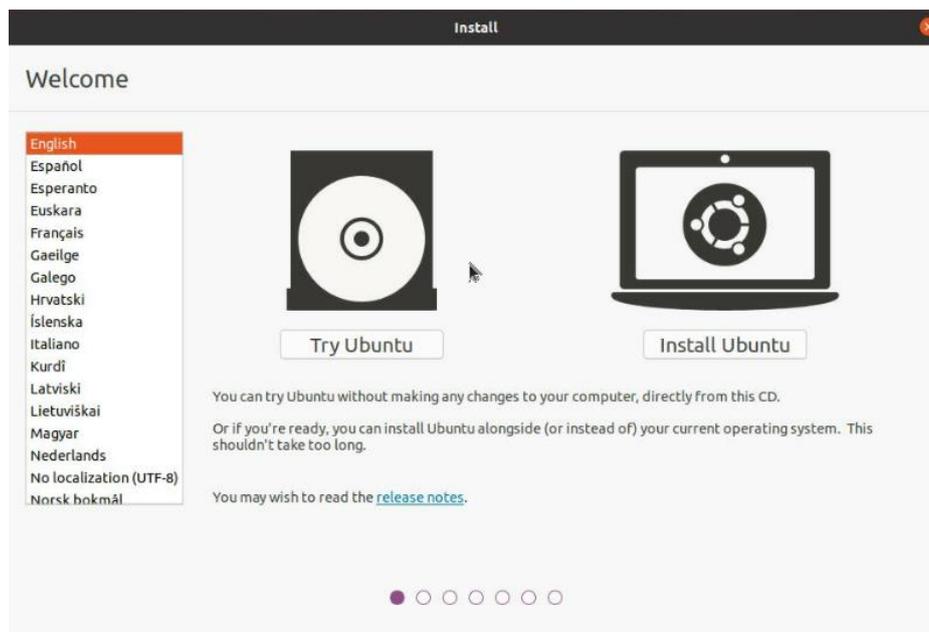


Press **CTRL-x** or **F10** to start the system.

- d. Waiting for the “Checking disks” to complete



e. When the installation started:



Press **Ctrl-ALT-F2** to switch new console window and press **ENTER** to activate this console. Ubuntu login: **ubuntu**

```

Ubuntu 20.04 LTS ubuntu tty2
ubuntu login: ubuntu
Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.4.0-26-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

0 updates can be installed immediately.
0 of these updates are security updates.

The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Your Hardware Enablement Stack (HWE) is supported until April 2025.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

```

And then execute following commands with root user to copy the driver contents.

```

$ sudo su          ← Switch to root user

# 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

```

```

ubuntu@ubuntu:~$ sudo su
root@ubuntu:/home/ubuntu# mkdir /hptdd
root@ubuntu:/home/ubuntu# mount /dev/sda1 /hptdd/
root@ubuntu:/home/ubuntu# cp -a /hptdd/hptdd/ /tmp

```

```

root@ubuntu:/home/ubuntu# 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 Ubuntu Desktop.

```

# bash /tmp/hptdd/preinst.sh ← Load SSD7103 driver.

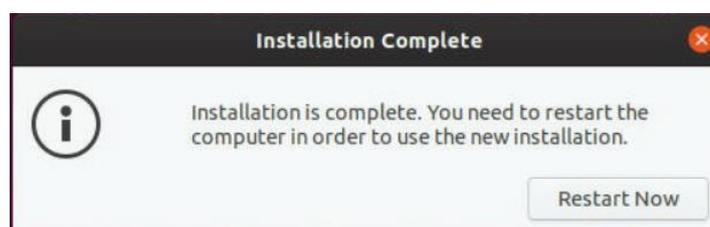
```

```

root@ubuntu:/home/ubuntu# bash /tmp/hptdd/preinst.sh
This step succeeded!

```

- f. Press **ALT-F1** to continue system installation.
- g. When the installation prompts “Installation Complete”, **don’t click** Restart Now



Press **Ctrl-ALT-F2** and execute following command to install driver to the installed Linux Ubuntu Desktop on the array of SSD7103.

```
# bash /tmp/hptdd/postinst.sh ←Install SSD7103 driver.
```

```
root@ubuntu:/home/ubuntu# bash /tmp/hptdd/postinst.sh
Running in chroot, ignoring request.
Running in chroot, ignoring request.
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/90_iommuoff.cfg'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.3.0-18-generic
Found initrd image: /boot/initrd.img-5.3.0-18-generic
Adding boot menu entry for EFI firmware configuration
done
setdefaultkernel:No change.
We have completed the driver installation.
```

- h. Press **ALT-F1** and click “**Restart Now**” to finish the installation.
- i. Open source driver needs to be installed after system installation.

[http://highpoint-tech.com/USA\\_new/series-ssd7103-download.htm](http://highpoint-tech.com/USA_new/series-ssd7103-download.htm)

Run the .bin file to install the driver package.

```
# sh hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin
```

```
root@test-System-Product-Name:/home/test/Desktop# sh hptnvme_g5_linux_src_v1.2.16_2020_06_09.bin
Verifying archive integrity... All good.
Uncompressing HighPoint NVMe RAID Controller Linux Open Source package installer.....
Checking and installing required toolchain and utility ...
Found program make (/usr/bin/make)
Found program gcc (/usr/bin/gcc)
Found program perl (/usr/bin/perl)
Found program wget (/usr/bin/wget)
old modprobe.blacklist-nvme pci_aspm=off intel_iommu=off and_iommu=off
new modprobe.blacklist-nvme
pci_aspm=off intel_iommu=off and_iommu=off pci_aspm=off
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/90_iommuoff.cfg'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.4.0-26-generic
Found initrd image: /boot/initrd.img-5.4.0-26-generic
Found Ubuntu 20.04 LTS (20.04) on /dev/hptblock0n3p2
Adding boot menu entry for UEFI Firmware Settings
done
Synchronizing state of hptdrv-monitor.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable hptdrv-monitor
update-rc.d: warning: enable action will have no effect on runlevel 1

Please run hptuninhptnvme to uninstall the driver files.

Please restart the system for the driver to take effect.
```

- j. Follow the prompts to complete the driver installation.
- k. 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/hptnvme/`. 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/hptnvme /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 SSD7103 controller. Installation of the management software is optional but recommended.

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

## 5 Rebuilding Driver Module for System Update

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

Please refer to the REAME file distributed with HighPoint SSD7103 open source package on how to build and install the driver module.

## 6 TroubleShooting

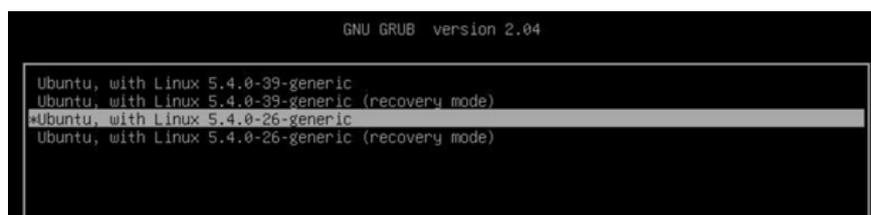
If you forget to install the open linux driver before updating the kernel, the system crash cannot enter. Please follow the steps below.

- a. Press **ESC** when booting, until the following interface appears.

Choose **“Advanced options for Ubuntu”** and press **Enter**



- b. Select the default kernel (5.4.0-26-generic) and enter the system.



- c. Install Linux open source driver.

[http://highpoint-tech.com/USA\\_new/series-ssd7103-download.htm](http://highpoint-tech.com/USA_new/series-ssd7103-download.htm)

Run the .bin file to install the driver package.

```
# sh hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin
```

```
root@test-System-Product-Name:/home/test/Desktop# sh hptnvme_g5_linux_src_v1.2.16_2020_06_09.bin
Verifying archive integrity... All good.
Uncompressing HighPoint NVMe RAID Controller Linux Open Source package installer.....
Checking and installing required toolchain and utility ...
Found program make (/usr/bin/make)
Found program gcc (/usr/bin/gcc)
Found program perl (/usr/bin/perl)
Found program wget (/usr/bin/wget)
old modprobe.blacklist=nvme pcie_aspm=off intel_iommu=off amd_iommu=off
new modprobe.blacklist=nvme
pcie_aspm=off intel_iommu=off amd_iommu=off pcie_aspm=off
Sourcing file '/etc/default/grub'
Sourcing file '/etc/default/grub.d/90_iommuoff.cfg'
Sourcing file '/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.4.0-26-generic
Found initrd image: /boot/initrd.img-5.4.0-26-generic
Found Ubuntu 20.04 LTS (20.04) on /dev/hptblock0n3p2
Adding boot menu entry for UEFI Firmware Settings
done
synchronizing state of hptdrv-monitor.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable hptdrv-monitor
update-rc.d: warning: enable action will have no effect on runlevel 1

Please run hptuninhptnvme to uninstall the driver files.

Please restart the system for the driver to take effect.
```

- d. The driver installation is complete, and the reboot can enter the system where the new kernel is located.

```
# uname -r
```

This command is used to view the kernel version.

## Appendix A

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

- **Create Command**

#### Syntax

Create Array Type (RAID0/RAID1/RAID10) 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 *  
<<< create RAID10 **
```

Create RAID10 array with all disks 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
```

This is help message.