

**HighPoint NVMe RAID
Controller SSD7505 Linux
RedHat 8.4 Installation Guide**

Version 1.00

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Last updated on June 20, 2022

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1. Overview

The purpose of this document is to provide clear instructions on how to install Linux RedHat 8.4 on the SSD7505 controller.

For the RedHat 8.4 (kernel: 4.18.0-305)

Mirror link:

[Red Hat Enterprise Linux Download | Red Hat Developer](#)

2. Installing Linux RedHat 8.4 on SSD7505 controller

If you would like to install Linux RedHat 8.4 onto drives attached to SSD7505 controller, please perform the following operations:

Step1. Prepare Your Hardware for Installation

After you attach your NVMe SSD to SSD7505 controller, you can use SSD7505 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 SSD7505 controller, from your system.

Note:

SSD7505 only support EFI boot. If you have other SCSI adapters installed, you must make sure the SSD7505 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.

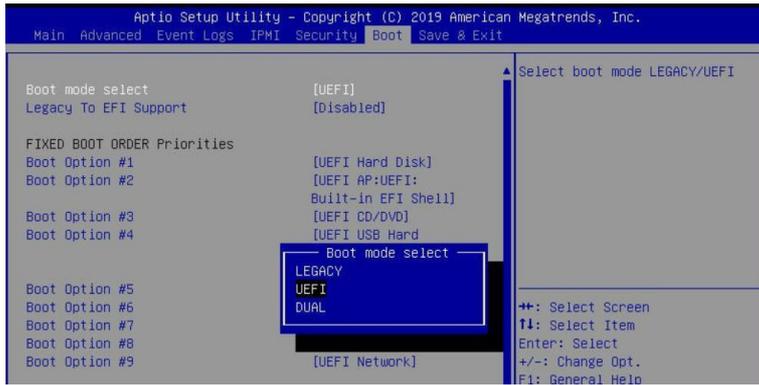
Step2. Check System EFI Settings

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 SSD7505 RAID. Refer to your motherboard EFI manual to see how to set boot sequence.

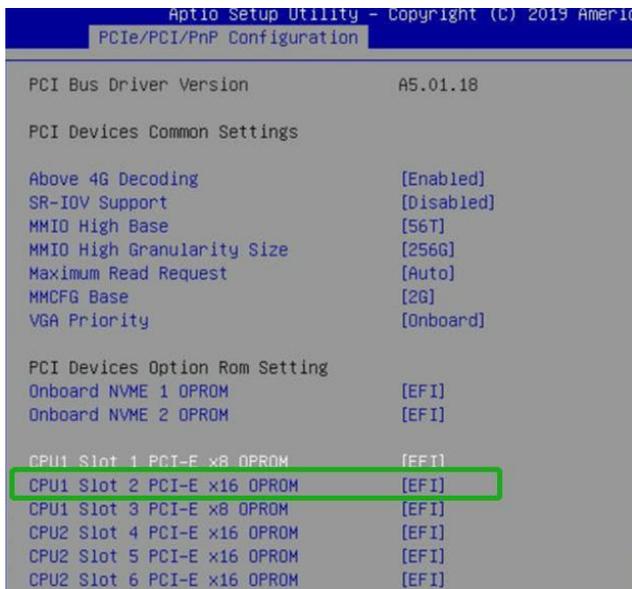
If your EFI settings do not support such a boot sequence, you can first set it to boot from EFI CDROM. After you finish installation, set SSD7505 RAID as the first boot device to boot up the system.

1. Set UEFI setting with Super Micro H12SSL -i motherboard as an example:

- a. Set "Boot->mode select" to "UEFI";



b. Set "Advanced->PCIe/PCI/PnP Configuration->CPU Slot PCI-E OPRM" to "EFI". If the SSD7505 has been connected to the motherboard CPU1Slot2 PCI-E X16, you should set "CPU1Slot2 PCI-E X16 OPRM" to "EFI":

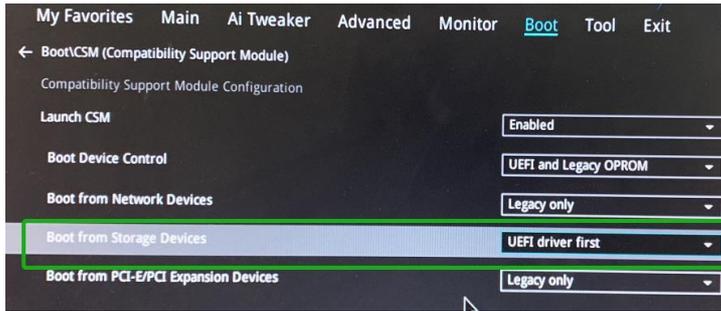


c. Disable "Secure Boot", set " Secure Boot " to "Disabled".

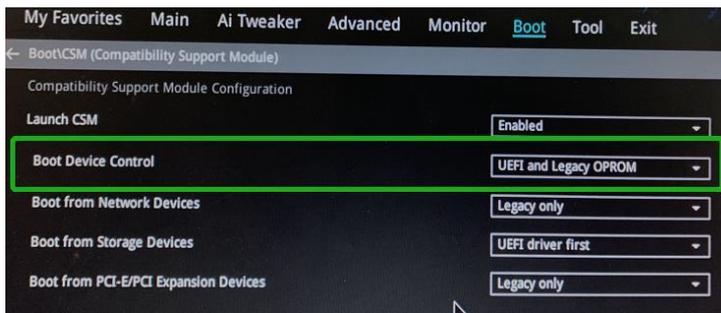


2. Set UEFI setting with ASUS PRIME X299 -DELUXE motherboard as an example

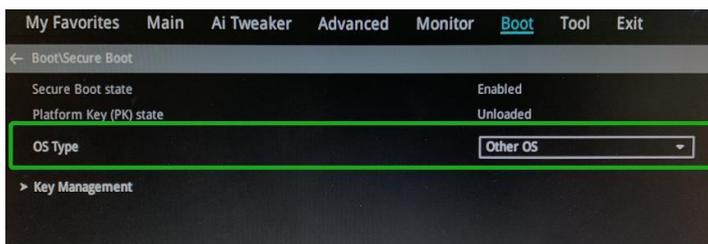
a. Set " Boot->CSM->Boot from Storage Devices" to "UEFI driver first";



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

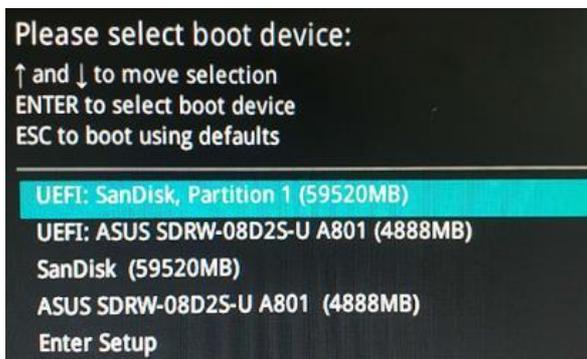


c. Set " Boot->Secure Boot->OS Type" to "Other OS".



Step3. Flash UEFI Rom to SSD7505

- Unzip SSD7505 UEFI package to root dir (/) of a USB flash driver, and insert the USB flash drive to the motherboard;
- Booting from the UEFI USB flash and enter the UEFI environment;



c. Command with "go.nsh", flash UEFI rom to SSD7505 Controller and reboot;

```
FS3:\> go.nsh
FS3:\> load.efi 7505uefi.rom
Load Utility for Flash EPROM v1.1.0
(built at Jan 5 2021 13:30:42)

Set flash size to 65K
Found adapter 0x75051103 at PCI 203:0:0
Flash size 0x10400, File size 0x10200
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
Erasing .....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS3:\>
```

Step4. Create Array

- a. Attach four NVMe SSD to SSD7505 Controller;

Note:

Make sure your USB flash partition format is FAT32.

```
HighPoint NVMe RAID driver version v1.1.13
[C1 00 ] SSD7505 found(0).
[      00] device found (PCI address C5:00:00).
[      01] device found (PCI address C6:00:00).
[      02] device found (PCI address C7:00:00).
[      03] device found (PCI address C8:00:00).
Adding HPT VD0-0 SCSI Disk Device (RAID10) Capacity 3840GB BlockSize 512 Bytes
```

- b. Boot, in the presence of the motherboard Log screen, there will be NVMe SSD information:

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

```
Please select boot device:
↑ and ↓ to move selection
ENTER to select boot device
ESC to boot using defaults

UEFI: SanDisk, Partition 1 (59520MB)
UEFI: ASUS SDRW-08D2S-U A801 (4888MB)
SanDisk (59520MB)
ASUS SDRW-08D2S-U A801 (4888MB)
Enter Setup
```

d. Command “Arraycreate.efi” to enter the Utility:

```
FS1:\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20200306)
==== Controller Information:
      Vendor: HighPoint Technologies, Inc.
      Product: SSD7505 (7505)

==== Physical device list(count 4):
1/1 Samsung SSD 980 PRO 2TB-S69ENG0NC00194K, 2000313MB(MaxFree 2000313MB), Normal
1/2 Samsung SSD 980 PRO 2TB-S69ENG0NC00180Y, 2000313MB(MaxFree 2000313MB), Normal
1/3 Samsung SSD 980 PRO 2TB-S69ENG0NC00197M, 2000313MB(MaxFree 2000313MB), Normal
1/4 Samsung SSD 980 PRO 2TB-S69ENG0NC00184M, 2000313MB(MaxFree 2000313MB), Normal

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

e. Command “create RAID0 ”.

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

==== Physical device list(count 4):
1/1 Samsung SSD 980 PRO 2TB-S69ENG0NC00180Y, 2000313MB(MaxFree 0MB), Normal
1/2 Samsung SSD 980 PRO 2TB-S69ENG0NC00184M, 2000313MB(MaxFree 0MB), Normal
1/3 Samsung SSD 980 PRO 2TB-S69ENG0NC00194K, 2000313MB(MaxFree 0MB), Normal
1/4 Samsung SSD 980 PRO 2TB-S69ENG0NC00197M, 2000313MB(MaxFree 0MB), Normal

==== Logical device list(count 1):
1 [VD1] RAID0_000041A7 (RAID0), 8001255MB (Stripe 512KB), Normal
      1/1 Samsung SSD 980 PRO 2TB
      1/2 Samsung SSD 980 PRO 2TB
      1/3 Samsung SSD 980 PRO 2TB
      1/4 Samsung SSD 980 PRO 2TB
-----
>>> Please specify command to execute:
<<< _
```

Create RAID0 array with all disks and with maximum capacity

f. Command “exit”;

g. For more command usages, refer to Appendix A.\

Step5. Prepare the Driver Diskette

a. Extract **HighPoint_NVMe_RedHat_8u4_x86_64_vx.x.x_xx_xx_xx.tar.gz** to the top(/) directory just created by the USB flash drive. It will look like:

```
[root@localhost Downloads]# tar xzvf HighPoint_NVMe_Rhel_8u4_x86_64_v1.2.33.1_20
22.06.15.tar.gz
hptdd/
hptdd/rhel-install-step2.sh
hptdd/rhel-install-step1.sh
hptdd/rhdd
hptdd/pcitable
hptdd/pci.ids
hptdd/modules.pcimaps
hptdd/module-setup.sh
hptdd/modules.dep
hptdd/modules.cgz
hptdd/modules.alias
hptdd/modinfo
hptdd/install.sh
hptdd/dracut-hptdrv.sh
hptdd/60-persistent-storage-hptblock.rules
hptdd/readme.txt
```

Step6. Install Linux RedHat8.4

a. Insert the USB flash drive to the target system.

b. Booting from Installation DVD disc (EFI mode).

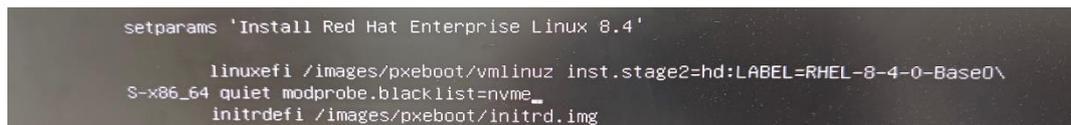
c. When the Installation screen appears:

If you want to choose the default system installation, please select "**Install RedHat Linux 8.4**" to install, press 'e' to edit boot command line option.



On the edit command window, move the cursor to the end of line

"linuxefi/images/pxeboot/vmlinuz...", and append "**modprobe.blacklist=nvme**" (double quotation mark are not included).



d. When the installation begins:



Press **Ctrl+ALT+F2** to switch new console window and press **ENTER** to activate this console.

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

```
# mkdir /dd ← Create mount point for USB flash
```

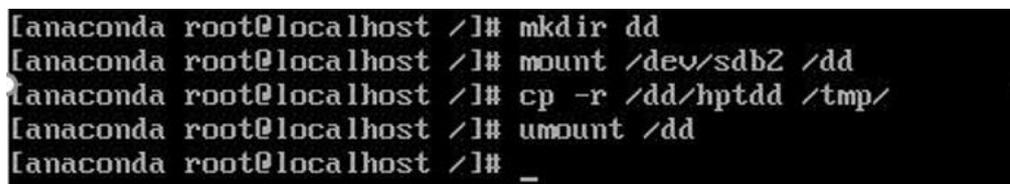
drive.

```
# mount /dev/sda1 /dd ← Mount the USB flash drive to /dd.
```

```
# cp -r /dd/hptdd /tmp ← Copy driver installation file to
```

system temporary directory.

```
# umount /dd ← Unmount the USB flash drive.
```



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 RedHat.

```
#sh /tmp/hptdd/rhel-install-step1.sh ← Load SSD7505 driver
```

```

[anaconda root@localhost /]# sh /tmp/hptdd/rhel-install-step1.sh
Driver Installation
Notify installer storage changes.
Traceback (most recent call last):
  File "/bin/anaconda-cleanup", line 84, in <module>
    devicetree.populate(cleanupOnly=True)
  File "/usr/lib/python2.7/site-packages/blivet/devicetree.py", line 2256, in populate
    self._populate()
  File "/usr/lib/python2.7/site-packages/blivet/devicetree.py", line 2323, in _populate
    self.addUdevDevice(dev)
  File "/usr/lib/python2.7/site-packages/blivet/devicetree.py", line 1152, in addUdevDevice
    log_method_call(self, name=name, info=pprint.pformat(dict(info)))
  File "/usr/lib/python2.7/site-packages/pyudev/device.py", line 747, in __getitem__
    return ensure_unicode_string(value)
  File "/usr/lib/python2.7/site-packages/pyudev/_util.py", line 66, in ensure_unicode_string
    value = value.decode(sys.getfilesystemencoding())
UnicodeDecodeError: 'ascii' codec can't decode byte 0xc2 in position 194: ordinal not in range(128)
Driver installation step 1 completed.

```

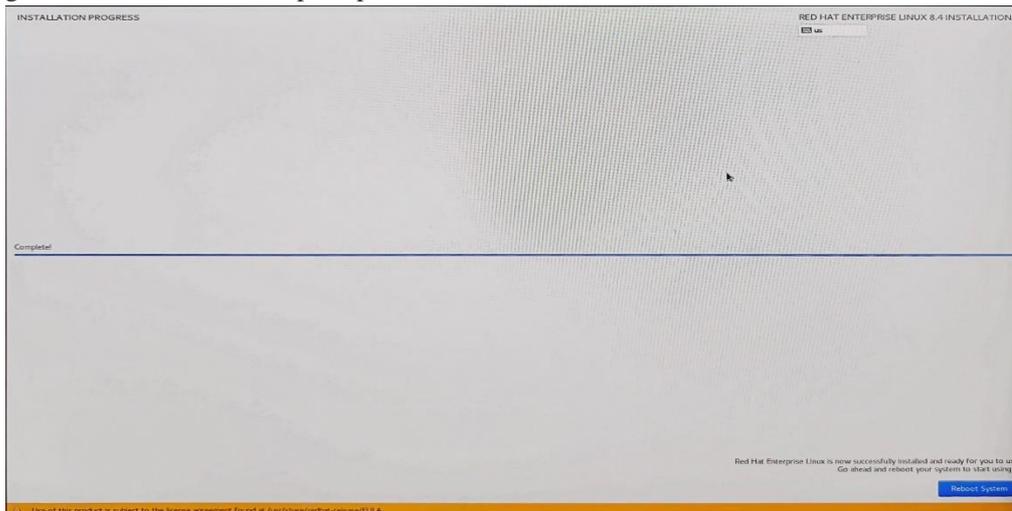
Note:

If the same error as the above figure is generated, it may be a prompt message on the system side, which has no effect on subsequent operations.

e. After the above steps are completed, the system will automatically return to the installation interface.

f. Select “Continue” to continue installing the system.

g. When the installation prompts "Reboot".



Press **Ctrl + ALT + F2** and execute the following command to install the driver on Linux RedHat on the SSD7505 array.

```
# cp -r /tmp/hptdd /mnt/sysimage/tmp/hptdd
```

← Copy the driver installation file to SSD7505.

```
# chroot /mnt/sysimage
```

← Switch to the top(/)directory in the SSD7505 system.

```
# sh /tmp/hptdd/rhel-install-step2.sh
```

←Install SSD7505 driver.

```
# rm -rf /tmp/hptdd
```

← Delete the driver file in SSD7505

```
# exit
```

← Exit the top(/) directory of the SSD7505 system.

```
[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 3.10.0-1160.el7.x86_64...
Driver installation step 2 completed.
[anaconda root@localhost /]# rm -rf /tmp/hptdd/
[anaconda root@localhost /]# exit_
```

- h. Press **Ctrl+ALT+F6** and Select "**Reboot**" to complete the installation.
- i. Open source driver needs to be installed after system installation.

Run the .bin file to install the driver package.

```
# ./hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin
```

```
[root@localhost HighPoint_NVMe_65_Linux_Src_v1.4.1_2022_03_04]# ./hptnvme_g5_linux_src_v1.4.1_2022_03_04.bin
Verifying archive integrity... All good.
Incompressing HighPoint NVMe RAID Controller 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)
old crashkernel=auto rd.lvm.lv=centos00/root rd.lvm.lv=centos00/swap rhgb quiet
new crashkernel=auto rd.lvm.lv=centos00/root rd.lvm.lv=centos00/swap rhgb quiet pcie_aspm=off iommu=off intel_iommu=off and_iommu=off
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-3.10.0-1160.el7.x86_64
Found initrd image: /boot/initramfs-3.10.0-1160.el7.x86_64.img
Found linux image: /boot/vmlinuz-0-rescue-13e58b89401b41e9a104dc38195cc5cf
Found initrd image: /boot/initramfs-0-rescue-13e58b89401b41e9a104dc38195cc5cf.img
Found CentOS Linux release 7.9.2009 (Core) on /dev/mapper/centos-root
done
Created symlink from /etc/systemd/system/default.target.wants/hptdrv-monitor.service to /usr/lib/systemd/system/hptdrv-monitor.service.
Please restart the system for the driver to take effect.
[root@localhost HighPoint_NVMe_65_Linux_Src_v1.4.1_2022_03_04]#
```

- j. Follow the prompts to complete the driver installation.
- k. After the installation is complete, you can perform a system update operation.

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 SSD7505 controller.

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

5 Troubleshooting

Error1: If you restart the system after installing the driver, the driver cannot be used.

Please follow the steps below.

- a. After entering the system, use the command to uninstall the original driver:

```
#hptuninhptnvme
```

- b. Connect to the network and install the following package files:

```
#yum install elfutils-libelf-devel
```

- c. Install Linux open source driver.

Run the .bin file to install the driver package.

```
#!/hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin
```

```
root@localhost HighPoint_NVMe_G5_Linux_Src_v1.4.1_2022_03_041# ./hptnvme_g5_linux_src_v1.4.1_2022_03_04.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 (/bin/make)
Found program gcc (/bin/gcc)
Found program perl (/bin/perl)
Found program wget (/bin/wget)
old crashkernel=auto rd.lvm.lv=centos00/root rd.lvm.lv=centos00/swap rhgb quiet
new crashkernel=auto rd.lvm.lv=centos00/root rd.lvm.lv=centos00/swap rhgb quiet pcie_aspm=off iommu=off intel_iommu=off amd_iommu=off
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-3.10.0-1160.el7.x86_64
Found initrd image: /boot/initramfs-3.10.0-1160.el7.x86_64.img
Found linux image: /boot/vmlinuz-0-rescue-13e58b89401b41e9a104dc38195cc5cf
Found initrd image: /boot/initramfs-0-rescue-13e58b89401b41e9a104dc38195cc5cf.img
Found CentOS Linux release 7.9.2009 (Core) on /dev/mapper/centos-root
done
Created symlink from /etc/systemd/system/default.target.wants/hptdrv-monitor.service to /usr/lib/systemd/system/hptdrv-monitor.service.
Please restart the system for the driver to take effect.
root@localhost HighPoint_NVMe_G5_Linux_Src_v1.4.1_2022_03_041#
```

- d. Driver installation is complete, restart the system to see if the driver can be used normally.

Error2: 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. After the system starts, select the default kernel (4.18.0-305) and enter the system.
- b. Install Linux open source driver.

Run the .bin file to install the driver package.

```
#!/hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin
```

```
root@localhost HighPoint_NVMe_G5_Linux_Src_v1.4.1_2022_03_041# ./hptnvme_g5_linux_src_v1.4.1_2022_03_04.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 (/bin/make)
Found program gcc (/bin/gcc)
Found program perl (/bin/perl)
Found program wget (/bin/wget)
old crashkernel=auto rd.lvm.lv=centos00/root rd.lvm.lv=centos00/swap rhgb quiet
new crashkernel=auto rd.lvm.lv=centos00/root rd.lvm.lv=centos00/swap rhgb quiet pcie_aspm=off iommu=off intel_iommu=off amd_iommu=off
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-3.10.0-1160.el7.x86_64
Found initrd image: /boot/initramfs-3.10.0-1160.el7.x86_64.img
Found linux image: /boot/vmlinuz-0-rescue-13e58b89401b41e9a104dc38195cc5cf
Found initrd image: /boot/initramfs-0-rescue-13e58b89401b41e9a104dc38195cc5cf.img
Found CentOS Linux release 7.9.2009 (Core) on /dev/mapper/centos-root
done
Created symlink from /etc/systemd/system/default.target.wants/hptdrv-monitor.service to /usr/lib/systemd/system/hptdrv-monitor.service.
Please restart the system for the driver to take effect.
root@localhost HighPoint_NVMe_G5_Linux_Src_v1.4.1_2022_03_041#
```

- c. The driver installation is complete. Reboot to enter the system where the new kernel is located.

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