



Using HighPoint NVMe RAID AICs with the Dell Precision 3930 Rack Workstation

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1. Dell Precision 3930 Rack Workstation introduction

This document provides guidelines and procedures for installing HighPoint NVMe AICs into the Dell Precision 3930 Rack Workstation platform. The guide examines the performance capabilities of each PCIe slot, and provides recommended hardware configurations that can be used to optimize NVMe storage configurations for maximum throughput and capacity.

1.1 Chassis

Dell Precision 3930 Rack Workstation chassis: 1U industrial rack

1.2 Chipset

Dell Precision 3930 Rack Workstation Chipset: Intel C246

1.3 Processor Types

Dell Precision 3930 Rack Workstation processor types:

Type	UMA Graphics
Intel Xeon E Processor E-2288G (8 Core,3.7 GHz,16 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2286G (6 Core,4.0 GHz,12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2278G (8 Core,3.4 GHz,16 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2276G (6 Core,3.8 GHz,12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2246G (6 Core,3.6 GHz,12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2236 (6 Core,3.4 GHz,12 MB Cache)	Not Supported
Intel Xeon E Processor E-2226G (6 Core,3.4 GHz,12 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2224G (4 Core,3.5 GHz,8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2224 (4 Core,3.4 GHz,8 MB Cache)	Not Supported
Intel Xeon E Processor E-2186G (6 Core HT 3.8 Ghz,4.7 GHz Turbo,8 MB Cache)	Integrated Intel UHD P630

Intel Xeon E Processor E-2176G (6 Core HT 3.7 Ghz,4.7 GHz Turbo, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2174G (4 Core HT 3.8 Ghz,4.7 GHz Turbo, 8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2146G (6 Core HT 3.5 GHz,4.5 GHz Turbo,8 MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2136 (6 Core HT 3.3 Ghz,4.5 GHz Turbo, 8 MB Cache)	Not Supported
Intel Xeon E Processor E-2134 (4 Core HT 3.5 Ghz,4.5 GHz Turbo, 8 MB Cache)	Not Supported
Intel Xeon E Processor E-2124G (4 Core,3.4 GHz,4.5 GHz Turbo, 8MB Cache)	Integrated Intel UHD P630
Intel Xeon E Processor E-2124 (4 Core 3.4 GHz,4.5 GHz Turbo, 8MB Cache)	Not Supported
Intel Core i3-8100 Processor (4 Core,3.6 GHz,6 MB Cache)	Integrated Intel UHD P630
Intel Core i5-8500 Processor (6 Core,3.0 GHz up to 4.1 GHz Turbo, 9 MB Cache)	Integrated Intel UHD P630
Intel Core i5-8600 Processor (6 Core,3.1 GHz up to 4.3 GHz Turo, 9 MB Cache)	Integrated Intel UHD P630
Intel Core i5-8600K Processor (6 Core,3.6 GHz up to 4.3 GHz Turbo,9 MB Cache)	Integrated Intel UHD P630
Intel Core i7-8700 Processor (6 Core,3.2 GHz up to 4.6 GHz Turbo,12 MB Cache)	Integrated Intel UHD P630
Intel Core i7-8700K Processor (6 Core,3.7 GHz up to 4.7 GHz Turbo,12 MB Cache)	Integrated Intel UHD P630
Intel Core i3-9100 Processor (4 Core,3.6 GHz,6 MB Cache)	Integrated Intel UHD P630
Intel Core i5-9400 Processor(8 Core,2.9 GHz,9 MB Cache)	Integrated Intel UHD P630
Intel Core i5-9500 Processor (6 Core,3.0 GHz,9 MB Cache)	Integrated Intel UHD P630
Intel Core i5-9600 Processor (6 Core,3.1 GHz,9 MB Cache)	Integrated Intel UHD P630
Intel Core i7-9700 Processor (8 Core,3.0 GHz,12 MB Cache)	Integrated Intel UHD P630
Intel Core i7-9700K Processor (8 Core,3.6 GHz,12 MB Cache)	Integrated Intel UHD P630
Intel Core i9-9900 Processor(8 Core,3.1 GHz.16 MB Cache)	Integrated Intel UHD P630
Intel Core i9-9900K Processor (8 Core,3.6 GHz,16 MB Cache)	Integrated Intel UHD P630

1.4 Memory

Memory type: DDR4 UDIMM Non-ECC/ECC memory

Memory speed: 2666 MHz

Minimum memory configuration: 4GB

Maximum memory configuration: 128GB

Memory size per slot: 8GB, 16GB, 32GB

Memory slot: 4 DIMM slots

Number of slots: 4

DIMM type: UDIMM

Maximum memory supported per slot: 32GB

Memory options: 4GB-1×4GB (Non-ECC)

8 GB-2 x 4 GB (Non-ECC)

8GB-1×8GB (ECC)

16GB-2×8GB (Non-ECC)

16GB-2×8GB (ECC)

32GB-4×8GB (Non-ECC)

32GB-4×8GB (ECC)

64 GB 2x 32 GB (Non-ECC)

64 GB 4 x 16 GB (Non-ECC)

64GB-4×16GB (ECC)

128 GB 4 x 32 GB (Non-ECC)

Note: ECC memory is only supported with Xeon E Processor and Core i3 Processor SKUs.

1.5 Riser slots



This picture is from the Dell Precision 3930 Rack Workstation back panel; the numbers on the picture represent the slot locations.

Dell Precision 3930 Rack Workstation Riser slots list:

Slot	Riser	Height	Length	Width	Slot width
1	Riser 1A	Full Height	Full Length	Double Width	x16
1	Riser 1A	Full Height	Full Length	Single Width	X8
2	Riser 1A	Full Height	Full Length	Single Width	X8
1	Riser 1B	Full Height	Full Length	Single Width	PCI 32/33
2	Riser 1B	Full Height	Full Length	Single Width	PCI 32/33
3	Riser 2	Full Height	Full Length	Single Width	X4

Notes:

Single Width indicates that this slot accepts the PCIe card with one standard expansion slot width.

Double Width indicates that this slot accepts the PCIe card with two standard expansion slot width.

Riser 1A can be configured with 1x x16 or with 2x x8.

1.6 GPU

Dell Precision 3930 Rack Workstation support GPU list:

GPU Type	Slot priority
UMA	N/A
Discrete	Riser 1A Slot

Notes:

Depending on the type of GPU installed into the Dell Precision 3930 Rack Workstation platform, one or more PCIe slots may be unavailable for use with HighPoint NVMe AICs.

Riser 1A Slot is designated as the default slot for graphics card.

1.7 Other PCIe devices

The Dell Precision 3930 Rack Workstation is available with optional PCIe devices.

The following table provides a list of PCIe device accessories available for the Dell Precision 3930 Rack Workstation platform and which expansion slot (or slots) they are typically associated with.

PCIe devices type	Slot priority
Intel X550-T2 10 GbE dual port PCIe network card (RJ45)	Riser 1A Slot, Riser 2 Slot
Intel X710-T2L-t 10 GbE dual port PCIe network card (RJ45)	Riser 1A Slot
Dell Ultraspeed Drive Duo Card	Riser 1A Slot, Riser 2 Slot

Note: Dell platforms are typically shipped with an array of pre-installed PCIe devices. Please note, one or more PCIe slots may be unavailable for use with HighPoint NVMe AICs.

2. HighPoint NVMe RAID AIC compatibility in Dell Precision 3930 Rack Workstation

HighPoint NVMe RAID AICs	Riser 1A Slot1 PCIe x16 Gen3	Riser 1A Slot1 PCIe x8 Gen3	Riser 1A Slot2 PCIe x8 Gen3	Riser2 Slot3 PCIe x4 Gen3
Gen3 AICs				
SSD7101A-1	√ ¹	N/A	N/A	X
SSD7104	√ ¹	N/A	N/A	X
SSD7105	√ ¹	N/A	N/A	X
SSD7202	√ ¹	√ ^{1, 2}	√ ^{1, 2}	X
SSD7204	√ ¹	√ ^{1, 2}	√ ^{1, 2}	X
SSD7140A	√ ¹	N/A	N/A	X
RocketAIC 7105HW	√ ¹	N/A	N/A	X
RocketAIC 7140AW	√ ¹	N/A	N/A	X
Gen4 AICs				
SSD7502	√ ^{1, 3}	N/A	N/A	X
SSD7505	√ ^{1, 3}	N/A	N/A	X
SSD7540	√ ^{1, 3}	N/A	N/A	X
RocketAIC 7502HW	√ ^{1, 3}	N/A	N/A	X
RocketAIC 7505HW	√ ^{1, 3}	N/A	N/A	X
RocketAIC 7540HW	√ ^{1, 3}	N/A	N/A	X

Notes:

√¹ means that the HighPoint NVMe RAID AIC can be used normally in this slot if you do not have the GPU or other PCIe devices installed in this slot.

√² means that the HighPoint NVMe RAID AIC can be used normally in this slot if you do not have the double-wide GPU installed in another slot on the riser card.

√³ means that the HighPoint NVMe RAID Gen4 AIC using this slot will be limited to Gen3 speed.

X means that the HighPoint NVMe RAID AIC is not compatible with this slot.

N/A means that this slot is not recommended. This slot does not have enough electrical channels to work properly with the HighPoint NVMe RAID AIC.

3. Installing HighPoint NVMe RAID AIC into Dell Precision 3930 Rack Workstation

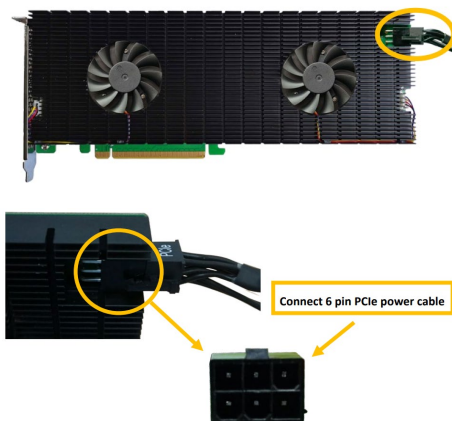
3.1 Install hardware

3.1.1 Recommended tools

- a. Screwdriver (system cover require a screwdriver to open)
- b. Wired ESD wrist strap (to prevent electrostatic accidents)

3.1.2 Installing hardware

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Insert a screwdriver and turn counterclockwise to unlock the system cover latch.
- d. Lift the latch upward to remove the system cover.
- e. Remove the riser1 module from the system.
- f. Pull the riser1 module latch and remove the riser1 module filler bracket.
- g. Holding the edge of the HighPoint NVMe RAID AIC, align the HighPoint NVMe RAID AIC connector with the riser1 module slot and insert it downward.
- h. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to connect the power cable to the 8-pin power connector on the system and to the 6-pin power connector on the side of the HighPoint NVMe RAID AIC.



Notes:

If you are not using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step. You may need to purchase additional power cables.

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- i. Press the riser1 module latch to secure the HighPoint NVMe RAID AIC bracket.
- j. Install the riser1 module into the system connector.
- k. Align the system cover with the system board and then push down on the system cover latch.
- l. Insert a screwdriver and turn clockwise to lock the system cover latch.

3.2 System BIOS Setting

The following is a list of Dell Precision 3930 Rack Workstation system BIOS settings required for each NVMe RAID AIC.

Please refer to the following sections for system BIOS settings setup procedures.

[3.2.1 Disable Secure boot](#)

[3.2.2 Disable Intel VMD Technology](#)

HighPoint NVMe RAID AICs	System BIOS setting (Boot RAID configurations)	
	Secure Boot	
SSD7105	√ ¹	
SSD7202	√ ¹	
SSD7502	√ ¹	
SSD7505	√ ¹	
SSD7540	√ ¹	
RocketAIC 7105HW	√ ¹	
RocketAIC 7502HW	√ ¹	
RocketAIC 7505HW	√ ¹	
RocketAIC 7540HW	√ ¹	
HighPoint NVMe RAID AICs	System BIOS Settings (Data RAID configurations)	
	Secure Boot	Intel VMD Technology
SSD7101A-1	√ ¹	x
SSD7104	√ ¹	x
SSD7105	√ ¹	x
SSD7140A	√ ¹	x
SSD7202	√ ¹	x
SSD7204	√ ¹	x
SSD7502	√ ¹	x
SSD7505	√ ¹	x
SSD7540	√ ¹	x
RocketAIC 7105HW	√ ¹	x
RocketAIC 7140AW	√ ¹	x
RocketAIC 7502HW	√ ¹	x
RocketAIC 7505HW	√ ¹	x
RocketAIC 7540HW	√ ¹	x

Notes:

√ means that the HighPoint NVMe RAID AIC support this BIOS setting.

√¹ means that the HighPoint NVMe RAID AIC support this BIOS setting if you are not using the Linux or the unsigned UEFI utility.

x means that the HighPoint NVMe RAID AIC do not support this BIOS setting.

3.2.1 Disable Secure boot

Note: *If you are using the SSD7000/7500 series NVMe RAID AICs or RocketAICs in Linux or the unsigned UEFI utility, Secure Boot must be disabled.*

- a. Power up the system.
- b. Press **F2** to enter **BIOS**.
- c. Find **Secure Boot**→**Secure Boot Enable**, select **Disabled**.
- d. Save the configuration and reboot the system.

3.2.2 Disable Intel VMD Technology

Note: *HighPoint NVMe RAID AICs don't support Intel VMD Technology, need to turn off Intel VMD Technology.*

- a. Power up the system.
- b. Press **F2** to enter **BIOS**.
- c. Find **System information**→**SATA Operation**, select **AHCI**.
- d. Save the configuration and reboot the system.

3.3 Install software

3.3.1 Installing HighPoint NVMe RAID AICs into the Dell Precision 3930

Rack Workstation (Data RAID configurations)

The following section discusses HighPoint NVMe RAID AIC driver installation for a non-bootable NVMe configuration.

3.3.1.1 Installing the Windows Driver & Management Software

Please refer to the [Data RAID Installation Guide \(Windows\)](#) to install the Windows Device Driver and Management Software.

3.3.1.2 Installing the Linux Driver & Management Software

Please refer to the [Data RAID Installation Guide \(Linux\)](#) to install the Linux Device Driver and Management Software.

3.3.2 Installing HighPoint NVMe RAID AICs into the Dell Precision 3930

Rack Workstation (Boot RAID configurations)

The following section discusses HighPoint NVMe RAID AIC driver installation for a bootable NVMe configuration.

3.3.2.1 Installing a Windows OS to a bootable RAID configuration

Windows BootRAID:

Please refer to [HighPoint Windows Boot RAID Windows installation Guide](#).

3.3.2.2 Installing Linux to a bootable RAID configuration

Debian BootRAID:

Please refer to [Linux Debian On HighPoint NVMe RAID Controller Installation Guide](#).

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RHEL BootRAID:

Please refer to [Linux RHEL On HighPoint NVMe RAID Controller Installation Guide](#).

Ubuntu BootRAID:

Please refer to [Linux Ubuntu On HighPoint NVMe RAID Controller Installation Guide](#).

Rocky Linux BootRAID:

Please refer to [Linux Rocky Linux On HighPoint NVMe RAID Controller Installation Guide](#)

4. Uninstalling a HighPoint NVMe RAID AIC from the Dell Precision 3930 Rack Workstation

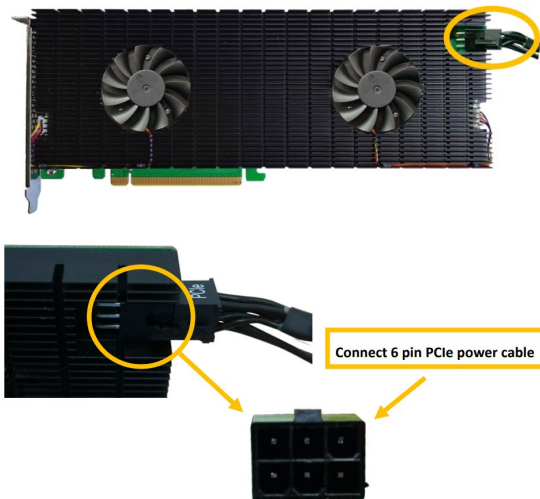
4.1 Uninstall hardware

4.1.1 Recommended tools

- a. Screwdriver (system cover require a screwdriver to open)
- b. Wired ESD wrist strap (to prevent electrostatic accidents)

4.1.2 Uninstalling hardware

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Insert a screwdriver and turn counterclockwise to unlock the system cover latch.
- d. Lift the latch upward to remove the system cover.
- e. Remove the riser1 module from the system.
- f. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to disconnect the power cable to the 8-pin power connector on the system and to the 6-pin power connector on the HighPoint NVMe RAID AICs.



Note: If you are not using SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step.

- g. Pull the riser1 module latch and push the release tab on the PCIe slot.
- h. Holding the edge of the HighPoint NVMe RAID AIC, lift up to remove the

HighPoint NVMe RAID AIC connector from the riser1 module slot.

- i. Install the riser1 module filler bracket and press the riser1 module latch.
- j. Install the riser1 module into the system connector.
- k. Align the system cover with the system board and then push down on the system cover latch.
- l. Insert a screwdriver and turn clockwise to lock the system cover latch.

4.2 Uninstalling the HighPoint Software

4.2.1 Uninstall the HighPoint NVMe RAID AIC for Windows

4.2.1.1 Uninstall the driver

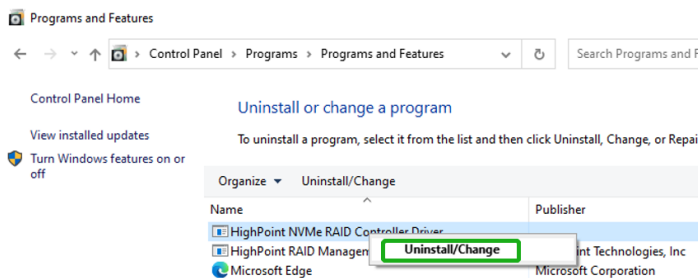
- a. Power down the system and remove the HighPoint NVMe RAID AIC from the system.

Notes:

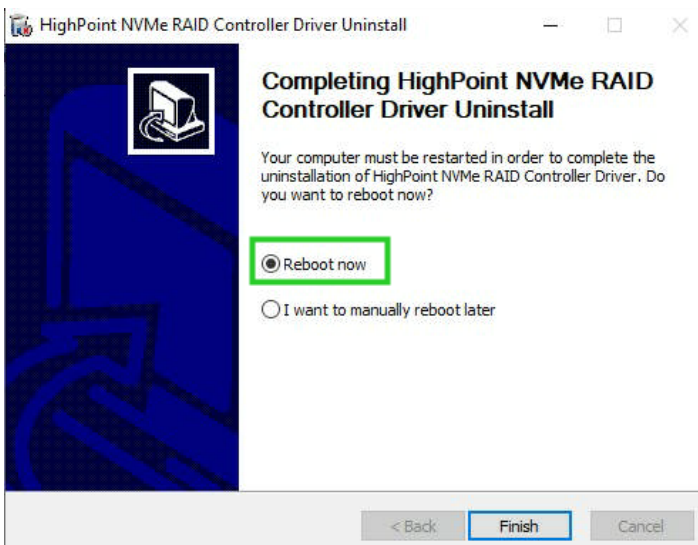
Failing to remove the HighPoint NVMe RAID AIC from the system during the uninstall process may result in data loss.

Whenever the driver is uninstalled, Windows will attempt to install the default NVMe support, which may corrupt the RAID configurations and any data stored on SSDs hosted by the HighPoint NVMe RAID AIC.

- b. Power on the system and boot Windows.
- c. Access **Control Panel** and select **Programs**→ **Programs and Features**, and click on the **HighPoint NVMe RAID Controller Driver** entry.
- d. Click **Uninstall/Change**.



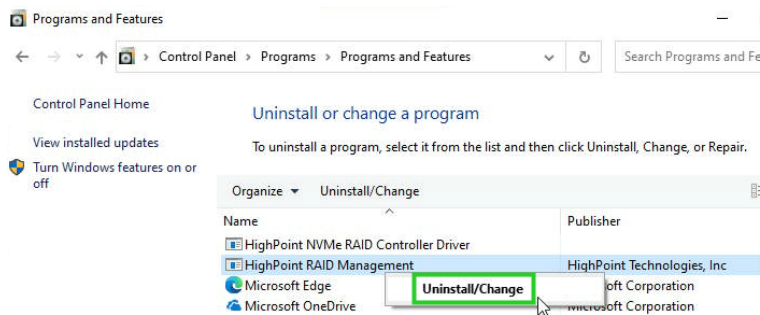
- e. After uninstalling the driver, click Finish.



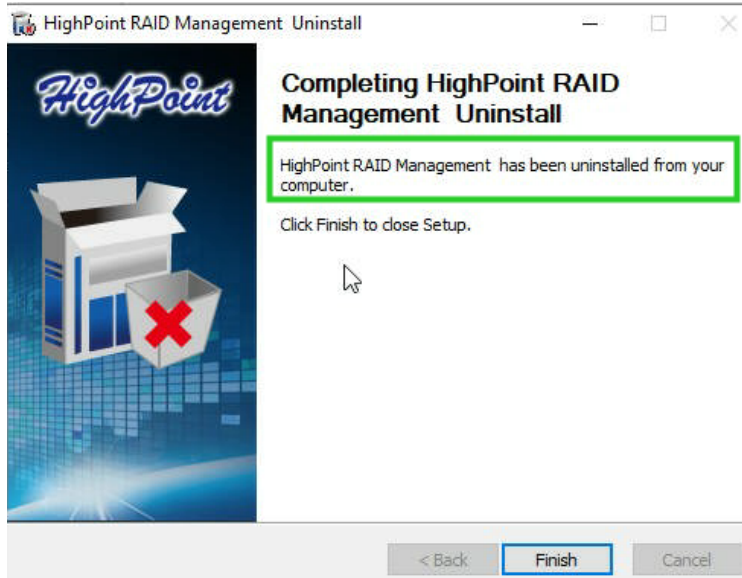
- f. Reboot Windows to complete the uninstall procedure.

4.2.1.2 Uninstall the RAID Management Software

- a. Access **Control Panel** and select **Programs**→ **Programs and Features**.
- b. Click on the **HighPoint RAID Management** entry.
- c. Click **Uninstall/Change**.



- d. After uninstalling the HighPoint RAID Management, click **Finish**.



4.2.2 Uninstall the HighPoint NVMe RAID AIC for Linux

4.2.2.1 Uninstall Driver

- Open the system terminal with root privileges.
- Enter the following commands to uninstall the driver: **hptuninhptnvme**.
- Press **'Y'** to confirm.

```
[root@localhost Downloads]# hptuninhptnvme
Are you sure to uninstall the driver hptnvme from system? (Y/n): y
Removed symlink /etc/systemd/system/default.target.wants/hptdrv-monitor.service.
Removed symlink /etc/systemd/system/sysinit.target.wants/systemd-hptdrv.service.
All files installed have been deleted from the system.
[root@localhost Downloads]#
```

- After uninstalling the driver, manually reboot the system.
- After the system has rebooted, open the system terminal with root privileges. And enter the following command to check the driver status:
lsmod |grep hptnvme

Before uninstalling:

```
[root@localhost test]# lsmod | grep hptnvme
hptnvme                235401  0
```

After uninstalling:

```
[root@localhost test]# lsmod | grep hptnvme
[root@localhost test]#
```

- If the system does not display information about “hptnvme”, the driver has been successfully uninstalled.

4.2.2.2 Uninstall the RAID Management Software

- Open the system terminal with root privileges.
- Enter the following commands to uninstall the RAID Management.

dpkg -r hptsvr (or rpm -e hptsvr-https)

```
root@testlu-Super-Server:/home/testlu/Desktop# dpkg -r hptsvr
(Reading database ... 183888 files and directories currently installed.)
Removing hptsvr (3.1.12) ...
```

- Enter the following command to check if the RAID Management has been removed successfully.

#hptraidconf

After uninstall:

```
root@testlu-Super-Server:/home/testlu/Desktop# hptraidconf
bash: /usr/bin/hptraidconf: No such file or directory
```