



SSD7000 Data RAID Linux Installation Guide

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Overview

This guide includes important hardware/software requirements, installation & upgrade procedures, and troubleshooting tips for using SSD7000 and SSD7500 series NVMe RAID controllers, and SSD6540 series NVMe RAID enclosures, with a Linux operating system.

Prerequisites

This section describes the base hardware and software requirements for the SSD7000 and SSD7500 series NVMe RAID controllers, and SSD6540 series NVMe RAID enclosures.

UEFI BIOS settings

This section describes how to configure your motherboard UEFI settings for use with SSD7000 and SSD7500 series NVMe RAID controllers, and SSD6540 series NVMe RAID enclosures.

Driver Installation

This section covers driver installation, driver upgrade and driver uninstallation procedures for SSD7000 and SSD7500 series NVMe RAID controllers, and SSD6540 series NVMe RAID enclosures in a Linux environment.

Management Software Installation

This section explains how to download and install the HighPoint RAID Management Software Suite for Linux distributions. The download includes both the Web RAID Management Interface (WebGUI), and the CLI (Command Line Interface).

Troubleshooting

Please consult this section if you encounter any difficulties installing or using SSD7000 and SSD7500 series NVMe RAID controllers, or SSD6540 series NVMe RAID enclosures. It includes solutions and description for commonly reported technical issues.

Appendix

This section describes how to collect troubleshooting information for support cases you have submitted via our Online Support Portal.

Prerequisites for a Data-RAID Configuration

In order to configure a non-bootable NVMe RAID array, you will need the following:

1. **An NVMe SSD must be installed.** At least one NVMe SSD must be installed into or connected to the HighPoint NVMe RAID controller/enclosure.
2. **A PCIe 4.0 slot or PCIe3.0 with x8 or x16 lanes.** The HighPoint NVMe RAID controller must be installed into a PCIe 4.0 slot or PCIe3.0 with x8 or x16 lanes.
3. **Your motherboard must have a UEFI BIOS with option ROM settings** for third-part devices (such as the HighPoint NVMe RAID controller, optical drives and USB flash drives). If this is not configured correctly, the system will fail to load the SSD7000/SSD7500 RAID controller. Please check the controller's compatibility lists for recommended motherboards.
4. **Secure Boot must be disabled.** The SSD7000 series Linux Driver capability has not been signed and certified. If Secure Boot is enabled, the motherboard will not recognize the SSD7000 controller, and you will be unable to proceed with installation.
5. **Make sure any non-HighPoint drivers are uninstalled for any SSD's hosted by the HighPoint NVMe RAID controller/enclosure.** Drivers provided by 3rd party software and manufacturer may prevent the SSD7000 from functioning properly.

Warnings:

- 1) **Failing to remove the controller and SSDs when uninstalling the driver may result in data loss.**
- 2) **Always make sure the SSD7000 driver is installed before moving a SSD7000 series NVMe RAID controller & RAID array to another Linux system.**

Linux distributions will always load the default NVMe support after the SSD7000 driver has been uninstalled, or if it detects the present of a card when no driver has been loaded – this driver will only recognize the NVMe SSDs as separate disks.

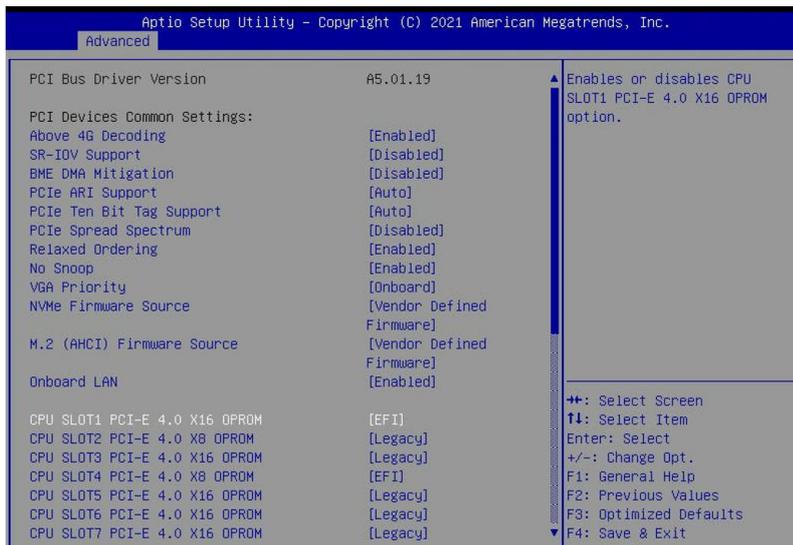
If the SSDs are recognized separately, any data they contain may be lost – including RAID configuration data.

UEFI BIOS Settings

Note: Only SSD7105/7202/7502/7505/7540/7580A/7580B needs to be set

Different motherboards will provide different UEFI-related BIOS settings. Please consult your motherboard’s user manual for more information. This section provides examples using a SuperMicro H12SSL-i motherboard.

1. Boot the system and access the motherboard BIOS menu.
2. Under "**Advanced->PCIe/PCI/PnP Configuration->**, change “**CPU Slot x PCI-E OPROM**” to "**EFI**". “**x**” represents the PCIE slot assignment. For this example, the SSD7505 is installed into “CPU Slot 1”.



3. Set "**Secure Boot**" to "**Disabled**".



Driver Installation

Installing the Open Source Driver

1. Power on the system and boot the Linux distribution.
2. Open a system terminal with root privileges, and verify that the HighPoint NVMe RAID controller/enclosure is detected by using the following command:

lspci

Example screenshot (SSD7101A/7104/7120/6540/6540M):

```
[root@localhost test]# lspci
00:00.0 Host bridge: Intel Corporation 8th Gen Core Processor Host Bridge/DRAM Registers (rev 0a)
00:01.0 PCI bridge: Intel Corporation Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor PCIe Controller (x16) (rev 0a)
00:02.0 VGA compatible controller: Intel Corporation UHD Graphics 630 (Desktop 9 Series)
00:12.0 Signal processing controller: Intel Corporation Cannon Lake PCH Thermal Controller (rev 10)
00:14.0 USB controller: Intel Corporation Cannon Lake PCH USB 3.1 xHCI Host Controller (rev 10)
00:14.2 RAM memory: Intel Corporation Cannon Lake PCH Shared SRAM (rev 10)
00:14.3 Network controller: Intel Corporation Wireless-AC 9560 (Jefferson Peak) (rev 10)
00:16.0 Communication controller: Intel Corporation Cannon Lake PCH HECI Controller (rev 10)
00:17.0 SATA controller: Intel Corporation Cannon Lake PCH SATA AHCI Controller (rev 10)
00:1b.0 PCI bridge: Intel Corporation Cannon Lake PCH PCI Express Root Port #17 (rev f0)
00:1c.0 PCI bridge: Intel Corporation Cannon Lake PCH PCI Express Root Port #1 (rev f0)
00:1c.4 PCI bridge: Intel Corporation Cannon Lake PCH PCI Express Root Port #5 (rev f0)
00:1c.6 PCI bridge: Intel Corporation Cannon Lake PCH PCI Express Root Port #7 (rev f0)
00:1d.0 PCI bridge: Intel Corporation Cannon Lake PCH PCI Express Root Port #9 (rev f0)
00:1f.0 ISA bridge: Intel Corporation Z390 Chipset LPC/eSPI Controller (rev 10)
00:1f.3 Audio device: Intel Corporation Cannon Lake PCH cAVS (rev 10)
00:1f.4 SMBus: Intel Corporation Cannon Lake PCH SMBus Controller (rev 10)
00:1f.5 Serial bus controller [0c80]: Intel Corporation Cannon Lake PCH SPI Controller (rev 10)
00:1f.6 Ethernet controller: Intel Corporation Ethernet Connection (7) T219-V (rev 10)
01:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
02:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
02:09.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
02:10.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
02:11.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
03:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981
04:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981
05:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981
73:00.0 Ethernet controller: Aquantia Corp. AQ107 NBase-T/IEEE 802.3bz Ethernet Controller [AQtion] (rev 02)
74:00.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
75:01.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
75:03.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
75:05.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
75:07.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
```

SSD7204:

```
16:1e.6 System peripheral: Intel Corporation Sky Lake-E PCU Registers (rev 04)
17:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
18:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
19:10.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1a:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:09.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:10.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:11.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1c:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM961/PM961
1d:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM961/PM961
1e:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM961/PM961
1f:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM961/PM961
64:00.0 PCI bridge: Intel Corporation Sky Lake-E PCI Express Root Port A (rev 04)
64:05.0 System peripheral: Intel Corporation Sky Lake-E VT-d (rev 04)
64:05.4 PIC: Intel Corporation Sky Lake-E IOxAPIC Configuration Registers (rev 04)
64:08.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:09.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.1 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.2 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.3 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.4 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.5 System peripheral: Intel Corporation Sky Lake-E LM Channel 1 (rev 04)
64:0a.6 System peripheral: Intel Corporation Sky Lake-E LMS Channel 1 (rev 04)
64:0a.7 System peripheral: Intel Corporation Sky Lake-E LMDP Channel 1 (rev 04)
64:0b.0 System peripheral: Intel Corporation Sky Lake-E DECS Channel 2 (rev 04)
64:0b.1 System peripheral: Intel Corporation Sky Lake-E LM Channel 2 (rev 04)
64:0b.2 System peripheral: Intel Corporation Sky Lake-E LMS Channel 2 (rev 04)
64:0b.3 System peripheral: Intel Corporation Sky Lake-E LMDP Channel 2 (rev 04)
64:0c.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.1 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.2 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.3 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.4 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.5 System peripheral: Intel Corporation Sky Lake-E LM Channel 1 (rev 04)
64:0c.6 System peripheral: Intel Corporation Sky Lake-E LMS Channel 1 (rev 04)
64:0c.7 System peripheral: Intel Corporation Sky Lake-E LMDP channel 1 (rev 04)
64:0d.0 System peripheral: Intel Corporation Sky Lake-E DECS Channel 2 (rev 04)
64:0d.1 System peripheral: Intel Corporation Sky Lake-E LM Channel 2 (rev 04)
64:0d.2 System peripheral: Intel Corporation Sky Lake-E LMS Channel 2 (rev 04)
64:0d.3 System peripheral: Intel Corporation Sky Lake-E LMDP Channel 2 (rev 04)
65:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
66:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
66:10.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
68:00.0 VGA compatible controller: NVIDIA Corporation GK208 [GeForce GT 710] (rev a1)
68:00.1 Audio device: NVIDIA Corporation GK208 HDMI/DP Audio Controller (rev a1)
b2:05.0 System peripheral: Intel Corporation Sky Lake-E VT-d (rev 04)
```

SSD7184/7180:

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19:00.2 System peripheral: PLX Technology, Inc. Device 87d0 (rev ca)
19:00.3 System peripheral: PLX Technology, Inc. Device 87d0 (rev ca)
19:00.4 System peripheral: PLX Technology, Inc. Device 87d0 (rev ca)
1a:08.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1a:09.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1a:0a.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1a:0b.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1a:10.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1a:11.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1a:12.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1a:13.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
1b:00.0 Non-Volatile memory controller: Western Digital Device 2400
1c:00.0 Non-Volatile memory controller: Western Digital Device 2400
1d:00.0 Non-Volatile memory controller: Western Digital Device 2400
1e:00.0 Non-Volatile memory controller: Western Digital Device 2400
1f:00.0 Non-Volatile memory controller: Western Digital Device 2400
20:00.0 Non-Volatile memory controller: Western Digital Device 2400
21:00.0 Non-Volatile memory controller: Western Digital Device 2400
22:00.0 Non-Volatile memory controller: Western Digital Device 2400
04:00.0 PCI bridge: Intel Corporation Sky Lake-E PCI Express Root Port A (rev 04)
64:05.0 System peripheral: Intel Corporation Sky Lake-E VT-d (rev 04)
64:05.2 System peripheral: Intel Corporation Sky Lake-E RAS Configuration Registers
64:05.4 PCI: Intel Corporation Sky Lake-E IOPIC Configuration Registers (rev 04)

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SSD7140A:

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00:1f.6 Ethernet controller: Intel Corporation Ethernet Connection (7) I219-V (rev 10)
01:00.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
01:00.1 System peripheral: PLX Technology, Inc. Device 87d0 (rev ca)
01:00.2 System peripheral: PLX Technology, Inc. Device 87d0 (rev ca)
01:00.3 System peripheral: PLX Technology, Inc. Device 87d0 (rev ca)
01:00.4 System peripheral: PLX Technology, Inc. Device 87d0 (rev ca)
02:00.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
02:09.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
02:0a.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
02:0b.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
02:10.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
02:11.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
02:12.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
02:13.0 PCI bridge: PLX Technology, Inc. Device 8749 (rev ca)
03:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981
04:00.0 Non-Volatile memory controller: Sandisk Corp WD Black 2018/PC SN520 NVMe SSD (rev 01)
05:00.0 Non-Volatile memory controller: Sandisk Corp WD Black 2018/PC SN520 NVMe SSD (rev 01)
06:00.0 Non-Volatile memory controller: Silicon Motion, Inc. Device 2262 (rev 03)
07:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981
08:00.0 Non-Volatile memory controller: Sandisk Corp WD Black 2018/PC SN520 NVMe SSD (rev 01)
09:00.0 Non-Volatile memory controller: Toshiba America Info Systems Device 011a
0a:00.0 Non-Volatile memory controller: Sandisk Corp WD Black 2018/PC SN720 NVMe SSD
77:00.0 Ethernet controller: Aquantia Corp. AQ107 NBase-T/IEEE 802.3bz Ethernet Controller [AQtion] (rev 02)
78:00.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
79:01.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
79:03.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
79:05.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
79:07.0 PCI bridge: ASMedia Technology Inc. ASM1184e PCIe Switch Port
root@debian:~#

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SSD7105:

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00:14.3 ISA bridge: Advanced Micro Devices, Inc. [AMD] FCH LPC Bridge (rev 51)
00:18.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 0
00:18.1 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 1
00:18.2 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 2
00:18.3 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 3
00:18.4 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 4
00:18.5 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 5
00:18.6 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 6
00:18.7 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship Device 24; Function 7
01:00.0 PCI bridge: PLX Technology, Inc. PEX 8749 48-Lane, 18-Port PCI Express Gen 3 (8.0 GT/s) Multi-Root Switch with DMA (rev ca)
01:00.1 System peripheral: PLX Technology, Inc. PEX PCI Express Switch DMA interface (rev ca)
01:00.2 System peripheral: PLX Technology, Inc. PEX PCI Express Switch DMA interface (rev ca)
01:00.3 System peripheral: PLX Technology, Inc. PEX PCI Express Switch DMA interface (rev ca)
01:00.4 System peripheral: PLX Technology, Inc. PEX PCI Express Switch DMA interface (rev ca)
02:00.0 PCI bridge: PLX Technology, Inc. PEX 8749 48-Lane, 18-Port PCI Express Gen 3 (8.0 GT/s) Multi-Root Switch with DMA (rev ca)
02:09.0 PCI bridge: PLX Technology, Inc. PEX 8749 48-Lane, 18-Port PCI Express Gen 3 (8.0 GT/s) Multi-Root Switch with DMA (rev ca)
02:10.0 PCI bridge: PLX Technology, Inc. PEX 8749 48-Lane, 18-Port PCI Express Gen 3 (8.0 GT/s) Multi-Root Switch with DMA (rev ca)
02:11.0 PCI bridge: PLX Technology, Inc. PEX 8749 48-Lane, 18-Port PCI Express Gen 3 (8.0 GT/s) Multi-Root Switch with DMA (rev ca)
02:12.0 PCI bridge: PLX Technology, Inc. PEX 8749 48-Lane, 18-Port PCI Express Gen 3 (8.0 GT/s) Multi-Root Switch with DMA (rev ca)
04:00.0 Non-Volatile memory controller: Toshiba Corporation XG6 NVMe SSD Controller
05:00.0 Non-Volatile memory controller: Toshiba Corporation Device 0116
06:00.0 Non-Volatile memory controller: Toshiba Corporation Device 0116
07:00.0 RAID bus controller: HighPoint Technologies, Inc. Device 7105 (rev 01)
08:00.0 Non-Essential Instrumentation [1300]: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Function
09:00.0 Non-Essential Instrumentation [1300]: Advanced Micro Devices, Inc. [AMD] Starship/Matisse Reserved SPP
09:00.3 USB controller: Advanced Micro Devices, Inc. [AMD] Starship USB 3.0 Host Controller
20:00.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse Root Complex

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SSD7202:

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16:1e.4 System peripheral: Intel Corporation Sky Lake-E PCU Registers (rev 04)
16:1e.5 System peripheral: Intel Corporation Sky Lake-E PCU Registers (rev 04)
16:1e.6 System peripheral: Intel Corporation Sky Lake-E PCI Registers (rev 04)
17:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
18:08.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
18:16.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1a:08.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:08.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:09.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:10.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1b:11.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
1d:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM961/PM961
1e:00.0 RAID bus controller: HighPoint Technologies, Inc. Device 7202 (rev 01)
1f:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM961/PM961
64:00.0 PCI bridge: Intel Corporation Sky Lake-E PCI Express Root Port A (rev 04)
64:05.0 System peripheral: Intel Corporation Sky Lake-E VT-d (rev 04)
64:05.2 System peripheral: Intel Corporation Sky Lake-E RAS Configuration Registers (rev 04)
64:05.4 PIC: Intel Corporation Sky Lake-E IOxAPIC Configuration Registers (rev 04)
64:08.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:09.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.1 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.2 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.3 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.4 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0a.5 System peripheral: Intel Corporation Sky Lake-E LM Channel 1 (rev 04)
64:0a.6 System peripheral: Intel Corporation Sky Lake-E LMS Channel 1 (rev 04)
64:0a.7 System peripheral: Intel Corporation Sky Lake-E LMPD Channel 1 (rev 04)
64:0b.0 System peripheral: Intel Corporation Sky Lake-E DECS Channel 2 (rev 04)
64:0b.1 System peripheral: Intel Corporation Sky Lake-E LM Channel 2 (rev 04)
64:0b.2 System peripheral: Intel Corporation Sky Lake-E LMS Channel 2 (rev 04)
64:0b.3 System peripheral: Intel Corporation Sky Lake-E LMPD Channel 2 (rev 04)
64:0c.0 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.1 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.2 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.3 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.4 System peripheral: Intel Corporation Sky Lake-E Integrated Memory Controller (rev 04)
64:0c.5 System peripheral: Intel Corporation Sky Lake-E LM Channel 1 (rev 04)
64:0c.6 System peripheral: Intel Corporation Sky Lake-E LMS Channel 1 (rev 04)
64:0c.7 System peripheral: Intel Corporation Sky Lake-E LMPD Channel 1 (rev 04)
64:0d.0 System peripheral: Intel Corporation Sky Lake-E DECS Channel 2 (rev 04)
64:0d.1 System peripheral: Intel Corporation Sky Lake-E LM Channel 2 (rev 04)
64:0d.2 System peripheral: Intel Corporation Sky Lake-E LMS Channel 2 (rev 04)
64:0d.3 System peripheral: Intel Corporation Sky Lake-E LMPD Channel 2 (rev 04)
65:00.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
66:08.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
66:10.0 PCI bridge: PLX Technology, Inc. PEX 8747 48-Lane, 5-Port PCI Express Gen 3 (8.0 GT/s) Switch (rev ca)
68:00.0 VGA compatible controller: NVIDIA Corporation GK208B [GeForce GT 710] (rev a1)
68:00.1 Audio device: NVIDIA Corporation GK208 HDMI/DP Audio Controller (rev a1)
b2:05.0 System peripheral: Intel Corporation Sky Lake-E VT-d (rev 04)
b2:05.2 System peripheral: Intel Corporation Sky Lake-E RAS Configuration Registers (rev 04)
b2:05.4 PIC: Intel Corporation Sky Lake-E IOxAPIC Configuration Registers (rev 04)

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SSD7505:

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07:00.3 USB controller: Advanced Micro Devices, Inc. [AMD] Matisse USB 3.0 Host Controller
08:00.0 SATA controller: Advanced Micro Devices, Inc. [AMD] FCH SATA Controller [AHCI mode] (rev 51)
09:00.0 SATA controller: Advanced Micro Devices, Inc. [AMD] FCH SATA Controller [AHCI mode] (rev 51)
0a:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0b:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0b:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0b:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0c:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0d:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0d:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0d:18.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0d:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0e:00.0 Non-Volatile memory controller: Seagate Technology PLC Device 5016 (rev 01)
0f:00.0 Non-Volatile memory controller: Seagate Technology PLC Device 5016 (rev 01)
10:00.0 Non-Volatile memory controller: Seagate Technology PLC Device 5016 (rev 01)
11:00.0 Non-Volatile memory controller: Seagate Technology PLC Device 5016 (rev 01)
12:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
13:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
13:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
14:00.0 RAID bus controller: HighPoint Technologies, Inc. Device 7505 (rev 01)
16:00.0 Mass storage controller: Broadcom / LSI Device c010 (rev b0)

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SSD7540:

```

d7:12.2 System peripheral: Intel Corporation Sky Lake-E M3KTI Registers (rev 07)
d7:15.0 System peripheral: Intel Corporation Sky Lake-E M2PCI Registers (rev 07)
d7:15.1 Performance counters: Intel Corporation Sky Lake-E DDRIO Registers (rev 07)
d7:16.0 System peripheral: Intel Corporation Sky Lake-E M2PCI Registers (rev 07)
d7:16.1 Performance counters: Intel Corporation Sky Lake-E DDRIO Registers (rev 07)
d7:16.4 System peripheral: Intel Corporation Sky Lake-E M2PCI Registers (rev 07)
d7:16.5 Performance counters: Intel Corporation Sky Lake-E DDRIO Registers (rev 07)
8:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
9:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
9:04.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
9:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
9:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
a:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
b:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
b:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
b:18.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
b:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c:00.0 Non-Volatile memory controller: Sandisk Corp WD Black 2018/PC SN520 NVMe SSD (rev 01)
d:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981/PM983
0:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
1:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
1:04.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
1:08.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
1:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
4:00.0 Non-Volatile memory controller: Sandisk Corp WD Black 2018/PC SN520 NVMe SSD (rev 01)
5:00.0 Non-Volatile memory controller: Sandisk Corp WD Black 2018/PC SN520 NVMe SSD (rev 01)
6:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
7:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
7:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
8:00.0 RAID bus controller: HighPoint Technologies, Inc. Device 7540 (rev 01)
9a:00.0 Mass storage controller: Broadcom / LSI Device c010 (rev b0)
root@localhost cs[]#

```

SSD7502:

```

40:01.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Host Bridge
40:01.1 PCI bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse GPP Bridge
40:02.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Host Bridge
40:03.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Host Bridge
40:04.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Host Bridge
40:05.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Host Bridge
40:07.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Host Bridge
40:07.1 PCI bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse Internal PCIe GPP Bridge 0 to bus[E:B]
40:08.0 Host bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse PCIe Dummy Host Bridge
40:08.1 PCI bridge: Advanced Micro Devices, Inc. [AMD] Starship/Matisse Internal PCIe GPP Bridge 0 to bus[E:B]
41:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
42:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
42:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
42:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
43:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
44:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
44:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
44:18.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
44:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
45:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981/PM983
46:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981/PM983
49:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
4a:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
4a:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)

```

SSD7580A:

```

00:18.7 Host bridge: Advanced Micro Devices, Inc. [AMD] Matisse Device 24: Function 7
01:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd Device a80a
02:00.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse Switch Upstream
03:00.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:01.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:02.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:03.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:04.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:05.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:08.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:09.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
03:0a.0 PCI bridge: Advanced Micro Devices, Inc. [AMD] Matisse PCIe GPP Bridge
04:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981/PM983
05:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd Device a80a
06:00.0 VGA compatible controller: NVIDIA Corporation GK208B [GeForce GT 710] (rev a1)
06:00.1 Audio device: NVIDIA Corporation GK208 HDMI/DP Audio Controller (rev a1)
07:00.0 Network controller: Intel Corporation Wi-Fi 6 AX200 (rev 1a)
08:00.0 Ethernet controller: Intel Corporation I211 Gigabit Network Connection (rev 03)
09:00.0 Ethernet controller: Realtek Semiconductor Co., Ltd. RTL8125 2.5GbE Controller (rev 01)
0a:00.0 Non-Essential Instrumentation [1300]: Advanced Micro Devices, Inc. [AMD] Starship/Matisse Reserved SPP
0a:00.1 USB controller: Advanced Micro Devices, Inc. [AMD] Matisse USB 3.0 Host Controller
0a:00.3 USB controller: Advanced Micro Devices, Inc. [AMD] Matisse USB 3.0 Host Controller
0b:00.0 RAID bus controller: Advanced Micro Devices, Inc. [AMD] Device 7916 (rev 51)
0c:00.0 RAID bus controller: Advanced Micro Devices, Inc. [AMD] Device 7916 (rev 51)
0d:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0e:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0e:04.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0e:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0e:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
0f:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
10:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
10:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
10:18.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
10:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
12:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981/PM983
14:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM981/PM981/PM983
15:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
16:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
16:04.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
16:08.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
16:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
17:00.0 Non-Volatile memory controller: Western Digital Device 2400
18:00.0 Non-Volatile memory controller: Western Digital Device 2400
19:00.0 Non-Volatile memory controller: Western Digital Device 2400
1a:00.0 Non-Volatile memory controller: Western Digital Device 2400
1b:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
1c:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
1c:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
1d:00.0 RAID bus controller: HighPoint Technologies, Inc. Device 7580 (rev 01)

```

SSD7580B:

```

0:00.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:00.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:01.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:02.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:03.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:04.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:05.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:06.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:07.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:08.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
9:1f.0 PCI bridge: LSI Logic / Symbios Logic Device c010 (rev b0)
a:00.0 Non-Volatile memory controller: Western Digital Device 2400
b:00.0 Non-Volatile memory controller: Western Digital Device 2200
c:00.0 Non-Volatile memory controller: Micron Technology Inc Device 51b1 (rev 02)
d:00.0 Non-Volatile memory controller: Micron Technology Inc Device 51b1 (rev 02)
e:00.0 Non-Volatile memory controller: Intel Corporation Optane DC P4800X Series SSD
f:00.0 Non-Volatile memory controller: Intel Corporation Optane DC P4800X Series SSD
0:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD controller SM981/PM981
1:00.0 Non-Volatile memory controller: Toshiba America Info Systems Device 0110 (rev 01)
2:00.0 RAID bus controller: HighPoint Technologies, Inc. Device 7580 (rev 11)
3:00.0 Serial Attached SCSI controller: LSI Logic / Symbios Logic Device 00b2 (rev b0)
b2:05.0 system peripheral: Intel Corporation Device 2034 (rev 04)
b2:05.2 system peripheral: Intel Corporation Sky Lake-E RAS configuration Registers (rev 04)
b2:05.4 PIC: Intel Corporation Device 2036 (rev 04)
b2:12.0 Performance counters: Intel Corporation Sky Lake-E M3KTI Registers (rev 04)
b2:12.1 Performance counters: Intel Corporation Sky Lake-E M3KTI Registers (rev 04)
b2:12.2 system peripheral: Intel Corporation Sky Lake-E M3KTI Registers (rev 04)
b2:15.0 system peripheral: Intel Corporation Sky Lake-E M2PCI Registers (rev 04)
b2:16.0 system peripheral: Intel Corporation Sky Lake-E M2PCI Registers (rev 04)
b2:16.4 system peripheral: Intel Corporation Sky Lake-E M2PCI Registers (rev 04)
b2:17.0 system peripheral: Intel Corporation Sky Lake-E M2PCI Registers (rev 04)
root@test-Super-Server:/home/test#

```

Additionally, you can verify that the NVMe drivers are detected by using the following command: **fdisk -l**

Example screenshot (SSD7101A-1):

```

Disk /dev/mapper/centos-swap: 8388 MB, 8388608000 bytes, 16384000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/nvme3n1: 512.1 GB, 512110190592 bytes, 1000215216 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/nvme2n1: 512.1 GB, 512110190592 bytes, 1000215216 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/nvme0n1: 512.1 GB, 512110190592 bytes, 1000215216 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/nvme1n1: 2000.4 GB, 2000398934016 bytes, 3907029168 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/centos-home: 192.9 GB, 192904429568 bytes, 376766464 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

```

- Download the appropriate driver from the Software Downloads web page:

SSD7105/7202:

<https://www.highpoint-tech.com/gen3-nvme-m2-bootable>

SSD7101A-1/SSD7104F/SSD7104/SSD7204/SSD7140A:

<https://www.highpoint-tech.com/gen3-nvme-m2-non-bootable>

SSD7120/SSD7180/SSD7184:

<https://www.highpoint-tech.com/gen3-nvme-u2-non-bootable>

SSD6540 Enclosures:

<https://www.highpoint-tech.com/ssd6540-catalog>

SSD7502/SSD7505/SSD7540:

<https://www.highpoint-tech.com/gen4-nvme-m2>

SSD7580A/SSD7580B:

<https://www.highpoint-tech.com/gen4-nvme-u2>

- Using the system terminal with root privileges, browse to the directory where the driver download is located, and enter the following commands to extract the Linux Open Source Driver software package:

tar zxvf HighPoint_NVMe_G5_Linux_Src_vx.x.xx_xx_xx_xx.tar.gz

```

[root@localhost Downloads]# tar zxvf HighPoint_NVMe_G5_Linux_Src_v1.2.13_20_03_17.tar.gz
hptnvme_g5_linux_src_v1.2.13_20_03_17.bin
README

```

Note: The driver revision shown in the screenshots may not correspond with current software releases. Please make sure to download the latest driver updates from the product's Software Updates page.

5. Install the Open Source Driver using the following command

sh hptnvme_g5_linux_src_vx.x.xx_xx_xx_xx.bin or
./hptnvme_g5_linux_src_vx.x.xx_xx_xx_xx.bin

```
[root@localhost Downloads]# sh hptnvme_g5_linux_src_v1.2.13_20_03_17.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)
Created symlink from /etc/systemd/system/default.target.wants/hptdrv-monitor.service to /usr/lib/systemd/system/hptdrv-monitor.service.

Please run hptuninhptnvme to uninstall the driver files.

Please restart the system for the driver to take effect.
[root@localhost Downloads]#
```

```
[root@localhost Downloads]# ./hptnvme_g5_linux_src_v1.2.20_2020_09_28.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 crashkernel=auto resume=/dev/mapper/cl-swap rd.lvm.lv=cl/root rd.lvm.lv=cl/swap rhgb quiet
new crashkernel=auto
resume=/dev/mapper/cl-swap
rd.lvm.lv=cl/root
rd.lvm.lv=cl/swap
rhgb
quiet pcie_aspm=off
Generating grub configuration file ...
Adding boot menu entry for EFI firmware configuration
done
Synchronizing state of hptdrv-monitor.service with SysV service script with /usr/lib/systemd/systemd-sysv-inst
all.
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/hptd
rv-monitor.service.

Please run hptuninhptnvme to uninstall the driver files.

Please restart the system for the driver to take effect.
[root@localhost Downloads]#
```

6. After driver installation is complete, the system will prompt you to restart to make the driver take effect. **Manually restart the system.**
7. After the distribution has rebooted, open the system terminal with root privileges and check the driver status using the following command:

dmesg | grep hptnvme

The following screenshot shows driver v1.2.13.

```
[root@localhost Downloads]# dmesg | grep hptnvme
[ 4.431322] hptnvme: loading out-of-tree module taints kernel.
[ 4.431325] hptnvme: module license 'Proprietary' taints kernel.
[ 4.431786] hptnvme: module verification failed: signature and/or required key missing - tainting kernel
[ 5.381222] hptnvme: HighPoint NVMe RAID controller driver (G5) v1.2.13 block major fc
[ 5.382480] scsi host6: hptnvme
[ 5.382617] hptnvme 0000:03:00.0: irq 145 for MSI/MSI-X
[ 5.382622] hptnvme 0000:03:00.0: irq 146 for MSI/MSI-X
[ 5.382625] hptnvme 0000:03:00.0: irq 147 for MSI/MSI-X
[ 5.382630] hptnvme 0000:03:00.0: irq 148 for MSI/MSI-X
[ 5.382633] hptnvme 0000:03:00.0: irq 149 for MSI/MSI-X
[ 5.382637] hptnvme 0000:03:00.0: irq 150 for MSI/MSI-X
```

Additionally, you can check the NVMe driver using the following command:

fdisk -l

```
Disk /dev/hptblock0n0p: 465.78 GiB, 500107862016 bytes, 976773168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/hptblock0n1p: 465.78 GiB, 500107862016 bytes, 976773168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/hptblock0n2p: 465.78 GiB, 500107862016 bytes, 976773168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/hptblock0n3p: 465.78 GiB, 500107862016 bytes, 976773168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

Updating the Driver

As of May 2022, current open-source driver releases include our Auto-Compile feature – auto compile checks the kernel version each time the system is booted to ensure compatibility. If a new kernel is detected, Auto Compile will check our online database for required updates and automatically compile a new driver.

The latest Open Source driver is available from the Software Downloads web pages. If you want to manually update using this download, please follow the procedure below.

1. Prerequisites

- a. Ensure that HighPoint NVMe RAID controller/enclosure is installed into the motherboard.
- b. Open the system terminal with root privileges to check the current driver version by using the following command:

dmesg | grep hptnvme.

The screenshot below shows driver version v1.2.13 is installed:

```
[root@localhost Downloads]# dmesg | grep hptnvme
[ 4.431322] hptnvme: loading out-of-tree module taints kernel.
[ 4.431325] hptnvme: module license 'Proprietary' taints kernel.
[ 4.431706] hptnvme: module verification failed: signature and/or required key missing - tainting kernel
[ 5.381222] hptnvme: HighPoint NVMe RAID controller driver (65) v1.2.13 block major fc
[ 5.382489] scsi host6: hptnvme
[ 5.382617] hptnvme 0000:03:00.0: irq 145 for MSI/MSI-X
[ 5.382622] hptnvme 0000:03:00.0: irq 146 for MSI/MSI-X
[ 5.382625] hptnvme 0000:03:00.0: irq 147 for MSI/MSI-X
[ 5.382630] hptnvme 0000:03:00.0: irq 148 for MSI/MSI-X
[ 5.382633] hptnvme 0000:03:00.0: irq 149 for MSI/MSI-X
[ 5.382637] hptnvme 0000:03:00.0: irq 150 for MSI/MSI-X
```

2. Updating the driver

- a. Open the directory where the latest driver version is located and open the system terminal with root privileges. Execute the following commands to complete the installation. The illustrated driver version is v1.2.14.

- b. Extract the Linux Open Source Driver software package using the following command:

tar xzvf HighPoint_NVMe_G5_Linux_Src_vx.x.xx_xx_xx_xx.tar.gz

```
[root@localhost Downloads]# tar xzvf HighPoint_NVMe_G5_Linux_Src_v1.2.14_20_04_10.tar.gz
hptnvme_g5_linux_src_v1.2.14_20_04_10.bin
README
```

- c. Make sure the system has an active internet connection. To manually install the latest Open Source Driver, open the system terminal with root privileges and enter the following command:

./hptnvme_g5_linux_src_vx.x.xx_xx_xx_xx.bin

```
[root@localhost Downloads]# ./hptnvme_g5_linux_src_v1.2.14_20_04_10.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 crashkernel=auto rd.lvm.lv=centos/root rd.lvm.lv=centos/swap rhgb quiet intel_iommu=off and iommu=off
new crashkernel=auto
rd.lvm.lv=centos/root
rd.lvm.lv=centos/swap
rhgb
quiet intel_iommu=off amd_iommu=off
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-3.10.0-1062.18.1.el7.x86_64
Found initrd image: /boot/initramfs-3.10.0-1062.18.1.el7.x86_64.img
Found linux image: /boot/vmlinuz-3.10.0-1062.el7.x86_64
Found initrd image: /boot/initramfs-3.10.0-1062.el7.x86_64.img
Found linux image: /boot/vmlinuz-0-rescue-cd0401dc0d1649da9932eac9f5546670
Found initrd image: /boot/initramfs-0-rescue-cd0401dc0d1649da9932eac9f5546670.img
done

Please run hptuninhptnvme to uninstall the driver files.
Please restart the system for the driver to take effect.
[root@localhost Downloads]#
```

- d. After the driver installation is complete, the system will prompt you to restart to allow the new driver to take effect. Please manually restart the system.

Note: for more information about this procedure, please consult the readme file included with each Open Source download.

- e. Once the distribution has rebooted, open the system terminal with root privileges and check the current driver version using the following command

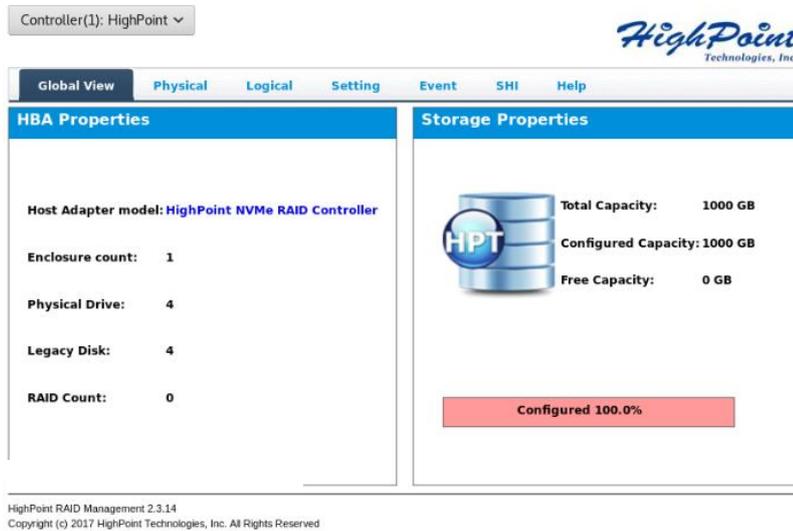
dmesg | grep hptnvme.

The screenshot below shows driver v1.2.14 is installed:

```
[root@localhost test]# dmesg | grep hptnvme
[ 4.267125] hptnvme: loading out-of-tree module taints kernel.
[ 4.267128] hptnvme: module license 'Proprietary' taints kernel.
[ 4.267485] hptnvme: module verification failed: signature and/or required key missing - tainting kernel
[ 5.216390] hptnvme: HighPoint NVMe RAID controller driver (65) v1.2.14 block major fc
[ 5.217073] scsi host0: hptnvme
[ 5.217813] hptnvme 0000:03:00.0: irq 145 for MSI/MSI-X
[ 5.217817] hptnvme 0000:03:00.0: irq 146 for MSI/MSI-X
[ 5.217820] hptnvme 0000:03:00.0: irq 147 for MSI/MSI-X
[ 5.217823] hptnvme 0000:03:00.0: irq 148 for MSI/MSI-X
[ 5.217827] hptnvme 0000:03:00.0: irq 149 for MSI/MSI-X
```

- f. Open the WebGUI to make sure it can connect to the controller and recognize the NVMe SSD's/RAID array.

- g. As shown below, the new driver has been successfully installed and loaded at bootup – the WebGUI can connect to the controller and recognize the SSD's and RAID array:



Uninstalling the Driver

1. Prerequisites

- a. Power off the system and remove the NVMe RAID controller card from the motherboard.

Note: failing to remove the controller and SSDs when uninstalling the driver may result in data loss. The Linux distribution will load the default NVMe support after the SSD7000 driver has been uninstalled – this driver will only recognize the NVMe SSD's as separate disks.

2. To uninstall the driver:

- b. Open the system terminal with root privileges. Enter the following commands to uninstall the driver:

Hptuninhptnvme

- c. 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]#
```

- d. After uninstalling the driver, manually reboot the system.

- e. After the distribution 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]#
```

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

HighPoint RAID Management (WebGUI) Installation / Driver Installation Verification

The HighPoint RAID Management software is used to configure and monitor the SSDs hosted by the HighPoint NVMe RAID controller/enclosure.

Download the HighPoint RAID Management software package from the HighPoint website:

SSD7105/7202:

<https://www.highpoint-tech.com/gen3-nvme-m2-bootable>

SSD7101A-1/SSD7104F/SSD7104/SSD7204/SSD7140A:

<https://www.highpoint-tech.com/gen3-nvme-m2-non-bootable>

SSD7120/SSD7180/SSD7184:

<https://www.highpoint-tech.com/gen3-nvme-u2-non-bootable>

SSD6540 Enclosures:

<https://www.highpoint-tech.com/ssd6540-catalog>

SSD7502/SSD7505/SSD7540:

<https://www.highpoint-tech.com/gen4-nvme-m2>

SSD7580A/SSD7580B:

<https://www.highpoint-tech.com/gen4-nvme-u2>

- Using the system terminal with root privileges, browse to the directory where the software download, and enter the following commands to extract the management software package:

tar zxvf RAID_Manage_Linux_v2.x.x.x_x_x_x.tgz

```
[root@localhost Downloads]# tar zxvf RAID_Manage_Linux_v2.3.14.1_17_07_26.tgz
HPT_CLI_Guide.pdf
README.txt
RAID_Manage_Linux_v2.3.14_17_07_26.bin
```

Note: The driver revision shown in the screenshots may not correspond with current software releases. Please make sure to download the latest driver updates from the product's Software Updates page.

- Install the HighPoint RAID management software (WebGUI & CLI) using the following command:

./RAID_Manage_Linux_v2.x.x.x_x_x_x.bin

```
[root@localhost Downloads]# ./RAID_Manage_Linux_v2.3.14_17_07_26.bin
-----
Install .....
Package readline6/hptsrv-https-2.3.14-17.0718.x86_64.rpm will be installed!
Starting hptdaemon (via systemctl): [ OK ]
Clean .....
Finish .....
```

- After the software is installed, open the WebGUI to make sure it can connect to the SSD7000 series RAID controller or enclosure.
- You can also check the controller using the CLI (command line interface). Using the system terminal, enter the following command:

hptraidconf

For more information about the CLI, please download the guide: [Link](#).

```
[root@localhost test]# hptraidconf
HPT CLI>query devices
-----
ID          Capacity  MaxFree  Flag   Status  ModelNumber
-----
1/E1/1     250.06    0        SINGLE LEGACY  Samsung SSD 960 EVO 250GB
1/E1/2     250.06    0        SINGLE LEGACY  Samsung SSD 960 EVO 250GB
1/E1/3     250.06    0        SINGLE LEGACY  Samsung SSD 960 EVO 250GB
1/E1/4     250.06    0        SINGLE LEGACY  Samsung SSD 960 EVO 250GB
-----
HPT CLI>
```

- If the WebGUI/CLI can connect to the controller and recognized the NVMe SSD's, the driver has been installed and is functioning normally:

SSD7105/7505/7101A/7204/7104/7120/6540/6540M/7180/7184/7140A/7540/
7580A/7580B:

Controller(1): HighPoint ▾



Global View Physical Logical Setting Event SHI Help

HBA Properties	Storage Properties
Host Adapter model: HighPoint NVMe RAID Controller	 Total Capacity: 1000 GB Configured Capacity: 1000 GB Free Capacity: 0 GB Configured 100.0%
Enclosure count: 1	
Physical Drive: 4	
Legacy Disk: 4	
RAID Count: 0	

HighPoint RAID Management 2.3.14
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SSD7202/7502:

Controller(1): HighPoint ▾



Global View Physical Logical Setting Event SHI Help

HBA Properties	Storage Properties
Host Adapter model: HighPoint NVMe RAID Controller	 Total Capacity: 500 GB Configured Capacity: 500 GB Free Capacity: 0 GB Configured 100.0%
Enclosure count: 1	
Physical Drive: 2	
Legacy Disk: 2	
RAID Count: 0	

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Uninstalling the HighPoint RAID Management Software (WEBGUI & CLI)

Open the system terminal with root privileges. Enter the following commands to uninstall the driver:

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

```
root@test-desktop: /home/test
root@test-desktop:/home/test# dpkg -r hptsvr
(Reading database ... 151203 files and directories currently installed.)
Removing hptsvr (3.0.4) ...
root@test-desktop:/home/test#
```

Enter the following command to check if the WebGUI has been removed successfully:

hptraidconf

after uninstall:

```
root@test-X299-UD4-Pro:/home/test/Desktop# hptraidconf
hptraidconf: command not found
root@test-X299-UD4-Pro:/home/test/Desktop#
```

Troubleshooting

WebGUI

1. The WebGUI fails to install

If you use an Ubuntu system, the system may prompt you about the lack of a **readline5** package when installing the WebGUI – this will interrupt the installation process.

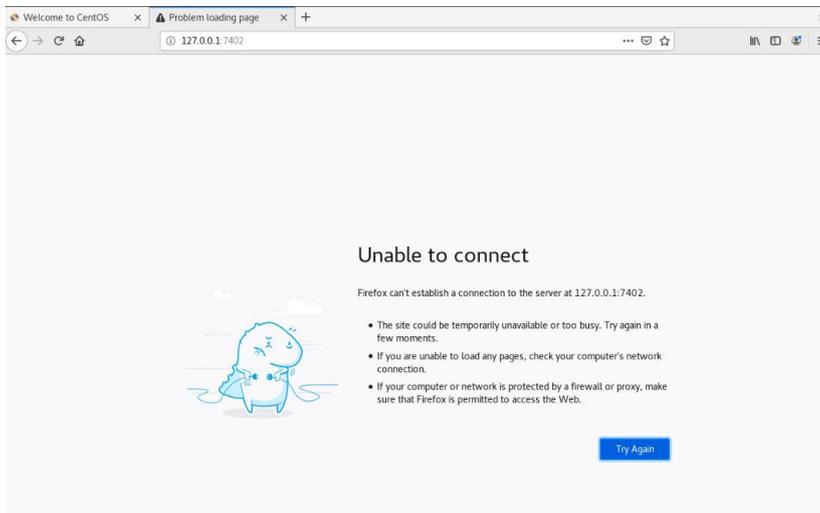
```
root@test-PRIME-Z390-A:/home/test/Downloads# sh RAID_Manage_Linux_v2.3.14_17_07_26.bin
-----
Install .....
Package readline lib not found! will be installed!
Install paran error!
Clean .....
Finish .....
```

Solution:

- a. With root permissions enabled, you can use the following command to load **readline5** at using a terminal, and will be allowed to install the WebGUI:
apt-get install libreadline5
- b. Once complete, restart the WebGUI installation procedure.

2. The WebGUI cannot connect to the controller

If you are unable to access the SSD7000 series RAID controller or enclosure using the WebGUI:



a. WebGUI service did not start successfully.

Solution:

Start the WebGUI by opening the system terminal with root privileges and entering the following command:

hptsvr

b. The driver cannot be compiled.

```
[root@localhost test]# hptsvr
proc file invalid, dwControllerId=0
Driver is not loaded.
[root@localhost test]#
```

Solution:

1. Make sure at least one NVMe SSD's has been installed into the SSD7000 series RAID controller or enclosure.
2. Make sure motherboard can recognize the SSD7000 device and display NVMe information during the BIOS post.
3. If you use a CentOS system, open the system terminal with root privileges and enter the following command to install "elfutils-libelf-devel":

yum install elfutils-libelf-devel

Once complete, install the SSD7000 driver once more.

4. If you use an Ubuntu/Debian system, open the system terminal with root privileges and enter the following command to install "libelf-dev":

yum install libelf-dev

Once complete, install the SSD7000 driver once more.

3. Fail to compile gcc, make and other driver files.

For Ubuntu

When installing the driver, due to various factors, driver files such as **gcc** and **make** cannot be compiled, thus interrupting the driver installation process:

```
root@test:/home/test# ./rsnvm_linux_src_v1.2.18.1_2020_03_18.bin
Verifying archive integrity... All good.
Uncompressing RocketNVM RAID Controller Linux Open Source package installer....
Checking and installing required toolchain and utility ...
Installing program make ... (failed)
Installing program gcc ... (failed)
Found program perl (/usr/bin/perl)
Found program wget (/usr/bin/wget)
```

This problem can be caused by:

a. The system is not connected to a network (internet connection)

Solution:

- a. Double check the system's internet connection
- b. Once confirmed, reinstall the driver.

b. System process is occupied/busy

Solution:

Open the system terminal with root privileges and enter the following command:

apt-get update

This will prompt the system to release the process and update the download source. Install the driver again after the system process has been released.

For Redhat

When installing the driver, due to various factors, driver files such as **gcc** and **make** cannot be compiled, thus interrupting the driver installation process:

```
[root@localhost Documents]# ./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 ...
Installing program make ... (failed)
Installing program gcc ... (failed)
```

Or a prompt with '**subscription-manager repos**':

```
compile:default boot kernel: /boot/vmlinuz-3.10.0-1160.el7.x86_64
dumpkernels:kernel installed
kernel-3.10.0-1160.el7.x86_64
dumpkernels:kernel-devel installed
kernel-devel-3.10.0-1160.el7.x86_64
dumpkernels:repo list kernel-devel

dumpkernels:end
installlib_centos elfutils-libelf-devel
There are no enabled repos.
Run "yum repolist all" to see the repos you have.
To enable Red Hat Subscription Management repositories:
subscription-manager repos --enable <repo>
To enable custom repositories:
yum-config-manager --enable <repo>
compile:some build tools are missing.
/var/lock/subsys/hptdrv-monitor:
```

Solution:

01. Go to the Red Hat website and register an account:

[Register for | Red Hat IDP](#)

02. Open the system terminal with root privileges.

Enter the following command to log in:

```
subscription-manager register --username=*** --password=***
```

```
--auto-attach
```

```
[root@localhost Documents]# subscription-manager register --username=*** --password=*** --auto-attach
Registering to: subscription.rhsm.redhat.com:443/subscription
The system has been registered with ID: 963725aa-d99d-48bc-bb7c-3011c4eef91f
The registered system name is: localhost.localdomain
```

Reinstall the driver

```
[root@localhost Documents]# ./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 ...
Installing program make ... done
Installing program gcc ... done
```

4. **If you experience any other WebGUI or CLI related problems**, please submit a support ticket using our [Online Support Portal](#), which includes a description of the problem in as much detail as possible, and upload the following:

Collect the following Log files: pci.log, drivermod.log, hptdrv.log, kernel.log

Please click the following [link](#) for more information about locating and collecting these logs.

Controller and Drive Detection Issues

If the system is unable to detect the controller or SSD's, make sure to remove all NVMe devices from the system that is not related to the SSD7000 series RAID controller or enclosure during the troubleshooting process. The presence of other NVMe devices may interfere with the detection of the SSD7000 device.

If you experience any other controller related problems, please submit a support ticket using our [Online Support Portal](#), which includes a description of the problem in as much detail as possible.

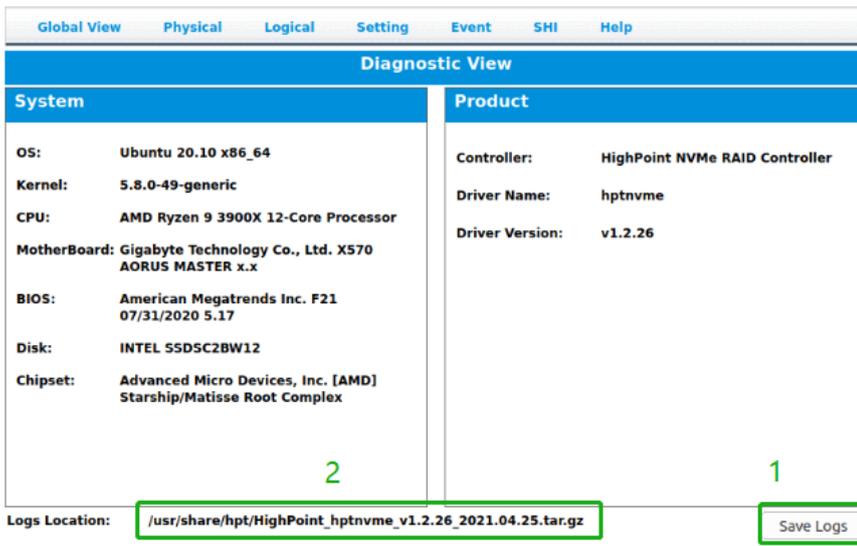
Please check the [Appendix](#) – providing system logs, screenshots and other information about your system will enable our Support Department resolve your support issue as quickly and efficiently as possible.

Appendix

When submitting a support ticket via our Online Support Portal, the following information will help our Support Department diagnose and resolve your issue as quickly and efficiently as possible.

How to collect Log information in WEBGUI

01. **1-Click Self-Diagnostic Solution:** Diagnostic View provides a “1-click” information collection system for troubleshooting. It will gather all necessary hardware, software and storage configuration data and compile it into a single file, which can be transmitted directly to our FAE Team via our Online Support Portal;



02. You can also click 'Help'→'Diagnostic' to enter the diagnostic view.



- Click the “**Save Logs**” button to create the diagnostic file.

Note, this process may take several minutes to complete.

The screenshot shows the 'Diagnostic View' interface. At the top, there are navigation tabs: Global View, Physical, Logical, Setting, Event, SHI, and Help. Below the tabs, the 'Diagnostic View' title is centered. The interface is divided into two main columns: 'System' and 'Product'. The 'System' column lists hardware and software details, and the 'Product' column lists controller and driver information. At the bottom, the 'Logs Location' is displayed as '/usr/share/hpt/HighPoint_hptnvme_v1.2.26_2021.04.25.tar.gz', and a 'Save Logs' button is visible. Green annotations include a '2' near the System column and a '1' near the Product column, and green boxes around the 'Logs Location' text and the 'Save Logs' button.

System	Product
OS: Ubuntu 20.10 x86_64	Controller: HighPoint NVMe RAID Controller
Kernel: 5.8.0-49-generic	Driver Name: hptnvme
CPU: AMD Ryzen 9 3900X 12-Core Processor	Driver Version: v1.2.26
MotherBoard: Gigabyte Technology Co., Ltd. X570 AORUS MASTER x.x	
BIOS: American Megatrends Inc. F21 07/31/2020 5.17	
Disk: INTEL 5SD5C2BW12	
Chipset: Advanced Micro Devices, Inc. [AMD] Starship/Matisse Root Complex	

Logs Location: /usr/share/hpt/HighPoint_hptnvme_v1.2.26_2021.04.25.tar.gz Save Logs

How to collect Log information CLI

- Execute the command ‘**hptraidconf**’ to enter the CLI;
- Execute the command ‘**diag**’ in CLI, your log information will be collected.

```
HPT CLI>diag
The diagnostic information has been saved in /usr/share/hpt/HighPoint_2021.04.07.
tar.gz
HPT CLI>
```

Please submit the log file to our **Support Department** using our online services: [Link](#).