# SSD7000 Controller Linux Debian Installation Guide

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# **1 Overview**

The purpose of this document is to provide clear instructions on how to install Linux Debian on the SSD7000 controller.

- Supported system: Debian10.1 /10.2 /10.3 /10.4 /10.5 /10.6 /10.7 / 10.8/10.9/11.3 /
   11.4/11.5/11.6
- ♦ Supported controller: SSD7580A/7580B/7540/7505/7502/7202/7105/7103

# 2 Installing Linux Debian on SSD7000 controller

If you would like to install Linux Debian onto drives attached to SSD7000 controller, please perform the following operations:

### **Step 1 Prepare Your Hardware for Installation**

After you attach your NVMe SSD to SSD7000 controller, you can use SSD7000 **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 SSD7000 controller, from your system.

#### Note

**SSD7000 only support EFI boot.** If you have other SCSI adapters installed, you must make sure the SSD7000 controller EFI will be loaded firstly. If not, try to move it to another PCI slot. Otherwise you may be unable to boot up your system.

### Step 2 Check System EFI Settings

In your system EFI SETUP menu, change **Boot Sequence** in such a way that the system will first boot from **EFI** CDROM or **EFI** a USB flash drive, and then from SSD7000 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 or EFI a USB flash drive. After you finish installation, set SSD7000 RAID as the first boot device to boot up the system.

1. Set UEFI setting with SuperMicro X11DPi-NT motherboard as an example.

a. "Advanced->PCIe/PCI/PnP Configuration->CPUSlot PCI-E OPROM"
 to "EFI". Suppose SSD7000 is connected to motherboard CPU1 Slot 2 PCI-E X16, then you should set "CPU1 Slot 2 PCI-E X16 OPROM" to "EFI";

NVMe Firmware Source	[Vendor Defined Firmware]	Enables or disables CPU1 SLOT2 PCI-E 3.0 X16 OPROM
M.2 (AHCI) Firmware Source	[Vendor Defined Firmware]	option.
CPU2 SLOT1 PCI-E 3.0 X8 OPROM	(EFI)	
CPU1 SLOT3 PCI-E 3.0 X8 OPROM	[EFI]	
CPU1 SLOT4 PCI-E 3.0 X16 OPROM	(EFI)	
CPU1 SLOTS PCI-E 3.0 X8 OPROM	[EFI]	
	SLOT2 PCI-E 3.0 X16 OPROM	
Onboard LAN1 Option ROM Disabled		
Onboard LAN1 Option ROM EFI		
P2_NVMe0 OPROM		
P2_NVMe1 OPROM		
Onboard Video Option ROM	[EFI]	

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

System Mode	Setup	Secure Boot feature is
Vendor Keys	Active	Active if Secure Boot is
Secure Boot	Not Active	Enabled, Platform Key(PK) is
		enrolled and the System is in User mode.
Secure Boot Mode	[Custom]	The mode change requires
CSM Support	[Enabled]	platform reset
Enter Audit Mode		
Key Management	Secure Boot	

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

My Favorites	Main	Ai Tweaker	Advanced	Monitor	Boot	Tool	Exit	
+ Boot\CSM (Compa	itibility Sup	port Module)				-		
Compatibility Sup	port Modul	e Configuration						
Launch CSM				[	Enabled			•
Boot Device Co	ntrol			[	UEFI and Lo	egacy OPR	ом	•
Boot from Net	work Device	5		[	Legacy only	1		-
Boot from Stor	age Devices			[	UEFI driver	first		·
Boot from PCI-	E/PCI Expan	sion Devices		[	Legacy only			·

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

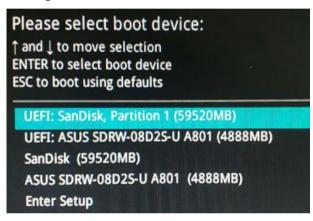
Compatibility Support Module Configuration	
Launch CSM	Enabled 👻
Boot Device Control	UEFI and Legacy OPROM -
Boot from Network Devices	Legacy only 🚽
Boot from Storage Devices	UEFI driver first 👻
Boot from PCI-E/PCI Expansion Devices	Legacy only +

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



### Step 3 Flash UEFI Rom to SSD7000

- a. Unzip SSD7000 UEFI package to root dir(/) of a USB flash drive, and insert the USB flash drive to the motherboard;
- b. Booting from the UEFI USB flash and enter the UEFI environment;



c. Command with "go.nsh", flash UEFI rom to SSD7000 Controller and reboot;

FSO:∖> go.nsh
FSO:∖> load.efi 71O3uefi.blf
Load Utility for Flash EPROM v1.1.5
(built at Jul 18 2022 15:07:51)
Set flash size to 65K
Found adapter 0x71031103 at PCI 9:0:0
Flash size 0x10400, File size 0x10200
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
ErasingSuceeded
Flashing
Flashing Success (total retry O)
Verifing
Passed !
FS0:\>

### **Step 4 Create Array**

a. Attach four NVMe SSD to SSD7000 Controller;

#### Note

Make sure your USB flash partition format is NTFS or FAT32.

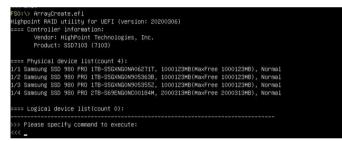
b. Boot, in the presence of the motherboard Log screen, there will be NVMe SSD information:

===:	= Physica	al de	evice	e lis	st (ci	ount 4):					
1/1	Samsung	SSD	980	PRO	1TB-	-S5GXNGONA06271	Τ,	1000123MB(MaxFree	1000123MB),	Normal	
1/2	Samsung	SSD	980	PRO	1TB-	-S5GXNGON905363	Β,	1000123MB(MaxFree	1000123MB),	Normal	
1/3	Samsung	SSD	980	PRO	1TB-	-SSGXNGON905355	Ζ,	1000123MB(MaxFree	1000123MB),	Normal	
1/4	Samsung	SSD	980	PRO	2TB-	-S69ENGONCOO184	М,	2000313MB(MaxFree	2000313MB),	Normal	
===:	= Logica.	l dev	vice	list	t (coi	unt 0):					
>>> <<<		spec:	ify (	comma	and i	to execute:					

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

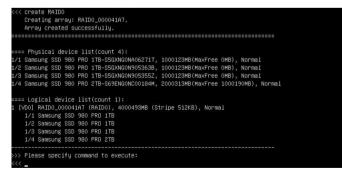


d. Command "ArrayCreate.efi" to enter the Utility:



e. Command "create RAID0".

Create RAID0 array with all disks and with maximum capacity.



- f. Command "exit";
- g. For more command usages, refer to Appendix A.

#### **Step 5 Prepare the Driver Diskette**

Extract HighPoint\_NVMe\_Debian\_11.6.0\_x86\_64\_vx.x.x\_xx\_xx\_tar.gz to top(/)

directory of an USB flash drive. It will look like:

```
root@debian:/home/test/Documents# tar zxvf HighPoint_NVMe_debian11.6_x86_64_v1.4.8_23_02_22.tar.gz
hptdd/
hptdd/postinst.sh
hptdd/postinst2.sh
hptdd/boot/
hptdd/boot/hptnvme5.10.0-20-amd64x86_64.ko.gz
hptdd/hptdrv
hptdd/hptdrk
hptdd/preist.sh
hptdd/preist.sh
hptdd/preist.sh
hptdd/preist.sh
hptdd/preist.sh
```

### Step 6 Install Linux Debian

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

Graphica	l install		
Install			
Advanced	options		
Accessib	le dark contra	st installer	menu .
Install	with speech sy	nthesis	

On the edit command window, move the cursor to the end of line "linux /install/vmlinuz...

", and append "modprobe.blacklist=nvme " (double quotation mark are not include).



Press CTRL-x or F10 to start the system.

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

artition disks				
he installer can guide you through ou can do it manually. With guided esults.	partitioning a disk partitioning you w	: (using different sta vill still have a chanc	ndard schemes) or, if you pr e later to review and custom	efer, nise the
you choose guided partitioning fo Partitioning method:	r an entire disk, yo	u will next be asked	which disk should be used.	
Guided - use the largest continuou:	free space			
iuided - use entire disk				
Suided - use entire disk and set up	LVM			
Suided - use entire disk and set up	encrypted LVM			
Manual				
		×		

Press "**Ctrl+ALT+F2**" to switch to the shell on console 2, and the then execute following commands to copy the driver contents:

##

.#

-#

# mkdir /hptdd	$\leftarrow$ Create mount point for USB flash drive
# mount /dev/sda1 /hptdd/	$\leftarrow \text{Mount the USB flash drive to /hptdd}$
# cp -a /hptdd/hptdd /tmp/	← Copy driver installation file to system temporary directory
# umount /hptdd	$\leftarrow$ Unmount the USB flash drive
:~# mkdir /hptdd	

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 Debian.

# sh /tmp/hptdd/preinst.sh ← Load SSD7000 driver.

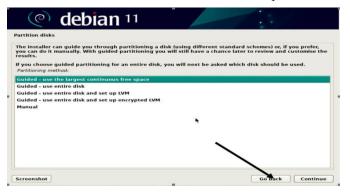


mount /dev/sda1 /hptdd/

umount /hptdd/

cp -a /hptdd/hptdd/ /tmp/

- f. Then press "Ctrl+ALT+F5" to switch back to installation screen and continue the installation as usual.
- g. Now click the "Go Back" button to detect the hptnvme disk.



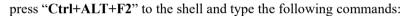
h. Now click the "Detect disks" button and "Continue" to detect the hptnvme disk.

Ce debian 11	*
Choose the next step in the install process:	
Configure the keyboard	
Detect and mount installation media	
Load installer components from installation media	
Detect network hardware	
Configure the network	
Set up users and passwords	
Configure the clock	
Detect disks	
Partition disks	
Install the base system	
Configure the package manager	
Select and install software	
Install the GRUB boot loader	
Continue without boot loader	
Finish the installation	
Change debconf priority	
Check the integrity of installation media	

his is an ystem, n	overview ount poin	of your currently t, etc.), a free sp	configured partiti	ons and mount points. Sele titions, or a device to initiali	ct a partition te its partition	to modify its s table.	settings (file
Guide	d partitic	ning					
Config	ure softw	vare RAID					
Config	ure the I	ogical Volume	Manager				
Config	ure encr	ypted volumes					
Config	ure iSCS	I volumes	_				
		5n0p - 4.0 TB U					
			Inknown USB SanDisk 3.	2Gen1			
SCSI24		sda) - 30.8 GB	USB SanDisk 3.				
SCSI24	4 (0,0,0)	sda) - 30.8 GB 1.0 MB	USB SanDisk 3. FREE SPACE	Basic data p			
SCS124 > > >	# (0,0,0) #1	sda) - 30.8 GB 1.0 MB 30.8 GB 1.0 MB	USB SanDisk 3. FREE SPACE fat32	Basic data p			
SCSI24 > > SCSI25	# (0,0,0) #1 5 (0,0,0)	sda) - 30.8 GB 1.0 MB 30.8 GB 1.0 MB sdb) - 30.8 GB	USB SanDisk 3. FREE SPACE fat32 FREE SPACE	Basic data p			
SCSI24 > > SCSI25	# (0,0,0) #1 5 (0,0,0)	sda) - 30.8 GB 1.0 MB 30.8 GB 1.0 MB	USB SanDisk 3. FREE SPACE fat32 FREE SPACE	Basic data p			

i. When the screen shows that "Finish the installation".

(c) debian 11
inish the installation



**#sudo sh /tmp/hptdd/postinst.sh** ← Install SSD7000 driver.

A message will be displayed that the driver has been installed successfully.



- j. Press "Ctrl+ALT+F5" to switch back to installation screen and finish the installation.
- k. Opensource driver needs to be installed after system installation, please connect to the internet:

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

SSD7502/7505/7540: https://www.highpoint-tech.com/gen4-nvme-m2

SSD7105/7202: https://www.highpoint-tech.com/gen3-nvme-m2-bootable

SSD7580A/7580B: https://www.highpoint-tech.com/gen4-nvme-u2

Run the .bin file to install the driver package.

sh hptnvme\_g5\_linux\_src\_vxx.x.x\_xx\_xx\_st.bin

```
README

root@debian:/home/test/Downloads# sh hptnvme g5 linux src v1.5.1 2023 02 21.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 gerl (/usr/bin/gcc)

Found program wget (/usr/bin/perl)

Found program wget (/usr/bin/wget)
```

1. Follow the prompts to complete the driver installation.

```
Found linux image: /boot/vmlinuz-5.10.0-20-amd64

Found initrd image: /boot/initrd.img-5.10.0-20-amd64

Warning: os-prober will be executed to detect other bootable partitions.

Its output will be used to detect bootable binaries on them and create new boot entries.

Adding boot menu entry for UEFI Firmware Settings ...

done

Synchronizing state of hptdrv-monitor.service with SysV service script with /lib/systemd/systemd-sysv-install.

Executing: /lib/systemd/systemd-sysv-install enable hptdrv-monitor

update-rc.d: warning: enable action will have no effect on runlevel 1

Created symlink /etc/systemd/system/default.target.wants/hptdrv-monitor.service → /lib/systemd/system/hptdrv-monitor.service.

SUCCESS: Driver hptnvme is installed successfully for kernel 5.10.0-20-amd64.

Please restart the system for the driver to take effect.

If you want to uninstall the driver from the computer , please run hptuninhptnvme to uninstall the driver files.

root@debian:/home/test/Downloads#
```

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

# **3** Monitoring the Driver

Once the driver is running, you can monitor it through the Linux proc file system support. There is a special file under /proc/scsi/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 SSD7000 controller. Installation of the management software is optional but recommended.

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

# **5** Trouble Shooting

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. Select the default (kernel: 5.10.0-20-amd64) and enter the system.



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

SSD7502/7505/7540: <u>https://www.highpoint-tech.com/gen4-nvme-m2</u> SSD7105/7202: <u>https://www.highpoint-tech.com/gen3-nvme-m2-bootable</u> SSD7580A/7580B: <u>https://www.highpoint-tech.com/gen4-nvme-u2</u>

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

#### sh hptnvme\_g5\_linux\_src\_vxx.x.x\_xx\_xx\_shin

d. Follow the prompts to complete the driver installation.

```
Found linux image: /boot/vmlinuz-5.10.0-20-amd64

Found initrd image: /boot/initrd.img-5.10.0-20-amd64

Warning: os-prober will be executed to detect other bootable partitions.

Its output will be used to detect bootable binaries on them and create new boot entries.

Adding boot menu entry for UEFI Firmware Settings ...

done

Synchronizing state of hptdrv-monitor.service with SysV service script with /lib/systemd/systemd-sysv-install.

Executing: /lib/systemd/systemd-sysv-install enable hptdrv-monitor

update-rc.d: warning: enable action will have no effect on runlevel 1

Created symlink /etc/systemd/system/default.target.wants/hptdrv-monitor.service → /lib/systemd/system/hptdrv-monitor.service.

SUCCESS: Driver hptnvme is installed successfully for kernel 5.10.0-20-amd64.

Please restart the system for the driver to take effect.

If you want to uninstall the driver for the computer, please run hptuninhptnvme to uninstall the driver files.

root@debian:/home/test/Downloads#
```

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

# **6 Rebuilding Driver Module for System Update**

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

Please refer to the README file distributed with HighPoint SSD7000 opensource package on how to build and install the driver module.

# Appendix A

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### 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

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<<< 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.