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SSD7000 Controller Linux Rocky Linux Installation Guide

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1 Overview

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

- Supported system: Rocky Linux 8.6/8.7/9.0/9.1
- Supported controller: SSD7540/7505/7502/7202/7105

2 Installing Linux Rocky Linux on SSD7000 controller

If you would like to install Linux Rocky Linux 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 Bootable USB drive, after you finish installation, set SSD7000 RAID controller as the first boot device to boot up the system. Refer to your motherboard EFI manual to see how to set boot sequence.

- 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]	
M.2 PCIe x2 OPROM Onboard LAN1 Option ROM Doboard LAN1 Option ROM P2 NVMe0 OPROM	SLOT2 PCI-E 3.0 X16 OPROM	

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 Favorite	s Main	Ai Tweaker	Advanced	Monitor	Boot	Tool	Exit		
← Boot\CSM (Con	npatibility Sup	oport Module)						-	
Compatibility	Support Modu	le Configuration							
Launch CSM					Enabled			•	
Boot Device	Control				UEFI and L	egacy OPR	OM	•	
Boot from I	letwork Device	es			Legacy only	,		•	
Boot from S	itorage Device	5		[UEFI driver	first		•	
Boot from	PCI-E/PCI Expa	nsion 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

For Example SSD7505 :

Note : Make sure your USB flash partition format is FAT32.

For other products, please refer to: Update UEFI ROM

- 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;

```
FS1:\> go.nsh
FS1:\> load.efi 7505uefi.rom
Load Utility for Flash EPROM v1.1.0
(built at Jan 5 2021 13:30:42)
Found adapter 0x75051103 at PCI 33:0:0
Flash size 0x10000, File size 0xee00
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
Erasing ....Suceeded
Flashing ....
Flashing Success (total retry 0)
Verifing ....
Passed !
FS1:\> _
```

Step 4 Create Array

- a. Attach two NVMe SSD to SSD7000 Controller;
- b. Boot, enter the motherboard's Boot List and select start from UEFI USB flash:



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



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



- e. Command "exit";
- f. For more command usages, refer to <u>Appendix A</u>.

Step 5 Prepare the Driver Diskette

Extract HighPoint_NVMe_Rocky_Linuxxx.xx_x86_64_vx.xx_xx_xx_xx_tar.gz to top(/)

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

[root@localhost home]# tar z	xvf HighPoint NVMe Rocky Linux9.1 x86 64 v1.5.1 23 04 12.tar.gz
hptdd/	· · · · · · · · · · · · · · · · · · ·
hptdd/60-persistent-storage-	hptblock.rules
hptdd/dracut-hptdrv.sh	
hptdd/install.sh	
hptdd/modinfo	
hptdd/module-setup.sh	
hptdd/modules.alias	
hptdd/modules.cgz	
hptdd/modules.dep	
hptdd/modules.pcimap	
hptdd/pci.ids	
hptdd/pcitable	9
hptdd/rhdd	
hptdd/rhel-install-step1.sh	
hptdd/rhel-install-step2.sh	
hptdd/readme.txt	

Step 6 Install Rocky Linux

For Example : Rocky Linux9.1

- 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 Bootable USB drive (EFI mode).
- d. When the Installation screen appears, press 'e' to edit boot command line option.



On the edit command window, move the cursor to the end of line "linuxefi /images / pxeboot... ", 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,

			ROCKY LINUX 9	1 INSTALLATIC
			🖽 us	Help!
WELCOME TO ROO What language would you	CKY LINUX 9.1. u like to use during the installation proces	57		
English	English 🕻	English (United States)		
العربية	Arabic	English (United Kingdom)		
Français	French	English (India)		
Deutsch	German	English (Australia)		
日本語	Japanese	English (Canada) English (Denmark)		
中文	Mandarin Chinese	English (Ireland)		
Русский	Russian	English (New Zealand)		
Español	Spanish	English (Nigeria)		
Afrikaans	Afrikaans	English (Hong Kong SAR China)		

Press **CTRL+ALT+F2** to switch to the shell on console 2, and press **ENTER** to activate this console.

Rocky Linux 9.1 (Blue Onyx) Kernel 5.14.0-162.6.1.el9_1.x86_64 on an x86_64
[anaconda root@localhost /]#

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/	← 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				
[anaconda root@localhost /]#	mkdir /hptdd				

Lanaconaa	rooterocarnost	1#	mkarr Znptaa
[anaconda	root@localhost	/]#	mount /dev/sdb1 /hptdd/
[anaconda	root@localhost	/]#	cp -a /hptdd/hptdd/ /tmp/
[anaconda	root@localhost	/]#	umount /dev/sdb1

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 Rocky Linux.

```
# sh /tmp/hptdd/ rhel-install-step1.sh ← Load SSD7000 driver.

[anaconda root@localhost /]# sh /tmp/hptdd/rhel-install-step1.sh

Driver Installation

Driver installation step 1 completed.
```

- f. Then press **ALT+F6** to switch back to installation screen and continue the installation as usual.
- g. When the following window appears during the installation process,



1) Set Root Password

[anaconda root@localhost /]#



2) Select Installation Destination and click "refresh"

Local Standard Disks			
111.79 GiB	57.3 GIB		
ATA KINGSTON SA40053 50026b73815ff1fc sda / 1.43 MiB free	SanDisk Cruzer Glide 3.0 sdb / 992.5 KiB free		
Specialized & Network Disks			
Add a disk			
Storage Configuration			
O Automatic O Custom			
I would like to make additional space available. Encryption			
Encryption Encrypt my data. You'll set a passphrase next.			
		h	
		N	
			O disks selected; O B capacity; O B free Refrest

then choose your own disk.

INSTALLATION DESTINATION
Done
Device Selection
Select the device(s) you'd like to install to. They will be left untouched until you click on the main
Local Standard Disks
1.82 TiB 0x1103 hptblock1n0p / 1.82 TiB free
Specialized & Network Disks
Add a disk

3) Set Software Selection and choose Server with GUI→Development Tools

	Server with GUI
	An integrated, easy-to-manage server with a graphical interface.
0	Server
	An integrated, easy-to-manage server.
0	Minimal Install Basic functionality.
0	Workstation
	Workstation is a user-friendly desktop system for laptops and PCs.
O	Custom Operating System
	Basic building block for a custom Rocky Linux system.
0	Virtualization Host
	Minimal virtualization host.
10.00	onsole Internet Tools onsole internet access tools, often used by administrators.
C	ontainer Management
T	pols for managing Linux containers
D	evelopment Tools
	basic development environment.
.N	IET Development
	pols to develop and/or run .NET applications
T	
	raphical Administration Tools
G	raphical Administration Tools raphical system administration tools for managing many aspects of a stem.
G Sy	raphical system administration tools for managing many aspects of a

Then begin installation.

h. If the following information is displayed during the installation, select "Yes".

C Installing boot loader	The following error occurred while installing the boot loader. The system will not be bootable. Would you like to ignore this and continue with installation? Could not get stage2 filesystem UUID		
	No	Yes	
			

i. When the screen shows that "complete!".



press CTRL+ALT+F2 to the shell and type the following commands:

rm -rf /tmp/hptdd \leftarrow Delete the driver file in SSD7000

# exit	\leftarrow Exit the top(/) directory of the SSD7000 system
Lanaconda root⊍localhost	/l# cp -r /tmp/hptdd /mnt/sysimage/tmp/hptdd
[anaconda root@localhost	/l# chroot /mnt/sysimage/
[anaconda root@localhost	/]# sh /tmp/hptdd/rhel-install-step2.sh
Driver Installation	1979년 - 1979년 - 1979년 6월 1979년 월 1979년 1979년 1971년 - 1979년 1971년 1971년 - 1979년 1971년 1971년 1971년 1971년 1971년 1 1971년 1월 1971년 1
Updating 5.14.0-162.6.1.e	e19_1.x86_64
Driver installation step	2 completed.
[anaconda root@localhost	/]# rm -rf /tmp/hptdd/
[anaconda root@localhost	/l# exit
exit	
[anaconda root@localhost	/]#

- j. Press ALT+F6 to switch back to installation screen and finish the installation.
- k. If you want to boot from another kernel, please install the SSD7000 Series opensource driver after entering the system.
- 1. Restart to enter the system, please connect to the internet:

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

https://www.highpoint-tech.com/nvme-3/ssd7540

https://www.highpoint-tech.com/nvme-2/ssd7505

https://www.highpoint-tech.com/nvme-2/ssd7502

https://www.highpoint-tech.com/nvme-2/ssd7105

https://www.highpoint-tech.com/nvme-2/ssd7202

Extract driver package:

tar zxvf HighPoint_NVMe_G5_Linux_Src_Src_vx.xx.xx_xx_xx_tar.gz

Run the .bin file to install the driver package.

```
sh hptnvme_g5_linux_src_vxx.x.x_xx_xx_src_vx
```

m. Follow the prompts to complete the driver installation.



n. 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: 5.14.0-162.6.1.el9.x86_64) and enter the system.

```
Rocky Linux (5.14.0-162.6.1.el9_1.x86_64) 9.1 (Blue Onyx)
Rocky Linux (0-rescue-fe62cd9bef094e579ef52bf9e0800eed) 9.1 (Blue Onyx)
FreeDOS (on /dev/sdb1)
UEFI Firmware Settings
```

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

https://www.highpoint-tech.com/nvme-3/ssd7540

https://www.highpoint-tech.com/nvme-2/ssd7505

https://www.highpoint-tech.com/nvme-2/ssd7502

https://www.highpoint-tech.com/nvme-2/ssd7105

https://www.highpoint-tech.com/nvme-2/ssd7202

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

sh hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin or

d. Follow the prompts to complete the driver installation.



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.

7 Appendix A

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

Create Command

Syntax Create Array Type (RAID0/RAID1/RAID10) Member Disk list (1/1,1/2|*) Capacity (100|*)

Examples

<<< create RAID0 <<< create RAID0 * <<< create RAID0 * * Create RAID0 array with all disks and with maximum capacity.

<<< create RAID1 1/1, 1/3 10 Create RAID1 array with disk 1/1 and 1/3 and with 10GB capacity.

```
<<< create RAID10
<<< create RAID10 *
<<< create RAID10 * *
  Create RAID10 array with all disks and with maximum capacity.
```

Delete Command Svntax delete {array ID}

Examples

<<< delete 1 Delete the first array from Logical device list. <<< delete 2 Delete the second array from Logical device list.

• **Info Command**

Syntax

info Display physical device list and logical list

Exit Command Syntax

Q/q/quit/exit Quit the application

• Help Command

Syntax H/h/help This is help message.