Linux Debian On HighPoint NVMe RAID AIC Installation Guide

V1.05-Apr 8, 2024

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1 Overview

The purpose of this document is to provide clear instructions on installing Linux Debian to an SSD or RAID array hosted by HighPoint NVMe AICs.

The following is a list of NVMe AICs and systems.

Supported System	Debian10.1 Debian10.2 Debian10.3 Debian10.4 Debian10.5 Debian10.6 Debian10.7 Debian10.8 Debian10.9 Debian11.3 Debian11.4 Debian11.5 Debian11.6
Supported AIC	SSD7202 SSD7105 SSD7505 SSD7502 SSD7540 SSD7580A SSD7580B SSD7580C SSD7749M2 SSD6780A RocketAIC 7505HW Series RocketAIC 7540HW Series RocketAIC 7749EW Series RocketAIC 7502HW Series RocketAIC 7105HW Series RocketAIC 7749MW Series

2 Installing Linux Debian on NVMe AIC

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

Step 1 Prepare Your Hardware for Installation

After you attach your NVMe SSD to the NVMe AIC, you can use **EFI Utility** to configure your NVMe SSDs into RAID arrays or just use them as single disks.

Before installation, you must remove all the NVMe SSDs that are not physically attached to the NVMe AIC from your system.

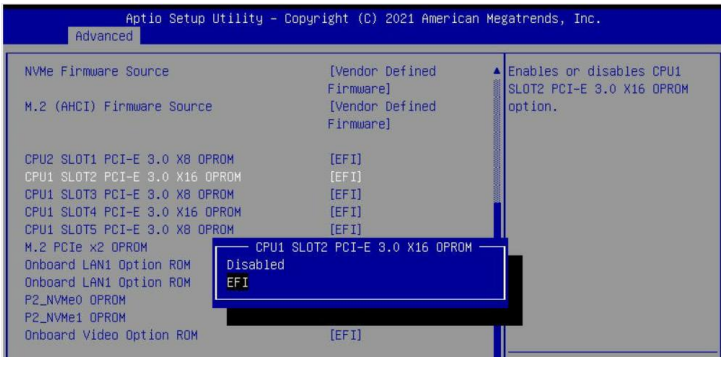
Note

NVMe AIC only supports EFI boot. If other SCSI adapters are installed, you must ensure the NVMe AIC EFI will be loaded first. If not, try to move it to another PCI slot. Otherwise, you may be unable to boot up your system.

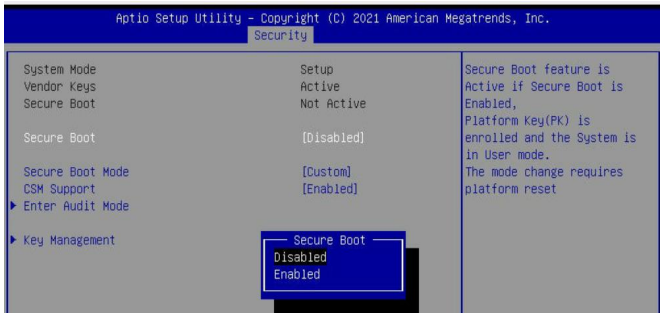
Step 2 Check System EFI Settings

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 the NVMe AIC as the first boot device to boot up the system. Refer to your motherboard EFI manual to see how to configure the 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"**. NVMe AIC is connected to motherboard CPU1 Slot 2 PCI-E X16; then you should set "CPU1 Slot 2 PCI-E X16 OPROM" to "EFI".

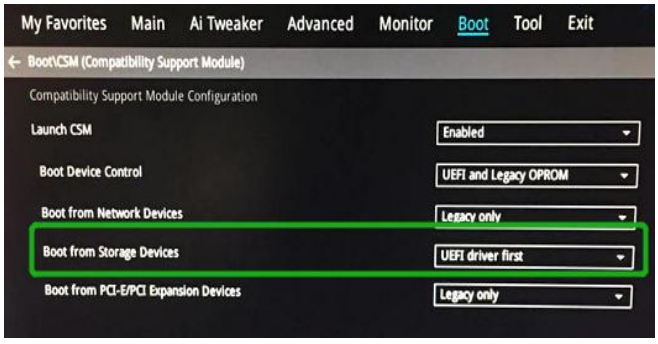


b. Disable "**Secure Boot**", and set "**Attempt Secure Boot**" to "**Disabled**".

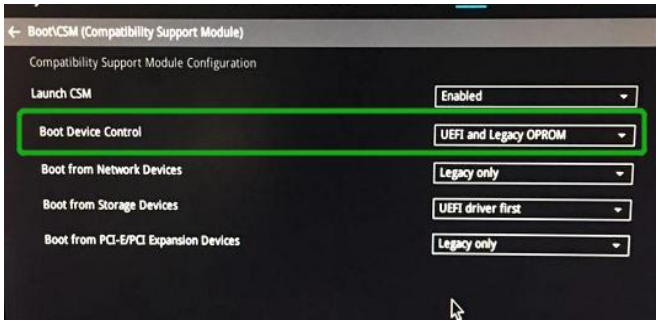


2. Configuring the UEFI settings (using an ASUS PRIME X299 -DELUXE motherboard as an example):

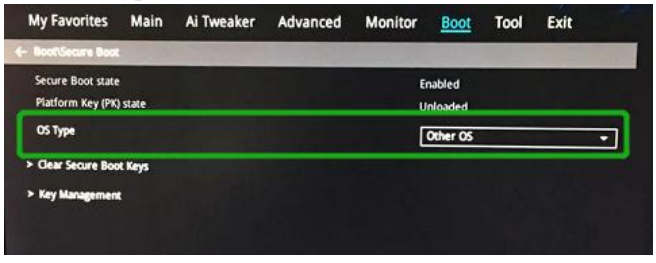
a. Set "**Boot from Storage Devices**" to "**UEFI driver first**".



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



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



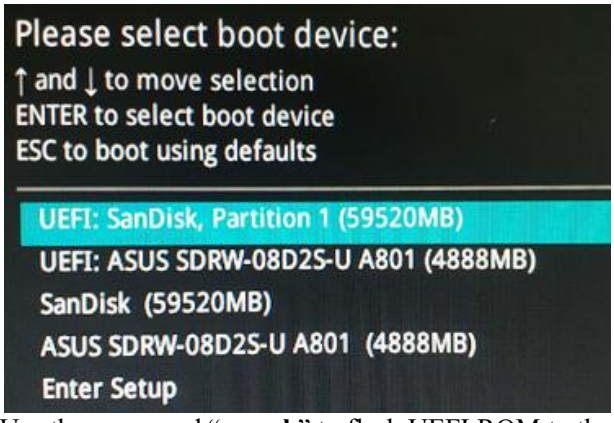
Step 3 Flash UEFI ROM to NVMe AIC

Example SSD7505:

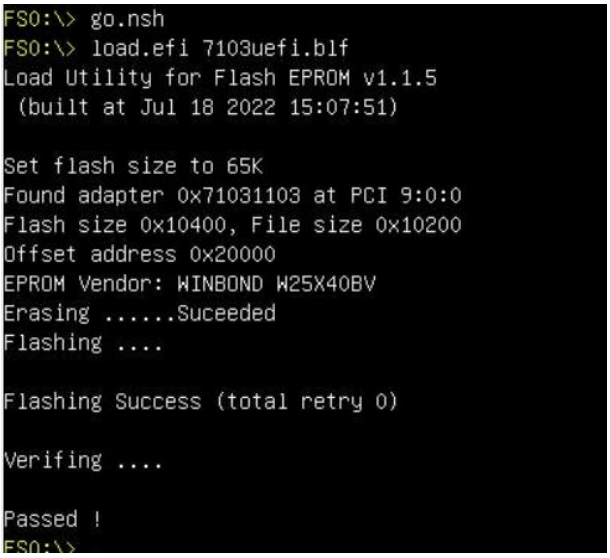
For other products, please refer to: Update UEFI ROM

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

1. Unzip the SSD7505 UEFI package to the root dir(/) of a USB flash drive and connect the USB flash drive to the motherboard.
2. Booting from the UEFI USB flash and entering the UEFI environment.



3. Use the command "**go.nsh**" to flash UEFI ROM to the SSD7505 and reboot the system.

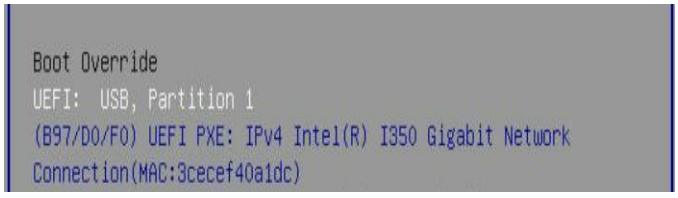


4. Use the "**exit**" command to exit the utility.

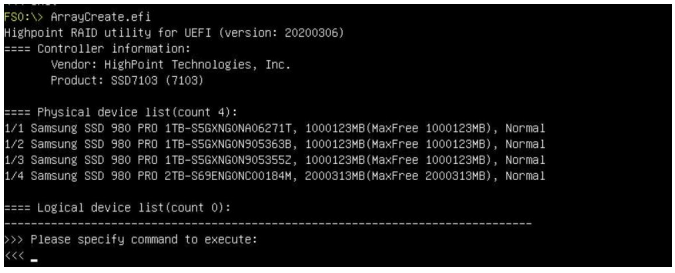
Step 4 Create Array

Note: *RocketAIC series NVMe drives are already pre-configured with RAID0. You can skip this step. If you want to use another RAID array for a Boot-RAID configuration, refer to the following steps.*

1. Attach NVMe SSDs to the NVMe AIC.
2. Boot, enter the motherboard's Boot list, and select start from UEFI USB flash.

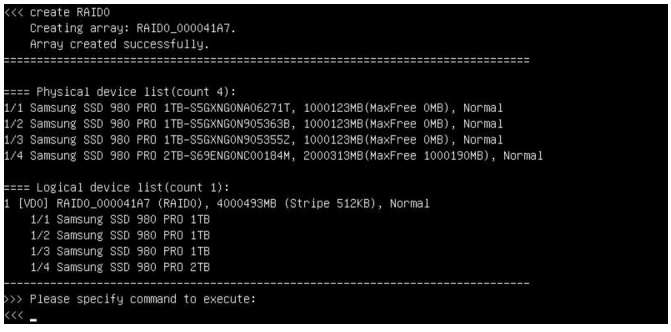


3. Use the command "ArrayCreate.efi" to enter the Utility:



4. Use the command "create RAID0".

   This will create a RAID0 array using all the NVMe SSDs and the maximum available capacity.



5. Use the "exit" command to exit the utility.
6. For additional command lines, refer to Appendix A.

Step 5 Prepare the Driver Diskette

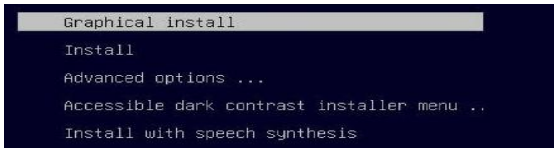
Extract **HighPoint_NVMe_Debian_11.6.0_x86_64_vx.x.x_xx_xx_xx.tar.gz** to a USB flash drive's top(/) directory. It will look like:

```
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/hptblock
hptdd/60-persistent-storage-hptblock.rules
hptdd/preinst.sh
hptdd/readme.txt
root@debian:/home/test/Documents#
```

Step 6 Install Linux Debian

Example: Debian 11

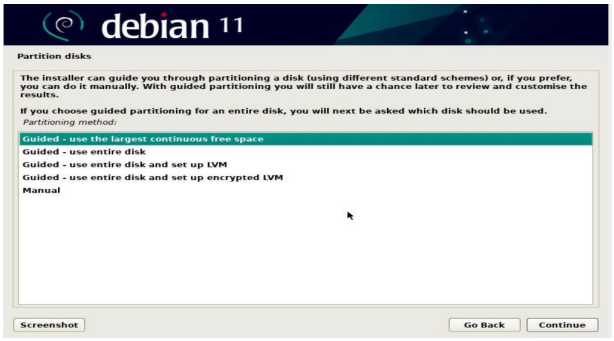
1. Before starting the installation procedure, verify the status of your network environment. To ensure Debian is successfully installed on the RAID array, we recommend that the system be disconnected from the internet and any local network.
2. Insert the Bootable USB drive into the target system.
3. Boot the system using a bootable USB drive.
4. press “e” to edit the boot command line option when the Installation screen appears.



On the edit command window, move the cursor to the end of the line “linux /install/vmlinuz...”, and append “**modprobe.blacklist=nvme”** (do not include the quotation marks).

Press **CTRL-x** or **F10** to start the system.

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



Press **Ctrl+ALT+F2** to switch to the shell on console 2. Next, execute the following commands:

 # mkdir /hptdd ← Create a mount point for the USB flash drive

 # mount /dev/sda1 /hptdd/ ← Mount the USB flash drive to /hptdd

 # cp -a /hptdd/hptdd /tmp/ ← Copy the driver installation file to the system's temporary directory

 # umount /hptdd ← Unmount the USB flash drive

```
:~# mkdir /hptdd
:~# mount /dev/sda1 /hptdd/
:~# cp -a /hptdd/hptdd/ /tmp/
```

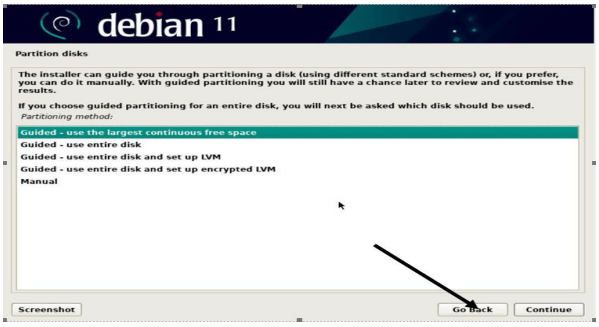
When the USB flash drive is unmounted, please unplug the USB flash drive from the system. Next, execute the following commands to install the driver for Linux Debian.

 # sh /tmp/hptdd/preinst.sh ← Load NVMe AIC driver.

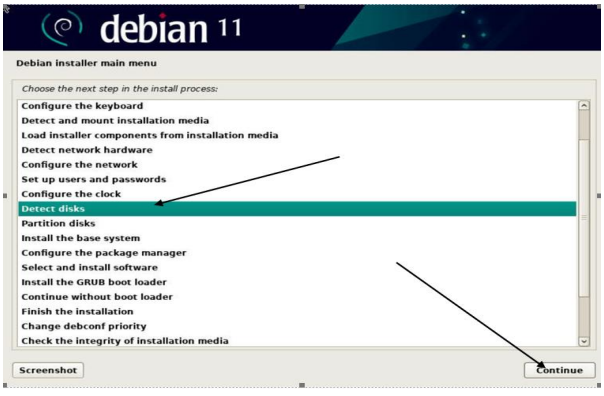
```
:~# sh /tmp/hptdd/preinst.sh
This step succeeded!
```

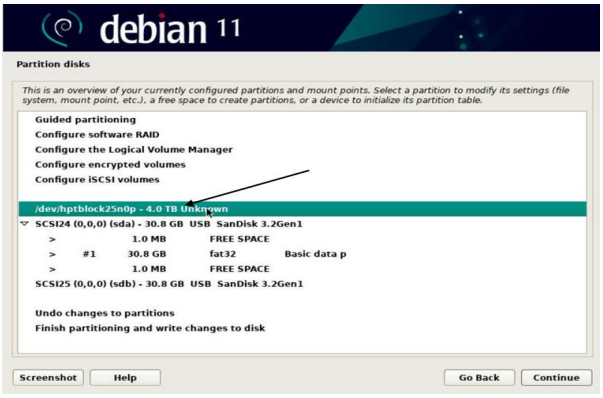
6. Press **"Ctrl+ALT+F5"** to switch back to the installation screen and continue the installation as usual**.**

7. Now click the "**Go Back**" button to detect the hptnvme disk.

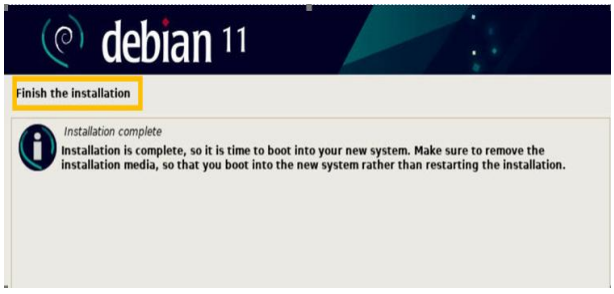


8. Now click the "**Detect disks**" and "**Continue**" to detect the hptnvme disk.





9. When the screen shows "**Finish the installation**".



Press **Ctrl+ALT+F2** to the shell and type the following commands:

#sudo sh /tmp/hptdd/postinst.sh ← Install NVMe AIC driver.

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

10. Press **Ctrl+ALT+F5** to switch back to the installation screen and **finish the installation**.

11. If you want to boot from another kernel, please install the NVMe AIC driver after entering the system.

12. Restart to enter the system, **please connect to the internet:**

a. Download the appropriate driver from the Software Downloads web page.

b. Please execute the following command before installing the driver

 # umount /dev/sda1

 # mount /dev/sda1 /media/cdrom

Note: *sda1 is a Bootable USB drive, and the default repository path is cdrom, so we need to adjust the ISO image mount path to /mnt/cdrom*

 # apt install gcc

 # apt install make

 # apt install linux-headers-$(uname -r)

c. Extract the driver package:

tar zxvf HighPoint_NVMe_G5_Linux_Src_vx.x.x_xxxx_xx_xx.tar.gz

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

sh hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.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 gcc (/usr/bin/gcc)
Found program perl (/usr/bin/perl)
Found program wget (/usr/bin/wget)
```

13.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#
```

14.After installing Debian, you can reconnect the system to the network/internet and update the system as needed.

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 /. You can view the driver status through this file 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.

Use the following command to show the 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's RAID Management Software can be used to check the status of the SSDs and RAID arrays hosted by the NVMe AIC. Installation of the management software is optional but recommended.

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

5 Troubleshooting

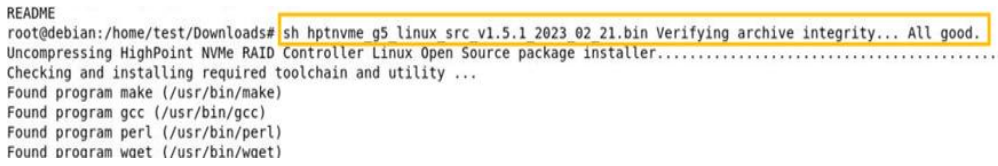
If you do not install the system or update the kernel according to the installation manual, the system will crash, and you cannot enter. Please follow the steps below.

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

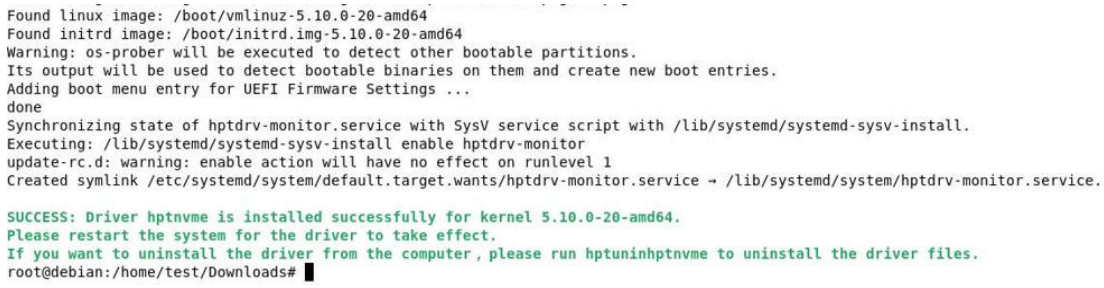
2. Install Linux Opensource driver.
3. Download the appropriate driver from the Software Downloads web page.

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

   sh hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin



4. Follow the prompts to complete the driver installation.



5. After the installation, 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 rebooting.

Please refer to the README file distributed with the NVMe AIC open-source 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 a RAID0 array with all disks and with maximum capacity.

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

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

- **Delete Command**
  Syntax
  delete {array ID}

  Examples
  <<< delete 1
  Delete the first array from the Logical device list.
  <<< delete 2
  Delete the second array from the 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 a help message.