

SSD7505 Controller

Linux Ubuntu Server 20.04.4

Installation Guide

Version 1.02

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1 Overview

The purpose of this document is to provide clear instructions on how to install Linux Ubuntu Server on the SSD7505 controller.

2 Installing Linux Ubuntu Server on SSD7505 controller

If you would like to install Linux Ubuntu Server onto drives attached to SSD7505 controller, please perform the following operations:

Step 1 Prepare Your Hardware for Installation

After you attach your NVMe SSD to SSD7505 controller, you can use SSD7505 **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 SSD7505 controller, from your system.

Note

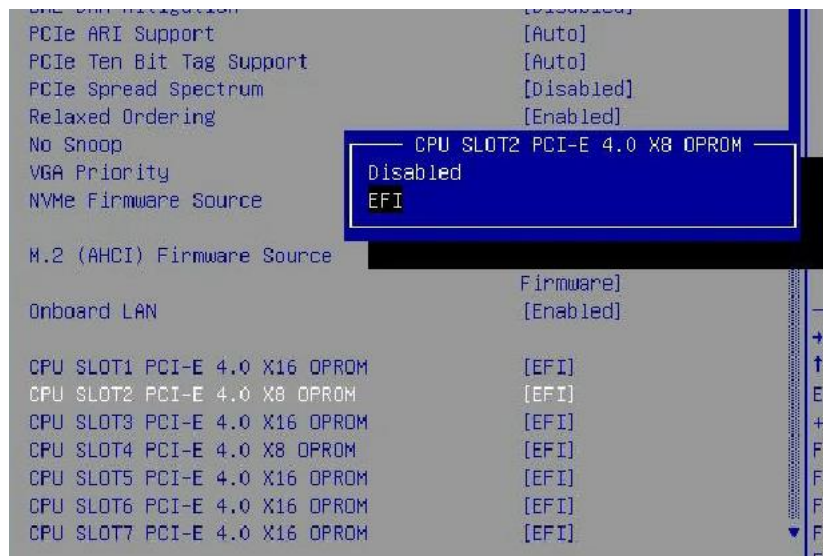
SSD7505 only support EFI boot. If you have other SCSI adapters installed, you must make sure the SSD7505 controller EFI will be loaded firstly. If not, try to move it to another PCI slot. Otherwise you may be unable to boot up your system.

Step 2 Check System EFI Settings

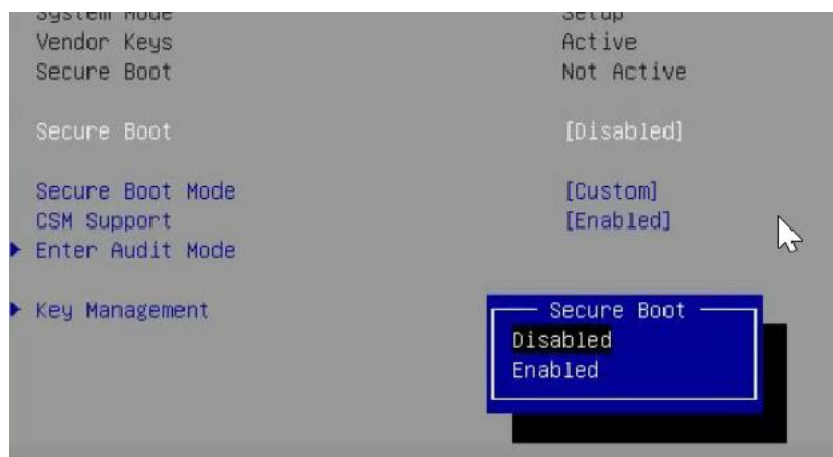
In your system EFI SETUP menu, change **Boot Sequence** in such a way that the system will first boot from **EFI CDROM**, and then from SSD7505 RAID. Refer to your motherboard EFI manual to see how to set boot sequence.

If your EFI settings do not support such a boot sequence, you can first set it to boot from EFI CDROM. After you finish installation, set SSD7505 RAID as the first boot device to boot up the system.

1. Set UEFI setting with SuperMicro H12SSL -i motherboard as an example.
 - a. "Advanced->PCIe/PCI/PnP Configuration->CPUSlot PCI-E OPRM" to "EFI". Suppose SSD7505 is connected to motherboard CPU1 Slot 2 PCI-E X16, then you should set "CPU1 Slot 2 PCI-E X16 OPRM" to "EFI";



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

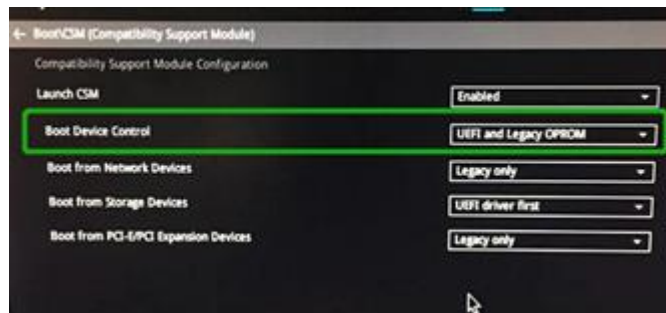


2. Set UEFI setting with ASUS PRIME X299 -DELUXE motherboard as an example:

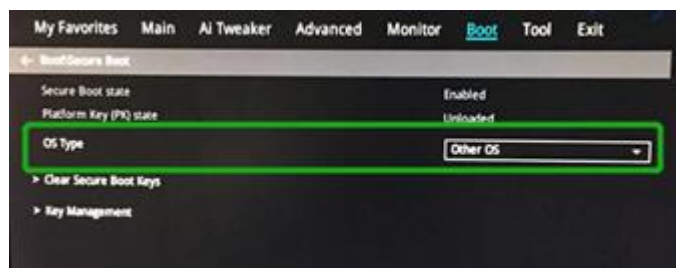
- a. Set "Boot from Storage Devices" to "UEFI driver first";



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



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



Step 3 Flash UEFI Rom to SSD7505

- a. Unzip SSD7505 UEFI package to root dir(/) of a USB flash driver, and insert the USB flash drive to the motherboard;
- b. Booting from the UEFI USB flash and enter the UEFI environment ;

```

Boot Override
ubuntu (HPT VD0-0 SCSI Disk Device)
UEFI: USB
UEFI: USB, Partition 1
UEFI: USB, Partition 2
UEFI: USB, Partition 3
UEFI: USB, Partition 2
(B69/D0/F1) UEFI PXE: IPv4 Broadcom NetXtreme Gigabit Ethernet
(BCM5720)(MAC:3cecef73321b)
(B69/D0/F0) UEFI PXE: IPv6 Broadcom NetXtreme Gigabit Ethernet
(BCM5720)(MAC:3cecef73321a)
(B69/D0/F1) UEFI PXE: IPv6 Broadcom NetXtreme Gigabit Ethernet
(BCM5720)(MAC:3cecef73321b)
    
```

- c. Command with “SSD7505.nsh”, flash UEFI rom to SSD7505 Controller and reboot;

```
FS3:\> load.efi 7505uefi.com
Load Utility for Flash EPROM v1.1.0
(built at Jan 5 2021 13:30:42)

Set flash size to 65K
Found adapter 0x75051103 at PCI 203:0:0
Flash size 0x10400, File size 0x10200
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
Erasing .....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS3:\> _
```

Step 4 Create Array

- a. Attach four NVMe SSD to SSD7505 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:

```
Samsung SSD 980 PRO 2TB-S69ENG0NC00180Y, 2000313MB(MaxFree 2000313MB), Normal
Samsung SSD 980 PRO 2TB-S69ENG0NC00184M, 2000313MB(MaxFree 2000313MB), Normal
Samsung SSD 980 PRO 2TB-S69ENG0NC00194K, 2000313MB(MaxFree 2000313MB), Normal
Samsung SSD 980 PRO 2TB-S69ENG0NC00197M, 2000313MB(MaxFree 2000313MB), Normal
```

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

```
Save as User Defaults
Restore User Defaults

Boot Override
UEFI: USB, Partition 1
UEFI: USB, Partition 2
(B69/D0/F1) UEFI PXE: IPv4 Broadcom NetX
(BCM5720)(MAC:3cecef73321b)
(B69/D0/F0) UEFI PXE: IPv6 Broadcom NetX
(BCM5720)(MAC:3cecef73321a)
```

- d. Command "Arraycreate.efi" to enter the Utility:

```

FS1:\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20200306)
==== Controller information:
      Vendor: HighPoint Technologies, Inc.
      Product: SSD7505 (7505)

==== Physical device list(count 4):
1/1 Samsung SSD 980 PRO 2TB-S69ENG0NC00194K, 2000313MB(MaxFree 2000313MB), Normal
1/2 Samsung SSD 980 PRO 2TB-S69ENG0NC00180Y, 2000313MB(MaxFree 2000313MB), Normal
1/3 Samsung SSD 980 PRO 2TB-S69ENG0NC00197M, 2000313MB(MaxFree 2000313MB), Normal
1/4 Samsung SSD 980 PRO 2TB-S69ENG0NC00184M, 2000313MB(MaxFree 2000313MB), Normal

==== Logical device list(count 0):
-----
>>> Please specify command to execute:
<<< create _

```

- e. Command “create RAID0 ”.
Create RAID0 array with all disks and with maximum capacity.

```

<<< create RAID0
      Creating array: RAID0_000041A7.
      Array created successfully.
=====

==== Physical device list(count 4):
1/1 Samsung SSD 980 PRO 2TB-S69ENG0NC00180Y, 2000313MB(MaxFree 0MB), Normal
1/2 Samsung SSD 980 PRO 2TB-S69ENG0NC00184M, 2000313MB(MaxFree 0MB), Normal
1/3 Samsung SSD 980 PRO 2TB-S69ENG0NC00194K, 2000313MB(MaxFree 0MB), Normal
1/4 Samsung SSD 980 PRO 2TB-S69ENG0NC00197M, 2000313MB(MaxFree 0MB), Normal

==== Logical device list(count 1):
1 [VD1] RAID0_000041A7 (RAID0), 8001255MB (Stripe 512KB), Normal
      1/1 Samsung SSD 980 PRO 2TB
      1/2 Samsung SSD 980 PRO 2TB
      1/3 Samsung SSD 980 PRO 2TB
      1/4 Samsung SSD 980 PRO 2TB
-----
>>> Please specify command to execute:
<<< _

```

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

Step 5 Prepare the Driver Diskette

Extract **HighPoint_NVMe_Ubuntu_20.04.4_x86_64_vx.x.x_xx_xx_xx.tar.gz** to top(/) directory of an USB flash drive. It will look like:

```

root@test:/home/test# tar zxvf HighPoint_NVMe_Ubuntu_20.04.4_x86_64_v1.2.20.1_2022_03_17.tar.gz
hptdd/
hptdd/preinst.sh
hptdd/postinst.sh
hptdd/hptblock
hptdd/60-persistent-storage-hptblock.rules
hptdd/boot/
hptdd/boot/hptnvme5.4.0-81-genericx86_64.ko.gz
hptdd/boot/hptnvme5.4.0-100-genericx86_64.ko.gz
hptdd/HighPoint_NVMe_Ubuntu_20.04.4_x86_64_v1.2.20.1_2022_03_17.tar.gz
hptdd/hptdrv
hptdd/readme.txt
hptdd/postinst2.sh
root@test:/home/test#

```

Step 6 Install Linux Ubuntu Server

- a. Insert the USB flash drive to the target system.
- b. Booting from Installation DVD disc (EFI mode).
- c. When the Installation screen appears, press 'e' to edit boot command line option.

```
*Install Ubuntu Server
Boot from next volume
UEFI Firmware Settings
Boot and Install with the HWE kernel
```

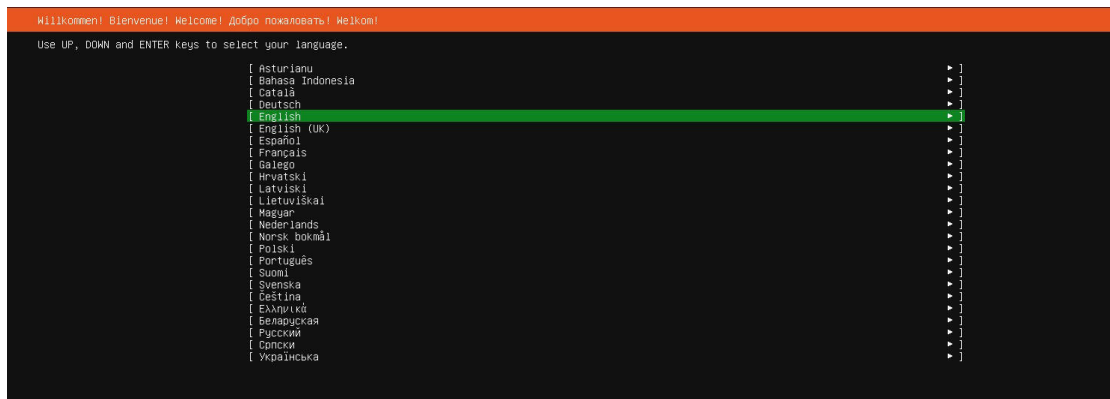
On the edit command window, move the cursor to the end of line "linux /casper/vmlinuz...quiet ", and append "**modprobe.blacklist=nvme**" (double quotation mark are not include).

```
setparams 'Install Ubuntu Server'

    set gfxpayload=keep
    linux      /casper/vmlinuz  quiet  --- modprobe.blacklist=nvme_
    initrd     /casper/initrd
```

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

- d. When the installation started:



Press **ALT-F2** to switch new console window and press **ENTER** to activate this console.

Ubuntu login: **ubuntu**


```

Ubuntu 20.04.4 LTS ubuntu-server tty3

Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.4.0-100-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Thu Mar 17 08:54:53 UTC 2022

System load:  4.47      Processes:            742
Usage of /home: unknown  Users logged in:      1
Memory usage:  1%      IPv4 address for enxb03af2b6059f: 169.254.3.1
Swap usage:    0%

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu-server@ubuntu-server:~$

```

And then execute following commands to copy the driver contents.

```

# mkdir /hptdd          ← 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 /dev/sda1      ← Unmount the USB flash drive

```

```

root@ubuntu-server:/home/ubuntu-server# mkdir /hptdd
root@ubuntu-server:/home/ubuntu-server# mount /dev/sdb2 /hptdd/
root@ubuntu-server:/home/ubuntu-server# cp -a /hptdd/hptdd /tmp/

```

```

root@ubuntu-server:/home/ubuntu-server# umount /dev/sdb2

```

```

# sh /tmp/hptdd/preinst.sh          ← Load SSD7505 driver.

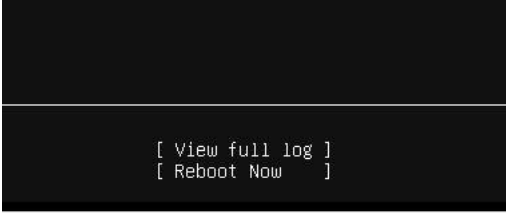
```

```

root@ubuntu-server:/home/ubuntu-server# sh /tmp/hptdd/preinst.sh
This step succeeded!

```

- e. Press **ALT-F1** to continue system installation.
- f. When the installation prompts “Reboot now”.



```
[ View full log ]
[ Reboot Now    ]
```

Press **ALT-F2** and execute following command to install driver to the installed Linux Ubuntu Server on the array of SSD7505.

```
# sh /tmp/hptdd/postinst.sh ← Install SSD7505 driver.
```

```
root@ubuntu-server:/home/ubuntu-server# sh /tmp/hptdd/postinst.sh
Running in chroot, ignoring request.
Running in chroot, ignoring request.
W: Possible missing firmware /lib/firmware/ast_dp501_fw.bin for module ast
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/90_iommuoff.cfg'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.4.0-100-generic
Found initrd image: /boot/initrd.img-5.4.0-100-generic
grub-probe: error: cannot find a GRUB drive for /dev/sdb1. Check your device.map.
Adding boot menu entry for UEFI Firmware Settings
done
setdefaultkernel:No change.
We have completed the driver installation.
```

- g. Press **ALT-F1** and press “**Reboot Now**” to finish the installation.
- h. Open source driver needs to be installed after system installation.

<https://www.highpoint-tech.com/ssd/ssd7505-overview>

Run the .bin file to install the driver package.

```
# ./hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin
```

```
root@test:/home/test# ./hptnvme_g5_linux_src_v1.4.0_2022_03_01.bin _
```

- i. Follow the prompts to complete the driver installation.
- j. 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 SSD7505 controller. Installation of the management software is optional but recommended.

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

5 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 REAME file distributed with HighPoint SSD7505 open source package on how to build and install the driver module.

6 Trouble Shooting

If you forget to install the open linux driver before updating the kernel, the system crash cannot enter. Please follow the steps below.

- a. Press and hold the keyboard up and down button when booting, until the following interface appears.

Choose “ **Advanced options for Ubuntu** ” and press **Enter**



```
Ubuntu
*Advanced options for Ubuntu
UEFI Firmware Settings
```

- b. Select the default kernel (5.4.0-100-generic) and enter the system.



```
*Ubuntu, with Linux 5.16.14
Ubuntu, with Linux 5.16.14 (recovery mode)
Ubuntu, with Linux 5.4.0-100-generic
Ubuntu, with Linux 5.4.0-100-generic (recovery mode)
```

- c. Install Linux open source driver.

<https://www.highpoint-tech.com/ssd/ssd7505-overview>

Run the .bin file to install the driver package.

./hptnvme_g5_linux_src_vxx.x.x_xx_xx_xx.bin

```
root@test:/home/test# ./hptnvme_g5_linux_src_v1.4.0_2022-03-01.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 pcie_aspm=off iommu=off intel_iommu=off amd_iommu=off
new pcie_aspm=off iommu=off intel_iommu=off amd_iommu=off
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.
Please restart the system for the driver to take effect.
```

- d. The driver installation is complete, and the reboot can enter the system where the new kernel is located.

uname -r

This command is used to view the kernel version.

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**

Syntax

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.