

# Using HighPoint NVMe RAID AICs with the Supermicro X12DPi-N6

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#### 1. Supermicro X12DPi-N6 Introduction

This document provides guidelines and procedures for installing HighPoint NVMe AICs into the Supermicro X12DPi-N6. The guide examines the performance capabilities of each PCIe slot, and provides recommended hardware configurations that can be used to optimize NVMe storage configurations for maximum throughput and capacity.

#### 1.1 Chassis

Chassis	Model						
2U	SuperChassis LA26E1C4-R609LP (OEM) <sup>2</sup>						
	SuperChassis LA25TQC-R609LP (OEM) <sup>2</sup>						
	SuperChassis 825BTQC-R1K23LPB <sup>1</sup>						
	SuperChassis 213BAC8-R1K23LPB <sup>1</sup>						
	SuperChassis 826BAC12-R1K23LPB <sup>1</sup>						
	SuperChassis 829HAC12-R1K62LPB <sup>1</sup>						
4U	SuperChassis 745BAC-R1K23B <sup>1</sup>						
	SuperChassis 846BE1C8-R1K23B4 <sup>1</sup>						
	SuperChassis 847BE1C12-R1K68LPB4 <sup>1</sup>						

Supermicro X12DPi-N6 Chassis list:

#### Notes:

1= Optimized SuperServer Chassis

2= Compatible Chassis

#### **1.2 Servers**

Supermicro X12DPi-N6 Servers list:

Server	Model
2U	Mainstream SuperServer SYS-220P-C9R
	Mainstream SuperServer SYS-620P-TR
4U	Mainstream SuperServer SYS-740P-TR

#### 1.3 Chipset

Supermicro X12DPi-N6 Chipset: Intel PCH C621A

#### **1.4 Processor Types**

Supermicro X12DPi-N6 processor type: Supports dual 3rd Gen Intel Xeon Scalable Processors (in Socket P+ LGA 4189) with up to 40 cores and a thermal design power (TDP) of up to 270W

#### 1.5 Memory

Memory Capacity: 18 DIMM slots

Up to 4TB Intel<sup>®</sup> Optane<sup>™</sup> Persistent Memory 200 Series, DDR4-3200MHz

Up to 4TB 3DS ECC LRDIMM, DDR4-3200MHz; Up to 4TB 3DS ECC RDIMM, DDR4-3200MHz

P1-DIMMB2 and P2-DIMMB2 are reserved for Intel Optane Persistent Memory 200 Series only.

Memory type: 3200/2933/2666 MT/s ECC DDR4 LRDIMM (3DS), RDIMM (3DS) DIMM Sizes: LRDIMM: 256GB/ RDIMM: 256GB Memory Voltage: 1.2V

#### **1.6 PCIe slots**

Slot	CPU	Height	Length	Width	Link width	Slot width
1	1	Full Height	Half Length	Single Width	x8	x8
2	1	Full Height	Full Length	Single Width	x16	x16
3	1	Full Height	Full Length	Single Width	x16	x16
4	2	Full Height	Full Length	Single Width	x16	x16
5	2	Full Height	Full Length	Single Width	x16	x16
6	2	Full Height	Half Length	Single Width	x8	x8

Supermicro X12DPi-N6 PCIe Expansion Slot Configuration:

*Note:* Supermicro 2U chassis or servers are only available in Half Height.

#### 1.7 GPU

Supermicro X12DPi-N6 Graphics controllers:

GPU Type	Slot priority
ASPEED AST2600 BMC	N/A
Graphics Controller	1, 6

Notes:

ASPEED AST2600 BMC is an integrated graphics card and will not take up a PCIe slot.

Depending on the type of GPU installed into the Supermicro X12DPi-N6 platform, one or more PCIe slots may be unavailable for use with HighPoint NVMe AICs.

#### **1.8 Other PCIe devices**

The Supermicro X12DPi-N6 is available with optional PCIe devices.

The following table provides a list of PCIe device accessories available for the Supermicro X12DPi-N6 and which slot they are typically associated with.

PCIe devices type	Slot priority
Intel X550 on LAN Controller	1, 6
Intel i350 on LAN Controller	1, 6

**Note:** Supermicro platforms are typically shipped with an array of pre-installed PCIe devices. Please note, one or more PCIe slots may be unavailable for use with HighPoint NVMe AICs.

#### 2. HighPoint NVMe RAID AIC compatibility with the

#### Supermicro X12DPi-N6

HighDoint						
INVIVIE RAID	4.0 X8	4.0 X16	4.0 X16	4.0 X16	4.0 X16	4.0 X8
AICS						
Gen3 AICs						
SSD6202A	<b>√</b> <sup>1</sup>					
SSD6204A	<b>√</b> <sup>1, 2</sup>					
SSD7101A-1	X	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
SSD7104	X	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
SSD7105	X	<b>V</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
SSD7140A	X	<b>V</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
SSD7202	<b>√</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	<b>V</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	<b>V</b> <sup>1</sup>	<b>√</b> <sup>1</sup>
SSD7204	<b>V</b> <sup>1, 2</sup>	<b>V</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>
RocketAIC	X	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
7105HW						
RocketAIC	X	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
7140AW						
Gen4 AICs						
SSD7502	X	<b>√</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	X
SSD7505	X	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
SSD7540	X	<b>V</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	X
RocketAIC	X	<b>√</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	<b>√</b> <sup>1</sup>	X
7502HW						
RocketAIC	X	<b>V</b> <sup>1, 2</sup>	<b>V</b> <sup>1, 2</sup>	<b>V</b> <sup>1, 2</sup>	<b>V</b> <sup>1, 2</sup>	X
7505HW						
RocketAIC	X	<b>V</b> <sup>1, 2</sup>	<b>V</b> <sup>1, 2</sup>	<b>√</b> <sup>1, 2</sup>	<b>V</b> <sup>1, 2</sup>	X
7540HW						

Notes:

 $v^1$  means that the HighPoint NVMe RAID AIC can be used normally in this slot if you do not have other PCIe devices installed in this slot.

 $\sqrt{2}$  means that the HighPoint NVMe RAID AIC can be used normally in this slot if you use the Full Height chassis or server.

**X** means that the HighPoint NVMe RAID AIC is not compatible with this slot.

# **3.** Installing HighPoint NVMe RAID AICs into the Supermicro X12DPi-N6

#### 3.1 Install hardware

#### **3.1.1 Recommended tools**

- a. Screwdriver (system cover require a screwdriver to open)
- b. Wired ESD wrist strap (to prevent electrostatic accidents)

# 3.1.2 Installing the Hardware into 2U Chassis: SuperChassis LA26E1C4-R609LP (OEM)/ SuperChassis LA25TQC-R609LP (OEM)/

#### SuperChassis 213BAC8-R1K23LPB

For PCIe slot recommendations, please refer to this <u>table</u>. The following installation procedure applies to these chassis:

Chassis	Model
2U	SuperChassis LA26E1C4-R609LP (OEM)
	SuperChassis LA25TQC-R609LP (OEM)
	SuperChassis 213BAC8-R1K23LPB

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Press both release tabs simultaneously to release the cover from the locked position.



d. Lift the cover up and off the chassis.

e. Remove the screw securing the PCI shield.



f. Remove the PCI shield pre-installed in the expansion slot.



g. Holding the edge of the HighPoint NVMe RAID AIC, align the HighPoint NVMe RAID AIC connector with the expansion slot and insert it downward.



h. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to connect the power cable to the 6-pin power connector on the side of the HighPoint NVMe RAID AICs.



*Note:* If you are not using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step.

i. Install the screw securing the HighPoint NVMe RAID AIC bracket.



j. Align the cover with the chassis in the locked position.



### 3.1.3 Installing the Hardware into 2U and 4U Chassis: SuperChassis 825BTQC-R1K23LPB/ SuperChassis 826BAC12-R1K23LPB/ SuperChassis 829HAC12-R1K62LPB/ SuperChassis 846BE1C8-R1K23B4/ SuperChassis

#### 847BE1C12-R1K68LPB4

For PCIe slot recommendations, please refer to this <u>table</u>. The following installation procedure applies to these chassis:

Chassis	Model
2U	SuperChassis 825BTQC-R1K23LPB
	SuperChassis 826BAC12-R1K23LPB
	SuperChassis 829HAC12-R1K62LPB
4U	SuperChassis 846BE1C8-R1K23B4
	SuperChassis 847BE1C12-R1K68LPB4

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Insert a screwdriver to remove the screws and on the sides of the chassis.
- d. Press both release tabs simultaneously to release the cover from the locked position.



- e. Lift the cover up and off the chassis.
- f. Remove the screw securing the PCI shield.



g. Remove the PCI shield pre-installed in the expansion slot.



h. Holding the edge of the HighPoint NVMe RAID AIC, align the HighPoint NVMe RAID AIC connector with the expansion slot and insert it downward.



i. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to connect the power cable to the 6-pin power connector on the side of the HighPoint NVMe RAID AICs.



*Note:* If you are not using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step.

j. Install the screw securing the HighPoint NVMe RAID AIC bracket.



k. Align the cover with the chassis in the locked position.



I. Insert a screwdriver and install the screws removed in step c to secure the chassis and cover.

#### **3.1.4 Installing the Hardware into the SuperChassis 745BAC-R1K23B**

For PCIe slot recommendations, please refer to this <u>table</u>.

The following installation procedure applies to these chassis:

Chassis	Model
4U	SuperChassis 745BAC-R1K23B

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Locate the latch on the cover, press where it says "Push" and lift the latch to release the cover.



d. In the rear of the chassis, push on the PCI shield lock, then lift up on the lock.



e. Remove the screw securing the PCI shield.



f. Remove the PCI shield.



g. Holding the edge of the HighPoint NVMe RAID AIC, align the HighPoint NVMe RAID AIC connector with the expansion slot and insert it downward.



h. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to connect the power cable to the 6-pin power connector on the side of the HighPoint NVMe RAID AICs.



*Note:* If you are not using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step.

i. Install the screw securing the HighPoint NVMe RAID AIC bracket.



j. Secure the HighPoint NVMe RAID AIC bracket onto the rear of the chassis with the PCI shield lock.



k. Align the cover with the chassis in the locked position.



#### **3.2 System BIOS Setting**

The following is a list of Supermicro X12DPi-N6 system BIOS settings required for each NVMe RAID AIC.

Please refer to the following sections for system BIOS settings setup procedures.

3.2.1 Disable Secure boot

3.2.2 Boot mode to UEFI

HighPoint NVMe	System BIOS Settings (Boot RAID configurations)				
RAID AICs	Secure Boot	Boot mode			
SSD6202A	V	V			
SSD6204A	V	V			
SSD7105	<b>√</b> <sup>1</sup>	V			
SSD7202	<b>√</b> <sup>1</sup>	V			
SSD7502	<b>V</b> <sup>1</sup>	V			
SSD7505	<b>V</b> <sup>1</sup>	V			
SSD7540	<b>V</b> <sup>1</sup>	V			
RocketAIC 7105HW	<b>V</b> <sup>1</sup>	V			
RocketAIC 7502HW	<b>√</b> <sup>1</sup>	V			
RocketAIC 7505HW	<b>√</b> <sup>1</sup>	V			
RocketAIC 7540HW	<b>√</b> <sup>1</sup>	V			

HighPoint NVMe	System BIOS Settings (Data RAID configurations)
RAID AICs	Secure Boot
SSD6202A	V
SSD6204A	V
SSD7101A-1	V <sup>1</sup>
SSD7104	v <sup>1</sup>
SSD7105	v <sup>1</sup>
SSD7140A	v <sup>1</sup>
SSD7202	V <sup>1</sup>
SSD7204	V <sup>1</sup>
SSD7502	V <sup>1</sup>
SSD7505	V <sup>1</sup>
SSD7540	$v^1$
RocketAIC 7105HW	V <sup>1</sup>
RocketAIC 7140AW	V <sup>1</sup>
RocketAIC 7502HW	V <sup>1</sup>
RocketAIC 7505HW	V <sup>1</sup>
RocketAIC 7540HW	V <sup>1</sup>

#### Notes:

✓ means that the HighPoint NVMe RAID AIC support this BIOS setting.
 ✓<sup>1</sup> means that the HighPoint NVMe RAID AIC support this BIOS setting if you are not using the Linux.

#### 3.2.1 Disable Secure boot

**Note:** If you are using the SSD7000/7500 series NVMe RAID AICs or RocketAIC series NVMe Drives in Linux, Secure Boot must be disabled. If you are using the SSD6200 series NVMe RAID AICs, Secure Boot can be enabled.

- a. Power up the system.
- b. Press **<Delete>** to enter BIOS.
- c. Find Security→Secure Boot, select 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	Disabled Enabled	

d. Save configuration and restart system.

#### 3.2.2 Boot mode to UEFI

- a. Power up the system.
- b. Press **<Delete>** to enter BIOS.
- c. Find Advanced→PCIe/PCI/PnP Configuration→CPU SLOT PCI-E OPROM, select EFI.

PCIe/PCI/PnP Configuration		
PCI Bus Driver Version	A5.01.24	Enables or disables PCIe Slot OPROM option.
PCI Devices Common Settings		
Above 4G Decoding SR-IOV Support AFI Support Bus Master Enable MWIO High Base MWIO High Granularity Size Maximum Read Request	[Enabled] [Enabled] [Enabled] [Enabled] [32T] [2566] 1 Slot 2 PCI-E 4.0 >	<15 OPROM
MMCFG Base Disable	ed	
VGA Priority		lect Screen lect Item
Onboard Video Option ROM	[UEFI]	+/-: Change Opt.
PCI Devices Option Rom Setting		F1: General Help F2: Previous Values F3: Optimized Defaults
CPU1 Slot 1 PCI-E 4.0 x8 OPROM	[EFI]	F4: Save & Exit
CPU1 Slot 2 PCI-E 4.0 ×16 OPROM	[EF1]	ESC: Exit
CPU1 Slot 3 PCI-E 4.0 x16 OPROM	[EFI]	
CPU2 SIDT 4 PCI-E 4.0 X16 UPROM CPU2 SIDT 5 PCI-E 4.0 X16 0PROM	(EFI) (FFT)	

d. Save configuration and restart system.

#### 3.3 Install software

#### 3.3.1 Installing HighPoint NVMe RAID AICs into the Supermicro

#### X12DPi-N6 (Data RAID configurations)

The following section discusses HighPoint NVMe RAID AIC driver installation for a non-bootable NVMe configuration.

#### 3.3.1.1 Installing the Windows Driver & Management Software

Please refer to the <u>Data RAID Installation Guide (Windows)</u> to install the Windows Device Driver and Management Software.

#### 3.3.1.2 Installing the Linux Driver & Management Software

Please refer to the <u>Data RAID Installation Guide (Linux)</u> to install the Linux Device Driver and Management Software.

#### 3.3.2 Installing HighPoint NVMe RAID AICs into the Supermicro

#### X12DPi-N6 (Boot RAID configurations)

The following section discusses HighPoint NVMe RAID AIC driver installation for a bootable NVMe configuration.

#### 3.3.2.1 Installing a Windows OS to a bootable RAID configuration

Windows BootRAID: Please refer to <u>HighPoint Windows Boot RAID Windows installation Guide</u>.

#### 3.3.2.2 Installing Linux to a bootable RAID configuration

Debian BootRAID: Please refer to <u>Linux Debian On HighPoint NVMe RAID Controller Installation</u> <u>Guide</u>.

RHEL BootRAID:

Please refer to <u>Linux RHEL On HighPoint NVMe RAID Controller Installation</u> <u>Guide</u>.

Ubuntu BootRAID:

Please refer to <u>Linux Ubuntu On HighPoint NVMe RAID Controller Installation</u> <u>Guide</u>.

Rocky Linux BootRAID:

Please refer to <u>Linux Rocky Linux On HighPoint NVMe RAID Controller Installation</u> <u>Guide</u>

#### 4. Benchmarking HighPoint NVMe RAID AICs

#### 4.1 Performance Testing

#### 4.1.1 Recommended Hardware Configuration

#### • Supermicro X12DPi-N6:

CPU: Intel(R) Xeon(R) Silver 4314 CPU @ 2.40GHz Memory: 131072 MB PCIe Slot: CPU1 SLOT1 PCI-E 4.0 X8/ CPU1 SLOT2 PCI-E 4.0 X16

#### • HighPoint NVMe RAID AICs:

Gen3 HighPoint NVMe RAID AICs	SSD6202A
	SSD6204A
	SSD7101A-1
	SSD7104
	SSD7105
	SSD7140A
	SSD7202
	SSD7204
	SSD7502
Gen4 HighPoint NVMe RAID AICs	SSD7505
	SSD7540

#### Disk:

Samsung 980 Pro 2TB Note: Samsung 980 Pro 2TB Disk spec.

Performance

Sequential Read Up to 7,000 MB/s \* Performance may vary based on system hardware & configuration

> Random Read (4KB, QD32) Up to 1,000,000 IOPS \* Performance may vary based on system hardware & configuration

Random Read (4KB, QD1) Up to 22,000 IOPS \* Performance may vary based on system hardware & configuration Sequential Write Up to 5,100 MB/s \* Performance may vary based on system hardware & configuration

Random Write (4KB, QD32) Up to 1,000,000 IOPS \* Performance may vary based on system hardware & configuration

Random Write (4KB, QD1) Up to 60,000 IOPS \* Performance may vary based on system hardware & configuration

#### 4.1.2 Test tool

Benchmark Tool: Iometer/ CrystalDiskMark

#### • Iometer script setting:

The lometer script can be downloaded <u>here</u>.

**Note:** If you use the SSD6200 series NVMe RAID AICs, you will need to download another <u>iometer script</u>.

- The "**2m-seq-read.icf**" script tests the Sequential read performance of 2M large data blocks.
- The "**2m-seq-write.icf**" script tests the Sequential write performance of 2M large data blocks.
- The "**4k-rand-read.icf**" script tests the Random read performance of 4k small data blocks.
- The "**4k-rand-write.icf**" script tests the Random write performance of 4k small data blocks.
- a. Open lometer with administrator rights.
- b. The system has two CPUs, so you need to specify the CPU node for performance testing.
  - a) open Task Manager and find Dynamo.exe in Details.
  - b) Right-click and select **Set affinity** to specify the CPU node (the CPU corresponding to the SLOT inserted in the HighPoint NVMe RAID AICs).

Processes Performance	App hist	tory Startup	U	End process tree			
Name	PID	Status	-	Provide feedback		Memory (a	UAC virtualizat
ApplicationFrameHo	10952	Running	9	Set priority	>	5,528 K	Disabled
🐝 conhost.exe	2316	Running		Set affinity		6,152 K	Not allowed
conhost.exe	7968	Running		ce anning		3,480 K	Not allowed
Csrss.exe	1316	Running	1	Analyze wait chain		1,228 K	Not allowed
🗉 csrss.exe	1400	Running	L.	JAC virtualization		1,192 K	Not allowed
🖉 ctfmon.exe	6412	Running		Create dump file		3,864 K	Disabled
📧 dasHost.exe	8180	8180 Running				4,268 K	Not allowed
📧 dllhost.exe	9876	Running	(	Open file location		996 K	Enabled
📧 dllhost.exe	2652	Running	9	Search online		3,952 K	Disabled
📧 dwm.exe	1928	Running	F	Properties		43,052 K	Disabled
Dynamo.exe	10200	Running		Go to service(s)		16,420 K	Not allowed
explorer.exe	5308	Running				56,312 K	Disabled
📧 fontdrvhost.exe	1720	Running		UMFD-0	00	976 K	Disabled
O lOmeter.exe	2456	Running		test	00	7,552 K	Not allowed

c. Click the folder icon to open the script, then select the script to be configured.



d. Select 2M-seq-read.



e. The **Disk Targets** page will change, the **Target** should be the test disk (the RAID array). The **Maximum Disk Size** should be set to **16777216** Sectors.

Image: Sector Sector       Image: Sector Sector         Image: Sector Sector       Image: Sector Sector         Image: Sector Sector       Image: Sector         Image: Sector       Image: Sector <th>lo lometer</th> <th>- 🗆 X</th>	lo lometer	- 🗆 X
Topology       Disk Targets       Network Targets       Access Specifications       Results Display       Test Setup         All Managers       C :=       Imagets       Imagets       Imagets       Imagets       Imagets         Worker 1       Worker 1       Worker 1       Imagets       Imagets       Imagets       Imagets       Imagets         Worker 1       Worker 1       Imagets       Ima		
	Topology     Disk Targets     Network Targets     Access Specificat       Image: StrDP-VKLHI     Image: StrDP-VKLHI     Image: StrDP-VKLHI     Image: StrDP-VKLHI       Image: StrDP-VKLHI     Image: StrDP-VK	ins Results Display Test Setup

f. After confirming the settings, click the green mark to start the performance test.

o lometer	
Topology	Dis Targets Network Targets Access Specifications Results Display Test Setup
BM All Managers B B LAPTOP-0619V2RF	Drag managers and workers from the Topology window Record last update for Start of Test

g. Result Display will be automatically configured as Start of Test.

e e 🖳 🗖 🔁 🕞	/ • 👷 🐴 ## 🛢 📍			
Topology	Disk Targets Network Targets Access	Specifications Results Di	isplay Test Setup	
B-M All Managers	Drag managers and workers from the Topology window to the progress bar of your choice.	Record last update results to file	Results Since U • Start of Test C Last Update	pdate Frequency (seconds)
	Display			
	Total I/Os per Second	All Managers	0.00	0
		All Managers	0.00 MBPS (0.00 MiBPS	5) 0
	Total MBs per Second (Decimal)			>
		All Managers	0.0000	0
	Average I/O Response Time (ms)			>
		All Managers	0.0000	0
	Maximum I/O Response Time (ms)			>
		All Managers	0.00 %	0 %

• CrystalDiskMark script setting:

CrystalDis	Settings			×
File Settings	Туре	Block Size	Queues	Threads
All	Profile: Default			
	SEQ. ~	2MiB ~	16 ~	2 ~
SEQ2M	SEQ ~	2MiB ~	16 ~	5 ~
Q16T2	RND ~	4KiB ~	32 ~	16 ~
SEQ2M	RND ~	4KiB ~	8 ~	8 ~
Q16T5	Profile: Peak Perfor	mance		
RND4K	SEQ ~	1MiB ~	8 ~	1 ~
Q32T16	RND ~	4KiB ~	32 ~	16 ~
DND4K	Profile:Demo			
O8T8	SEQ ~	1MiB ~	8 ~	1 ~
	Measure Time (sec)	)	Interval Time (sec)	
	5	~	1	~
	Default	NVMe SSD		ОК

- a. Open CrystalDiskMark with administrator rights.
- b. Click Settings.

CrystalDi	Settings							×
File Setting:	Type Profile: Def	ault	Block Size		Queues		Threads	
All	SEQ	~	2MiB	~	16	~	2	~
SEQ2M	SEQ	~	2MiB	~	16	~	5	~
Q16T2	RND	~	4KiB	~	32	~	16	~
SEQ2M	RND	~	4KiB	~	8	~	8	~

*Note1: Please refer to the following Screenshot for recommended settings.* 

📇 CrystalDisk	Settings			×
File Settings	Туре	Block Size	Queues	Threads
	Profile: Default			
All	SEQ. ~	2MiB ~	64	~ 2 ~
SE02M	SEQ. ~	2MiB ~	64	~ <u>5</u> ~
Q64T2	RND ~	4KiB ~	32	~ 16 ~
650034	RND ~	4KiB ~	8	~ 8 ~
O64T5	Profile: Peak Perfo	rmance		
	SEQ ~	1MiB ~	8	× 1 ×
RND4K	RND ~	4KiB ~	32	~ 16 ~
Q32110	Profile:Demo			
RND4K	SEQ. ~	1MiB ~	8	~ 1 ~
Q8T8	Measure Time (see	:)	Interval Time (se	ec)
	5	~	· 1	~
	Default	NVMe SSD		OK

**Note2:** The above recommended setting will meet the needs of most NVMe RAID AICs and achieve optimal performance in testing. In testing, you can also choose to adjust the settings in the script yourself for optimal performance.

c. Test Size: set to 8GiB; Test Drive: set to the RAID Volume.

File Settings	Profil	e Theme Help Languag	e		
5 ~ 8GiB ~ D: 0% (0/1863GiB) ~ MB/s ~					
		Read [MB/s]	Write [MB	/s]	
SEQ2M		0.00		0 00	
Q16T1		0.00		0.00	

d. After confirming the settings, click **ALL** to start the performance test.

File Setting	s Profile Theme Help Language	
All	5 ~ 8GiB ~ D: 0% (0/1	863GiB) ~ MB/s ~
	Read [MB/s]	Write [MB/s]
SEQ2M	0.00	0.00
Q16T1	0.00	0.00

#### 4.1.3 Gen3 HighPoint NVMe RAID AIC test results

Iometer					
(script setting)	Gen3 RAID AIC	Legacy	RAID0	RAID1	RAID10
2m-Seq-Read	SSD6202A	3,482	6,994	7,005	/
(MiB/s)	SSD6204A	1,755	6,995	3,503	/
	SSD7101A-1	3,580	13,995	6,883	14,055
	SSD7104	3,580	14,003	6,876	13,988
	SSD7105	3,579	14,033	7,160	14,046
	SSD7140A	3,527	14,276	6,805	14,309
	SSD7202	3,578	7,026	7,046	/
	SSD7204	3,602	7,151	7,156	7,154
	SSD6202A	3,471	6,005	3,026	/
	SSD6204A	1,724	6,146	1,700	/
	SSD7101A-1	3,525	13,560	3,521	6,767
2m-Seq-Write	SSD7104	3,518	13,544	3,519	6,788
(MiB/s)	SSD7105	3,524	13,271	3,513	6,679
	SSD7140A	3,513	13,668	3,531	6,742
	SSD7202	3,516	7,001	3,515	/
	SSD7204	3,523	7,119	3,495	3,556
	SSD6202A	724,915	1,215,943	1,200,989	/
	SSD6204A	387,870	1,174,944	839,252	
	SSD7101A-1	851,140	168,765	166,126	168,635
4k-Rand-Read	SSD7104	843,034	168,394	165,702	162,773
(IOPS)	SSD7105	846,629	171,722	163,821	149,633
	SSD7140A	837,259	159,130	173,400	138,244
	SSD7202	849,373	163,919	163,846	/
	SSD7204	854,443	170,671	161,044	159,144
	SSD6202A	758,130	909,994	647,210	/
	SSD6204A	400,999	874,780	292,857	/
	SSD7101A-1	827,696	162,678	107,718	85,147
4k-Rand-Write	SSD7104	836,103	141,569	105,278	88,797
(IOPS)	SSD7105	829,326	139,825	92,713	82,851
	SSD7140A	830,024	139,462	104,938	87,304
	SSD7202	810,523	127,690	114,057	/
	SSD7204	829,904	143,712	95,506	84,410

(script setting)	Gen3 RAID AIC	RAIDO	RAID1	RAID10
2m-Seq (MB/s)	SSD6202A	No.         Sector         No.	Ties length         Total time into unpage           MI 5         0 MM 0           Badd (MAV)         Write (MAV)           State         6674.69         2940.65           State         7088.79         2951.98           State         7088.99         3088.73           Tie temp, Total time time using         000000000000000000000000000000000000	/
	SSD6204A	The time time integraph         Tops         To	The importance         The importance           All         5         0.00 <td>/</td>	/
	SSD7101A-1	Time         Time <th< td=""><td>To:         Source         Other High Lengage           All         5         8.06         0.06</td><td>No.         Sec. (MRX)         Num         Num</td></th<>	To:         Source         Other High Lengage           All         5         8.06         0.06	No.         Sec. (MRX)         Num
	SSD7104	Image: Solution of the second of th	File         Balling         Source         Or Micro Processing         Micro Procesping         MicroProces	Phi         Sense / Add.         Dear High Lengage           All         5
	SSD7105	rbit         them         the         them         them <tht< td=""><td>The Steep, Public News High Lengung         With (PMR)           3 - () 6.0 - () 5.0 + ()</td><td>Price         Sender Text         Price         Price</td></tht<>	The Steep, Public News High Lengung         With (PMR)           3 - () 6.0 - () 5.0 + ()	Price         Sender Text         Price
	SSD7140A	R:         Seeming         Point Image         Seeming         Seeming <th< td=""><td>B         Serger         Auto         Text         Hose support           Aut         5 - 6 cm         -0 cm (strike)cm)         Write (ME/n)           B00000         7118.18         3462,85           B00000         68744.35         3408,71           B00000         7108.18         3522,200           B00         Feed (ME/n)         Write (OPF)           B00000         70 (Strike)cm)         000 (Strike)cm)           B000000         70 (Strike)cm)         1000 (Strike)cm)           B000000         70 (Strike)cm)         1000 (Strike)cm)           B000000         12692.87         152277.78           B0000000         1008874.27         108874.27</td><td>R:         Servery         Point in the strength of t</td></th<>	B         Serger         Auto         Text         Hose support           Aut         5 - 6 cm         -0 cm (strike)cm)         Write (ME/n)           B00000         7118.18         3462,85           B00000         68744.35         3408,71           B00000         7108.18         3522,200           B00         Feed (ME/n)         Write (OPF)           B00000         70 (Strike)cm)         000 (Strike)cm)           B000000         70 (Strike)cm)         1000 (Strike)cm)           B000000         70 (Strike)cm)         1000 (Strike)cm)           B000000         12692.87         152277.78           B0000000         1008874.27         108874.27	R:         Servery         Point in the strength of t
	SSD7202	Interp.         Partie         Name         Hole         Longarge           All         3 - @ 683         - @ 000 @ 00726688         Winter 008/0           Based         7112.15         6903.15           Based         7103.56         6840.49           Based         7135.76         7077.19           Tr         See Based         0 00 00272688         0 005 ×           Based         12507.08         19637.94         005853.52	Intermediation         Intermediation         Intermediation         Intermediation         Intermediation           Intermediation         5	/
	SSD7204	The Servey Andre Smer Hey Langang         Source Servey	Pic Serup Auto Same Wei Jongst         With Units         <	To Samp, Balls         These May         To support           At         5.         0.00 M/224000         Write (MMa)           Mard (MMa)         Write (MMa)         Write (MMa)           Work         71227.65         34490.444           Write (MMa)         Write (MMa)         Write (MMa)           Write (MMa)         Write (MMa)         Write (MMa)           Write (MMa)         Write (MMa)         Write (MMa)           Write (MMa)         S.         0.00 M/272600         Org >           K         See Mark (Write (MMa)         Write (MMa)         Write (MMa)           Write (MMa)         See Mark (Write (MMa)         Write (MMa)         Write (MMa)           K         See Mark (Write (MMa)         Write (MMa)         Write (MMa)           K         See Mark (Write (MMa)         Write (MMa)         Write (MMa)           K         See Mark (Write)         19324.446         Write (MMa)           Write (MMark (Write)         1547755.13         89692.388         1446

• CrystalDiskMark

*Note: / means that this AIC does not support the creation of RAID10.* 

#### 4.1.4 Gen4 HighPoint NVMe RAID AIC test results

Iometer					
(script setting)	Gen4 RAID AIC	Legacy	RAID0	RAID1	RAID10
	SSD7502	6,574	13,136	12,305	/
2m-Seq-Read	SSD7505	6,477	23,980	11,980	24,131
	SSD7540	6,438	28,683	11,163	28,517
2m Cog Write	SSD7502	4,939	9,568	5,028	/
2m-seq-write	SSD7505	5,005	17,034	5,030	9,987
(10110/3)	SSD7540	6,436	23,722	5,037	12,344
Ak Band Boad	SSD7502	905,012	983,250	971,845	/
(IOPS)	SSD7505	907,814	964,106	900,608	966,553
	SSD7540	895,347	865,398	972,638	897,784
4k-Rand-Write (IOPS)	SSD7502	805,797	764,111	586,708	/
	SSD7505	736,564	786,607	581,603	600,161
	SSD7540	732,091	750,337	590,254	573,522

#### • CrystalDiskMark

(script setting)	Gen4 RAID AIC	RAID0	RAID1	RAID10
2m-Seq (MB/s)	SSD7502	The form	In         Second Math         Invest into Language           All         5 - () ((36) - () (0 - () ((0 - () ((0 - () ((0 - () ((0 - () ((0 - () ((0 - () (() ((0 - () (()	/
	SSD7505	Interface         Particle Norm         Hole Legge           All         5 - Biell         - O No Mark Scole         Male - O           All         5 - Biell         - O No Mark Scole         Male - O           All         13401.24         11083.59         With (Mark)           Source         25017.01         18977.09           Source         23485.98         19329.82           Te Seep, Infor Name Has Legged         - O P - Name Has Legged           Source         5 - Seel - O Sub / Ac2cele         - O P - Name Has Legged           Mark         6502.93         18809.81           Mark         176084.23         143926.27	Rote         Auth         Base         Hore Hap (Delta)         Multip - Write (DBA)           All         3 - (EdB - ) Delta)         Write (DBA)         Write (DBA)           Wite         117555.09         5034,55           Write         13515.32         4781.80           Write         12829.32         4916.08           Ris Grege         The Hare Hap (Larger)         Verta (DPS)           Write         12829.32         4916.08           Ris Grege         New Hap (Larger)         Verta (DPS)           Write         15301.27         21592.04           Write         175521.00         111773.93	Inc.         Solution         Dest Mode         Dest Mode         Million           Att         5         Solution         Dest Mode         Write MMAD           Marci         20526.25         9082.54           Marci         25221.42         9626.93           Marci         252461.62         9767.22           Ros Gene         Dest Mode         Ores           Marci         125441.75         21210.21           Marci         12541.75         21210.21           Marci         166027.10         92542.97
	SSD7540	Initial Series, Initial	The Servey, Public New Wey Lengts           S - () (GR - ) () (SR (T) (SG (R)) - ) (M(S) - ) (M(S) - ) (M(S) (T) (SG (R)) - ) (M(S) (T) (T) (T) (T) (T) (T) (T) (T) (T) (T	Tes         Setting         Testing         Testing <thtesting< th=""> <thtesting< th=""> <thtesti< td=""></thtesti<></thtesting<></thtesting<>

*Note: / means that this AIC does not support the creation of RAID10.* 

# 5. Uninstalling HighPoint NVMe RAID AICs from the Supermicro X12DPi-N6

#### 5.1 Uninstall hardware

#### 5.1.1 Recommended tools

- a. Screwdriver (system cover require a screwdriver to open)
- b. Wired ESD wrist strap (to prevent electrostatic accidents)

#### 5.1.2 Uninstalling the Hardware from 2U Chassis: SuperChassis

#### LA26E1C4-R609LP (OEM)/ SuperChassis LA25TQC-R609LP (OEM)/

#### SuperChassis 213BAC8-R1K23LPB

The following installation procedure applies to these chassis:

Chassis	Model
2U	SuperChassis LA26E1C4-R609LP (OEM)
	SuperChassis LA25TQC-R609LP (OEM)
	SuperChassis 213BAC8-R1K23LPB

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Press both release tabs simultaneously to release the cover from the locked position.
- d. Lift the cover up and off the chassis.



e. Remove the screw securing the HighPoint NVMe RAID AIC bracket.



f. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to disconnect the power cable to the 6-pin power connector on the HighPoint NVMe RAID AICs.



*Note:* If you are not using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step.

g. Holding the edge of the HighPoint NVMe RAID AIC, lift up to remove the HighPoint NVMe RAID AIC connector from the expansion slot.



h. Install the PCI shield into the expansion slot.



i. Install the screw securing the PCI shield.



j. Align the cover with the chassis.



#### 5.1.3 Uninstalling the Hardware from 2U and 4U Chassis: SuperChassis

825BTQC-R1K23LPB/ SuperChassis 826BAC12-R1K23LPB/ SuperChassis

#### 829HAC12-R1K62LPB/ SuperChassis 846BE1C8-R1K23B4/ SuperChassis

#### 847BE1C12-R1K68LPB4

For PCIe slot recommendations, please refer to this <u>table</u>. The following installation procedure applies to these chassis:

Chassis	Model
2U	SuperChassis 825BTQC-R1K23LPB
	SuperChassis 826BAC12-R1K23LPB
	SuperChassis 829HAC12-R1K62LPB
4U	SuperChassis 846BE1C8-R1K23B4
	SuperChassis 847BE1C12-R1K68LPB4

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Insert a screwdriver to remove the screws at the rear of the chassis and on the sides of the cover.
- d. Lift the cover up and off the chassis.



e. Remove the screw securing the the HighPoint NVMe RAID AIC bracket.



f. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to disconnect the power cable to the 6-pin power connector on the HighPoint NVMe RAID AICs.



*Note:* If you are not using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step.

g. Holding the edge of the HighPoint NVMe RAID AIC, lift up to remove the HighPoint NVMe RAID AIC connector from the expansion slot.



h. Install the PCI slot cover into the expansion slot.



i. Install the screw securing the PCI slot cover.



j. Align the cover with the chassis.



k. Insert a screwdriver and install the screws removed in step c to secure the chassis and cover.

#### 5.1.4 Uninstalling the Hardware from the SuperChassis 745BAC-R1K23B

For PCIe slot recommendations, please refer to this <u>table</u>.

The following installation procedure applies to these chassis:

Chassis	Model
4U	SuperChassis 745BAC-R1K23B

- a. Use a wired ESD wrist strap that is properly grounded.
- b. Shut down the system.
- c. Locate the latch on the cover, press where it says "Push" and lift the latch to release the cover.



d. In the rear of the chassis, push on the PCI shield lock, then lift up on the lock.



e. Remove the screw securing the HighPoint NVMe RAID AIC bracket.



f. If you are using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you will need to disconnect the power cable to the 6-pin power connector on the HighPoint NVMe RAID AICs.



*Note:* If you are not using the SSD7140A, SSD7540, RocketAIC 7140AW, or RocketAIC 7540HW, you can safely move to the next step.

g. Holding the edge of the HighPoint NVMe RAID AIC, lift up to remove the HighPoint NVMe RAID AIC connector from the expansion slot.



h. Install the PCI shield into the expansion slot.



i. Install the screw securing the PCI shield.



j. Secure the PCI shield onto the rear of the chassis with the PCI shield lock.



k. Align the cover with the chassis in the locked position.



#### 5.2 Uninstalling the HighPoint Software

#### 5.2.1 Uninstall the HighPoint NVMe RAID AIC for Windows

#### 5.2.1.1 Uninstall the Driver

a. Power down the system and remove the HighPoint NVMe RAID AIC from the system.

#### Notes:

Failing to remove the HighPoint NVMe RAID AIC from the system during the uninstall process may result in data loss.

Whenever the driver is uninstalled, Windows will attempt to install the default NVMe support, which may corrupt the RAID configurations and any data stored on SSDs hosted by the HighPoint NVMe RAID AIC.

- b. Power on the system and boot Windows.
- c. Access **Control Panel** and select **Programs** → **Programs and Features**, and click on the **HighPoint NVMe RAID Controller Driver** entry.
- d. Click Uninstall/Change.



e. After uninstalling the driver, click Finish.

🐞 HighPoint NVMe RAID Co	ntroller Driver Uninstall	<u></u>		×
	Completing HighPo Controller Driver Un Your computer must be restarte uninstallation of HighPoint NVMe you want to reboot now?	int NVMe ninstall d in order to cc RAID Controlli	RAID	e Do
	< Back	Finish	Cano	el

f. Reboot Windows to complete the uninstall procedure.

#### 5.2.1.2 Uninstall the RAID Management Software

- a. Access Control Panel and select Programs -> Programs and Features.
- b. Click on the HighPoint RAID Management entry.
- c. Click Uninstall/Change.



d. After uninstalling the HighPoint RAID Management, click Finish.



#### 5.2.2 Uninstall the HighPoint NVMe RAID AIC for Linux

#### 5.2.2.1 Uninstall Driver

- a. Open the system terminal with root privileges.
- b. 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 system has rebooted, open the system terminal with root privileges. And enter the following command to check the driver status: Ismod |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.

#### 5.2.2.2 Uninstall the RAID Management Software

- a. Open the system terminal with root privileges.
- b. Enter the following commands to uninstall the RAID Management. # dpkg -r hptsvr (or rpm -e hptsvr-https) root@testlu-Super-Server:/home/testlu/Desktop#[dpkg -r hptsvr] (Reading database ... 183888 files and directories currently installed.) Removing hptsvr (3.1.12) ...
- c. Enter the following command to check if the RAID Management has been removed successfully.

#### #hptraidconf

After uninstall:

```
root@testlu-Super-Server:/home/testlu/Desktop# hptraidconf
bash: /usr/bin/hptraidconf: No such file or directory
```