SSD6204 Debian 10.8 Installation Guide

Version 1.00

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1 Overview

This guide explains how to install Debian to an NVMe SSD or array hosted by the SSD6204 controller.

For Debian 10.8

Mirror link: https://www.debian.org/distrib/

2 Installing Debian 10.8 to the SSD6204 controller

Step 1 Prepare Your Hardware for Installation

After installing the NVMe SSDs into the SSD6204 controller, you can configure the SSD's as a RAID array, or use them as separate, single disks.

Before installation, you must temporarily remove all the NVMe SSD, which are not physically attached to SSD6204 controller, from your system. These can be reinstalled after Debian is up and running.

Note: Debian 10.8 requires UEFI Boot support when used with the SSD6204. If you have other SCSI-class adapters installed, you must make sure the SSD6204 controller UEFI support is loaded first; otherwise the system may be unable to boot. If the SSD6204 is not loading first, try moving it to another PCIe slot.

Step 2 Create an Array

If you would like to configure a RAID array using NVMe SSD's hosted by the SSD6204, please select 1 of the following 4 Methods.

Method 1: Create a RAID array using the Motherboard BIOS

Using the SuperMicro X11DPi-NT motherboard as an example:

1. Set 'Boot mode select' to 'UEFI'.



2. Next, under "Advanced->PCIe/PCI/PnP Configuration", change "CPU Slot x PCI-E OPROM" to "EFI". "x" refers to the slot number (slot 2 was used when the screenshot was taken). Please consult the motherboard manual for more information.

Aptio Setup Utility PCIe/PCI/PnP Configuration	– Copyright (C) 2019 Americ:
PCI Bus Driver Version	A5.01.18
PCI Devices Common Settings	
Above 4G Decoding SR-IOV Support MMIO High Base MMIO High Granularity Size Maximum Read Request MMCFG Base VGA Priority	(Enabled) [Disabled] [56T] [256G] [Auto] [2G] [Onboard]
PCI Devices Option Rom Setting Onboard NVME 1 OPROM Onboard NVME 2 OPROM CPU1 Slot 1 PCI-E x8 OPROM	(EFI) (EFI)
CPU1 Slot 2 PCI-E ×16 OPROM CPU1 Slot 3 PCI-E ×8 OPROM CPU2 Slot 4 PCI-E ×16 OPROM CPU2 Slot 5 PCI-E ×16 OPROM CPU2 Slot 6 PCI-E ×16 OPROM	[EFI] [EFI] [EFI] [EFI] [EFI]

3. Creating the RAID array:

a. Select "Advanced → Marvell NVMe Configuration Utility";



Note: If you cannot find "**Marvell NVMe Configuration Utility**" in the motherboard BIOS under "**advanced**" interface, you will need to create the array using one of the other three methods.

b. Select "Create RAID Configuration". Press "Enter" to open the Configuration Menu:



c. Set "RAID Configuration Menu" to "Enabled", and select "Goto RAID Config".

d. For "**Would you like to create this virtual disk**" select "**Yes**", then select "**Accept**" to create the RAID0 array.

Aptio Setup Utility Create Namespace Configura	– Copyright (C) 2019 Americ <mark>tion</mark>
Namespace Configuration	
Namespace Count	1
Maximum VD Size	1862GB
Utilized Size	OMB
Remainding Size	1862GB
Namespace_1 Size	0
Would you like to create those namespace on the virtual disk?	[Yes]
▶ [Accept]	

e. When the page displays "Successful!" select OK, to exit the menu.

Aptio Setup Utility – Copyright (C) 2019 American <mark>Messages</mark>	Megatrends, Inc.
	+: Select Screen 1: Select Item Enter: Select 4/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.20.1276. Copyright (C) 2019 American Me	gatrends, inc.

Method 2: Create a RAID array using the UEFI Tool

1. First, prepare the UEFI Tool. This file should be copied to the root of a bootable USB flash drive.

Using the SuperMicro X11DPi-NT motherboard as an example:

2. Set 'Boot mode select' to 'UEFI';

	lity – Copyright (C) 2019 Americ IPMI Security <mark>Boot</mark> Save & Exi	
Boot mode select	[UEFI]	Select boot mode LEGACY/UEFI
Legacy To EFI Support	[Disabled]	
FIXED BOOT ORDER Priorities		
Boot Option #1	[UEFI Hard Disk]	
Boot Option #2	[UEFI AP:UEFI:	
	Built-in EFI Shell]	
Boot Option #3	[UEFI CD/DVD]	
Boot Option #4	[UEFI USB Hard Disk]	
Boot Option #5	Boot mode select —	
	LEGACY	
Boot Option #6	UEFI	
Boot Option #7	DUAL	++: Select Screen
Boot Option #8	The second se	↑↓: Select Item
Boot Option #9		Enter: Select
		+/-: Change Opt.
Add New Boot Option		F1: General Help
Delete Boot Option		F2: Previous Values
		F3: Optimized Defaults
Add New Driver Option		F4: Save & Exit
▶ Delete Driver Option		ESC: Exit
UEFI Application Boot Priorit	ies	
► UEFI USB CDROM/DVD Drive BBS	Priorities	
Version 2.20.1	276. Copyright (C) 2019 American	Megatrends, Inc.

3. Choose to boot from the USB flash drive (shown as "UEFI: SanDisk, Partition 1" for the example below):

Save Options	
)iscard Changes and Exit	
Save Changes and Reset	
Save Changes	
Discard Changes	
Default Options	
Restore Optimized Defaults	
Save as User Defaults	
Restore User Defaults	
Boot Override	
JEFI: Built-in EFI Shell	
(B97/D0/F0) UEFI: PXE IPv4 Intel(R) I350 Gigabit Netw	Jork
Connection(MAC:3cecef40a1dc) (B97/D0/F1) UEFI: PXE IPv4 Intel(R) I350 Gigabit Netw	
Connection(MAC:3cecef40aidd)	++: Select Screen
(B97/D0/F0) UEFI: PXE IPv6 Intel(R) I350 Gigabit Netw	
Connection(MAC:3cecef40a1dc)	Enter: Select
(B97/D0/F1) UEFI: PXE IPv6 Intel(R) I350 Gigabit Netw	work +/-: Change Opt.
Connection(MAC:3cecef40a1dd)	F1: General Help
aunch EFI Shell from filesystem device	F2: Previous Values
	F3: Optimized Default:
	F4: Save & Exit
	ESC: Exit

4. After entering UEFI Shell, select "FS0:" to access the USB flash drive:

Note: "FS0" is the name of the USB flash drive used for this example



5. Next, locate the "mnv_cli.efi" program and run it:



Note: if the CLI reports that "No NVMe Controller is found", please see Appendix –troubleshooting.

6. To create a RAID0 array using two NVMe SSD's, enter the following command.

create -r 0 -d 0,1



For more CLI commands, please download the CLI manual from the product page of the official website.

Method 3: Create the RAID array using a Windows operating System, and the WebGUI management software:

- 1. This method assumes you have access to a Windows Server 2019 system and have installed the WebGUI software.
- 2. Open the WebGUI, select the Logical tab. Click "Create Array", and configure the array as desired using the drop-down menus and selection boxes. Once configured, click the "Create"button to create the array (the example below shows 4 NVMe SSD's configured as a RAID 0 array).

Create Array			Crea	nte Array		
ogical Device	Array Type:	RAID 0	~			
escan	Array Name:	Default				
	Initialization Method:	Quick Init	~			
	Cache Policy:		\sim			
	Block Size:	128K	~			
		Select All	Location	Model	Capacity	Max Free
		✓	1/1	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GE
	Available Disks:	\checkmark	1/2	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GE
		\checkmark	1/3	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GE
		\checkmark	1/4	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GE
	Capacity: (According to the max free space on the selected disks)	Maximum	(MB)			

3. Once the array has been created, it will be displayed under Logical Device Information.

						High	Technologies, I
Global View	Physical	ogical	Setting	Event	SHI		
Create Array			Logica	l Device	Information		
Logical Device	Name Typ	e Capacit	y BIOCKSIZE	Sectorsize	OS Name	Status	
Rescan	VD_0 RAI	ID 0 2.00 TB	128k	512B	HighPoint-SSD62	204 Normal	<u>Maintenance</u>
Rescan	🤪 VD_0 RAI	ID 0 2.00 TB			HighPoint-SSD62		Maintenance
Rescan	VD_0 RAI	ID 0 2.00 TB					Maintenance Max Free
Rescan		Model		al Device		ı	
Rescan	Location	Model Samsung S	Physica	al Device		n Capacity	Max Free
Rescan	Location	Model Samsung S	Physica SSD 970 EVO P	al Device lus 500GB lus 500GB		Capacity 500.10 GB	Max Free 0.00 GB

Method 4: Create a RAID array in Redhat 8.3 using the CLI Tool

- a. This method assumes that you have already prepared a Debain system.
- b. Boot the system, and enter the username and password to start Debian.
- c. Copy the CLI package into the root directory of a USB flash drive. Use the following command to copy the mnv_cli package to home directory:

cp mnv_cli /home



d. Access the home directory and enter the following command to start the CLI:

./mnv_cli

```
[root@localhost home]# ./mnv_cli
CLI Version: 1.0.0.1041
Welcome to NVMe Command Line Interface.
```

e. To create a RAID0 array using Four NVMe SSD's, enter the following command.

create -r 0 -d 0,1,2,3



For more CLI commands, please download the CLI manual from the product page of the official website.

Step 3 Adjust the Motherboard BIOS Settings

Using the Super Micro X11DPi-NT motherboard as an example:

1. In the system BIOS SETUP menu, change 'Boot mode select' to 'UEFI;

	.lity – Copyright (C) 2019 Amer IPMI Security Boot Save & E	
Boot mode select Legacy To EFI Support	(UEF1) [Disabled]	Select boot mode LEGACY/UEFI
FIXED BOOT ORDER Priorities		
Boot Option #1	[UEFI Hard Disk]	
Boot Option #2	[UEFI AP:UEFI:	
	Built-in EFI Shell]	
Boot Option #3	[UEFI CD/DVD]	
Boot Option #4	[UEFI USB Hard	
	Boot mode select	
Boot Option #5	UEFI	
Boot Option #6	DUAL	++: Select Screen
Boot Option #7	A CONTRACTOR OF	11: Select Item
Boot Option #8		Enter: Select
Boot Option #9	[UEFI Network]	+/-: Change Opt.

 Under "Advanced→PCIe/PCI/PnP Configuration, change the setting for "CPU Slot x PCI-E OPROM" to "EFI". "x" refers to the slot number (slot 2 was used when the screenshot was taken). Please consult the motherboard manual for more information.

Aptio Setup Utility - PCIe/PCI/PnP Configuration	Copyright (C) 2019 Americ
PCI Bus Driver Version	A5.01.18
PCI Devices Common Settings	
Above 4G Decoding SR-IOV Support MMIO High Base MMIO High Granularity Size Maximum Read Request MMCFG Base VGA Priority	[Enabled] [Disabled] [56T] [256G] [Auto] [2G] [Onboard]
PCI Devices Option Rom Setting Onboard NVME 1 OPROM Onboard NVME 2 OPROM OPU1 Slot 1 PCI-E x8 OPROM CPU1 Slot 2 PCI-E x16 OPROM CPU1 Slot 3 PCI-E x8 OPROM	(EFI) [EFI] [EF1] [EF1] [EF1]
CPU2 Slot 4 PCI-E ×16 OPROM CPU2 Slot 5 PCI-E ×16 OPROM CPU2 Slot 6 PCI-E ×16 OPROM	(EFI) (EFI) (EFI)

3. Set " Secure Boot " to "Disabled".

Aptio Setup Ut	ility – Copyright (C) 2019 American Secure Boot
System Mode	Setup
Secure Boot	[Disabled] Not Active
Secure Boot Mode CSM Support ▶ Restore Factory Keys ▶ Reset To Setup Mode	[Custom] [Enabled]
▶ Key Management	

Step 4 Install Debian 10.8

- 1. Boot from the Debian 10.8 Installation DVD (UEFI mode).
 - a. When the Installation screen appears, please select " **Graphcal install** " to install Debian 10.8.



2. When the installation switches to the graphical interface, choose "Guided-use entire disk" and then click "continue" to select the target disk for installation.

The installer can guide you through partitioning a disk (usir prefer, you can do it manually. With guided partitioning you customise the results.		
f you choose guided partitioning for an entire disk, you will Partitioning method:	next be asked which disk should	be used.
Guided - use entire disk		
Guided - use entire disk and set up LVM		
Guided - use entire disk and set up encrypted LVM		
Manual		
Screenshot	Go Back	Continu

3. Select the RAID array as the target disk to install the Debian 10.8. You can then proceed normally - follow the onscreen prompts to install Debian 10.8 to the array.

artition disks Note that all data on the disk eally want to make the chan	you select will be eras ges.	ed, but not before	e you have confirme	d that you
Select disk to partition: /dev/nvme0n1 - 2.0 TB gdghf				
devilamenti - 2.0 fb gagm				
	k			
creenshot			Go Back	Continu

4. After installation is complete, select the appropriate startup item to enter the system.



5. Enter the user name and password to log into Debian 10.8.



Appendix

Troubleshooting

- 1. The CLI reports that "No NVMe Controller is found"
 - 1) After starting "**mnv-cli.efi**", the utility reports "**No NVME Controller is found**" (as shown below):



2) You will need check and make sure the system recognizes the SSD6204. First, enter the following command using the UEFI tool:

pci -b



3) If the interface reports "Vendor 1B4B Device 2241 Prog Interface 2", the SSD6204 is recognized by the motherboard, but cannot support the UEFI tool. In this case, you will need to create the array using one of the other methods described in this manual (BIOS, CLI or WebGUI).



- 4) If the interface does not display "**Vendor 1B4B Device 2241 Prog Interface 2**", then the motherboard does not recognize the SSD6204.
 - a. Power down the system, and make sure the SSD6204 is securely installed into the PCIe slot
 - b. Boot the system and enter the motherboard BIOS utility. Make sure the required BIOS settings are still enabled (refer to page 1)

2. The replacement SSD6204 controller cannot recognize the RAID array

Existing RAID arrays may not be recognized if you simply transfer the NVMe SSD's from one controller to another.

Diagram before replacing NVMe to the new SSD6204:

Boot Override Windows Boot Manager (Namespace#1) USB#0:SanDisk IBA 40G Slot 6000 v1066 UEFI: SanDisk, Partition 1 UEFI: Built-in EFI Shell Launch EFI Shell from filesystem device

Diagram after replacing NVMe to the new SSD6204:

Boot Override UEFI: Built-in EFI Shell UEFI: SanDisk, Partition 1

This problem can be resolved by importing the array using the new host controller. There are 3 ways to import an existing RAID configuration. This command is a Simple API feature to import a VD when an importable VD roams from one controller to another. If NVMe Controller supports the RAID mode, this function will import VD.

If VD is created from one controller and the SSD with VD roamed to another controller, the VD needs to be imported first before the firmware reports the VD to the OS.

Note: The user can use > info -o VD command to check if the VD status to be imported or not.

Method 1: Import the RAID array using the BIOS Utility

- 1) Set the Slot Storage OPROM of SSD6204 in the motherboard BIOS to UEFI.
- 2) Set 'Boot mode select' to 'UEFI'.
- 3) From the motherboard BIOS menu, select "Marvell NVME Configuration Utility":



4) Next, select "Virtual Device Information":

[Physical Device Information]	informations.
[Virtual Device Information]	
[Namespace Information]	
[Create RAID Configuration]	

5) Click "**Import**".

Detail Information	
ID	0
Name	New_VD
Status	Functional- Importable
3GA Type	NONE
3GA Status	NONE
RAID Level	RAIDO
Member Count	2
1ember ID	[1] [3]
Stripe Block	128K
Size	953GB

6) After restarting the system, you can recognized the RAID0 and can see that the status of the RAID has changed by entering "Virtual device information→[0]New_VD"

Virtual Device Det) Utility – Copyright (C) 2019 Americ all Information
Detail Information	
ID	0
Name	New VD
Status	Functional
BGA Type	NONE
BGA Status	NONE
RAID Level	RAIDO
Member Count	4
Member ID	[0] [1] [2] [3]
Stripe Block	128K
Size	186268

Method 2: Import the RAID array using the UEFI Utility

- 1) Copy **mnv_cli** to the root directory of a bootable USB flash drive.
- 2) Boot to the flash drive and enter the following command:

import –l 0	
FSO:\> mnv_cli.efi CLI Version: 1.0.0.	1041
Welcome to NVMe Com	mand Line Interface.
> info -o vd	
VD ID:	0
Name:	New_VD
Status:	Functional
Importable:	Yes
RAID Mode:	RAIDO
size:	953 GB
PD Count:	2
PDs:	1 3
Stripe Block Size:	128K
Sector Size:	512 bytes
Total # of VD:	1
> <mark>import −1 0</mark> VD 0 import success	fully.

3) After restarting the system, you can recognized the RAIDO and can see that the status of

> info -o vd VD ID: 0 Name: VD_0 Functional Status: Importable: No RAIDO RAID Mode: size: 1862 GB PD Count: PDs: 0123 Stripe Block Size: 128K Sector Size: 512 bytes Total # of VD:

the RAID has changed by entering the command : info -o vd

Method 3: Import the RAID array using the CLI tool:

1) Run mnv_cli.exe using the following command:

./mnv_cli



2) Entering the command : import -I 0



3) After restarting the system, you can recognized the RAIDO and can see that the status of

the RAID has changed by entering the command: info -o vd

VD ID:	0
Name:	VD_0
Status:	Functional
Importable:	No
RAID Mode:	RAIDO
size:	1862 GB
PD Count:	4
PDs:	0123
Stripe Block Size:	128K
Sector Size:	512 bytes
Total # of VD:	1