SSD6202 Red Hat 8.3 Installation Guide

Version 1.00

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1 Overview

This guide explains how to install Red Hat to an NVMe SSD or array hosted by the SSD6202 controller.

For Red Hat 8.3

Mirror link: https://developers.redhat.com/products/rhel/download#

2 Installing Red Hat 8.3 on SSD6202 controller

Step 1 Prepare Your Hardware for Installation

After installing the NVMe SSDs into the SSD6202 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 SSD6202 controller, from your system. These can be reinstalled after Red Hat is up and running.

Note: Red Hat 8.3 requires UEFI Boot support when used with the SSD6202. If you have other SCSI-class adapters installed, you must make sure the SSD6202 controller UEFI support is loaded first; otherwise the system may be unable to boot. If the SSD6202 is not loading first, try moving it to another PCIe slot.

Step 2 Create an Array

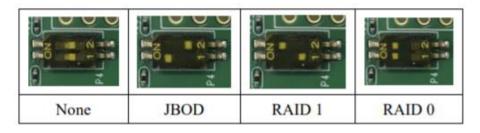
If you would like to configure a RAID array using NVMe SSD's hosted by the SSD6202, please select 1 of the following 5 Methods.

Method 1: Create a RAID array via RAID Switch settings

1. Connect two NVMe SSD's to the SSD6202.

Note: make sure that there is no RAID or residual partitions in the two NVMe SSD's.

2. Create RAID arrays via RAID Switch settings.



Note: If you don't want to use RAID Switch to create RAID, please make sure the switch setting is None.

Method 2: Create a RAID array using the Motherboard BIOS

Using the SuperMicro H11DSi motherboard as an example:

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

	lity – Copyright (C) 2019 American H Logs Security Boot Save & Exit	Megatrends, Inc.
Boot Configuration		Select boot mode Legacy/UEFI
Boot Mode Select LEGACY to EFI Support	[UEFI] [Disabled]	
FIXED BOOT ORDER Priorities Boot Option #1 Boot Option #2 Boot Option #3	[UEFI Hard Disk] [UEFI AP:UEFI: Built-in EFI Shell]	
Boot Option #4 Boot Option #5	[UEFI CD/DVD] Boot Mode Select k] Legacy UEFI Dual	
Boot Option #6 Boot Option #7 Boot Option #8	(UEFI USB Lan)	
Boot Option #3	(UEFI Network:(B97/D0/FO) UEFI: PXE IPv4 Intel(R) I350 Gigabit Network Connection(MAC:3cecef 40aidc)]	++: Select Screen 11: Select Item Enter: Select +/-: Change Oot. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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.

PCI Bus Driver Version	A5.01.19	Enables or Disables 64bit
PCI Devices Common Settings:		capable Devices to be Decoded in Above 4G Address
Above 4G Decoding		Space (Only if System
SR-IOV Support	[Disabled]	Supports 64 bit PCI
BME DMA Mitigation	[Disabled]	Decoding).
PCIe ARI Support	[Auto]	
PCIe Spread Spectrum	[Disabled]	
VGA Priority	[Onboard]	
NVMe Firmware Source	[Vendor Defined	
	Firmware]	
M.2(AHCI) Firmware Source	[Vendor Defined	
	Firmware]	
CPU2 SLOT1 PCI-E 3.0 X8 OPROM	[EFI]	
CPU1 SLOT2 PCI-E 3.0 X16 OPROM	[EFI]	
CPU1 SLOT3 PCI-E 3.0 X8 OPROM	[EFI]	
CPU1 SLOT4 PCI-E 3.0 X16 OPROM	[EFI]	++: Select Screen
CPU1 SLOTS PCI-E 3.0 X8 OPROM	[EFI]	11: Select Item
4.2 PCIe x2 OPROM	(EFI)	Enter: Select
Onboard LAN1 Option ROM	(EFI)	+/-: Change Opt.
Onboard LAN1 Option ROM	[EFI]	F1: General Help
P2_NVMe0 OPROM	(EFI)	F2: Previous Values
P2_NVMe1 OPROM	[EFI]	F3: Optimized Defaults
Onboard Video Option ROM	[EFI]	F4: Save & Exit ESC: Exit

3. Creating the RAID array:

a. Select "Advanced-Marvell NVMe Configuration Utility"

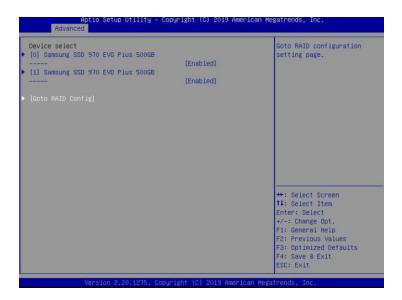
Aptio Setup Utility - C Main Advanced Event Logs IPMI Se	(C) 2019 American Megatrends, Inc. oot Save & Exit	
 Boot Feature CPU Configuration Chipset Configuration Server ME Information SATA Configuration SATA Configuration PCIE/PCI/PP Configuration Super 10 Configuration ACPI Settings Trusted Computing TIs Auth Configuration RAM Disk Configuration Marvell NVMe Configuration Utility 	Manage NVMe Controller Configuration. **: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2 20 1276 Con) 2019 American Megatrends, Inc.	

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. Next, select "Create RAID Configuration". Press"Enter"to open the Configuration Utility.

Aptio Setup Utility – Copyright (C) 2 Marvell NVMe Configuration Utility	2019 American Megatrends, Inc.
Configuration Utility • [Physical Device Information] • [Virtual Device Information] • [Oneate RAID Configuration] • [Delete RAID Configuration] • [Rebuild RAID Configuration] • [Controller Information]	Create a RAID configuration. ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.20.1276. Copyright (C) 201	19 American Megatrends, Inc.

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



d. For "Would you like to create this virtual disk?" select "Yes", then select "Goto Namespace Configuration".

RAID Configuration	
RAID Level	[RAIDO]
Stripe Size	[128K]
Quick Initialization	[Quick]
Name	
Would you like to create this virtual disk?	[Yes]

e. For "**Would you like to create those namespace on the virtual disk?**" select "**Yes**", then select "**Accept**" to create the RAID0 array.

Aptio Setup Utility - Advanced	Copyright (C) 2019
Namespace Configuration	
Namespace Count	1
Maximum VD Size	931GB
Utilized Size	OMB
Remainding Size	931GB
Namespace_1 Size	0
Would you like to create those namespace on the virtual disk?	[Yes]
[Accept]	

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

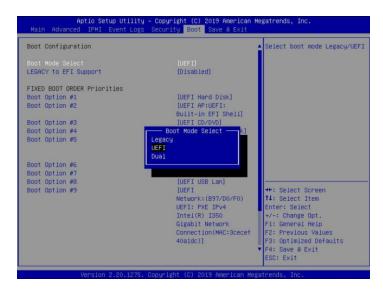


Method 3: Create RAID in UEFI

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

Using the SuperMicro H11DSi motherboard as an example:

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



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

Main Advanced IPMI Event Logs Security Boot Save & Exi	an Megatrends, Inc. t
Save Options Olscard Changes and Exit Save Changes Discard Changes Discard Changes Discard Changes Default Options Restore Optimized Defaults Save as User Defaults Boot Override UEFI: Built-in EFI Shell UEFI: Shell Sk, Partition 1 (B97/D0/FO) UEFI: PXE IPV4 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidc) (B97/D0/FO) UEFI: FXE IPV4 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) (B97/D0/FO) UEFI: PXE IPV4 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) (B97/D0/FO) UEFI: FXE IPV4 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) (B97/D0/FO) UEFI: PXE IPV6 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) (B97/D0/FI) UEFI: PXE IPV6 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) Launch EFI Shell from filesystem device	++: Select Screen T: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

4. After entering the 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 4: 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.
- 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 2 NVMe SSD's configured as a RAID 0 array).

Create Array			C	reate Array		
Logical Device Rescan	Array Type: Array Name:	RAID 0	~			
	Initialization Method:	Quick Init	*			
	Cache Policy:		\sim			
	Block Size:	128K	~			
		Select All	Location	Model	Capacity	Max Free
	Available Disks:		1/1	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GE
			= 1/2	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GE
	Capacity: (According to the					
	max free space	Maximum	(MB)			
	on the selected					

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

Global View	Physical	Logical	Setting	Event	SHI		
Create Array			Logic	al Devic	e Information		
Logical Device	Name Typ	ne seatories		SectorSize	OS Name	Status	
Rescan	VD_0 RA	AID 0 1.00 TB	128k	512B	HighPoint SSD620	2 Normal	Maintenance
			Physi	cal Devic	e Information		
	Location	Model				Capacity	Max Free
	1/1	Samsung S	SD 970 EV	O Plus 500	GB	500.10 GB	0.00 GB
	= 1/2	Cameuna C	CD 070 EV	O Plus 500	CB	500.10 GB	0.00 GB

Method 5: Create a RAID array in Red Hat 8.3 using the CLI Tool

- 1. This method assumes that you have already prepared a Red Hat system.
- 2. Boot the system, and enter the username and password to start Red Hat.
- 3. 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

```
[root@localhost mnt]# cp mnv_cli /home/
[root@localhost mnt]# cd /home/
[root@localhost home]# ls
mnv_cli <u>test</u>
```

4. 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.
```

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

create -r 0 -d 0,1

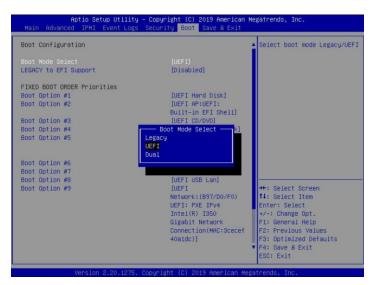


For more CLI commands, please download the CLI manual from the product page of the official website.

Step 3 Adjust the Motherboard BIOS Settings

Using the Super Micro H11DSi motherboard as an example:

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



2. 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 4 was used when the screenshot was taken). Please consult the motherboard manual for more information.

PCI Bus Driver Version	A5.01.19	Enables or Disables 64bit capable Devices to be
PCI Devices Common Settings:		Decoded in Above 46 Addres
Above 4G Decoding		Space (Only if System
SR-IOV Support	[Disabled]	Supports 64 bit PCI
BME DMA Mitigation	[Disabled]	Decoding).
PCIe ARI Support	[Auto]	
PCIe Spread Spectrum	[Disabled]	
VGA Priority	[Onboard]	
NVMe Firmware Source	[Vendor Defined	
	Firmwarel	
M.2(AHCI) Firmware Source	[Vendor Defined	
	Firmware]	
CPU2 SLOT1 PCI-E 3.0 X8 OPROM	[EFI]	
CPU1 SLOT2 PCI-E 3.0 X16 OPROM	[EFI]	
CPU1 SLOT3 PCI-E 3.0 X8 OPROM	[EFI]	
CPU1 SLOT4 PCI-E 3.0 X16 OPROM	[EFI]	++: Select Screen
CPU1 SLOTS PCI-E 3.0 X8 OPROM	[EFI]	11: Select Item
4.2 PCIe x2 OPROM	[EFI]	Enter: Select
Onboard LAN1 Option ROM	(EF1)	+/-: Change Opt.
Onboard LAN1 Option ROM	[EFI]	F1: General Help
P2_NVMe0 OPROM	[EFI]	F2: Previous Values
P2_NVMe1 OPROM	[EFI]	F3: Optimized Defaults
Onboard Video Option ROM	[EFI]	▼ F4: Save & Exit
		ESC: Exit

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

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

Step 4 Install Red Hat 8.3 to the SSD6202

- 1. Boot from the Red Hat 8.3 Installation DVD (UEFI mode).
- 2. When the Installation screen appears, please select "Install Red Hat Enterprise Linux 8.3" to install Red Hat 8.3.



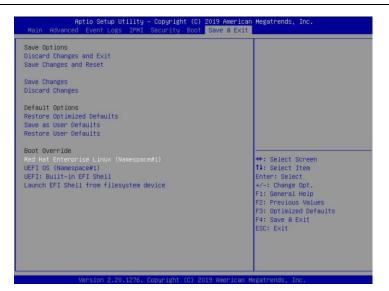
3. When the installation switches to the graphical interface, click "**Root Password**" and "**User Creation**" to set username and password. Next, click "**Installation Destination**" to select the target disk for installation.

		*		
ned Hat	INSTALLATION SUMMARY	Å	RED HAT ENTERPRISE	LINUX 8.3 INSTALLATION
	O Time & D	d Connect tr Not registered support States Date Connect tr Not registered Support States Connect tr Not registered	n Source	
	Americanhe USER SETTING Root Pas Root Creat USer Cre USer Cre	w York timezone Server with GU	b Connected	
	2 Base combine term marked with the inner		Guit We work touch your disk	Begin Installation

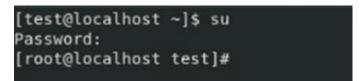
4. Select the RAID array as the target disk to install the Red Hat 8.3. You can then proceed normally - follow the onscreen prompts to install Red Hat 8.3 to the array.

Device Selection	
Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button	1.
Local Standard Disks	
1.82 TIB	
HighPoint SSD6204 i.0050432308000001	
nvme0n1 / 1.97 MiB free	
	Disks left unselected here will not be touched.
Specialized & Network Disks	
Add a disk	
	Disks left unselected here will not be touched.
Storage Configuration	
Automatic Custom	
I would like to make additional space available.	
Encryption	
Encrypt my data. You'll set a passphrase next.	
Full disk summary and boot loader	disk selected; 1.82 TiB capacity; 1.97 MB free Refresh.
Line sense percenter y attra solors investore	was associed, 1.02 no capacity, 1.97 mill free Refresh.

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



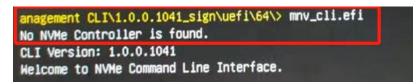
6. Enter the user name and password to log into Red Hat 8.3.



Appendix

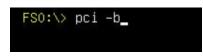
Troubleshooting

- 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):

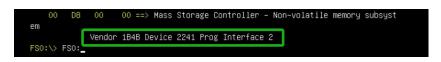


2) You will need check and make sure the system recognizes the SSD6202. First, enter the following command using the UEFI tool:

pci -b



3) If the interface reports "Vendor 1B4B Device 2241 Prog Interface 2", the SSD6202 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).



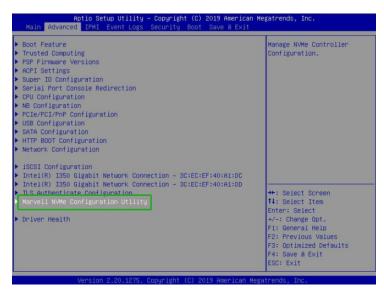
- 4) If the interface does not display "**Vendor 1B4B Device 2241 Prog Interface 2**", then the motherboard does not recognize the SSD6202.
 - a. Power down the system, and make sure the SSD6202 is securely installed into the PCIe slot
 - b. Boot the system and enter the motherboard BIOS utility. Make sure the required BIOS settings are still enabled (refer to page 1)

2. Check the RAID create via RAID Switch settings is created or not

Method 1: Check in BIOS Utility

- 1) Set the Slot Storage OPROM of SSD6202 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) Select the "Virtual device information"

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc. Advanced					
Configuration Utility	Display Virtual Device informations.				
[Physical Device Information] [Virtual Device Information]					
(Namespace Information)					
[Create RAID Configuration]					
[Delete RAID Configuration]					
[Rebuild RAID Configuration]					
[Controller Information]					

5) Select the "[0] New_VD"

Aptio Setup Utility – Copyright (C) 20: Advanced	19 American Megatrends, Inc.
Virtual Device Information List	Press [Enter] key to view
▶ [0] New_VD	the detail information.

6) As shown in the figure below, you can see the RAID0 information:

Advanced	
Detail Information	
ID	0
Name	New_VD
Status	Functional
BGA Type	NONE
BGA Status	NONE
RAID Level	RAIDO
Member Count	2
Member ID	[0] [1]
Stripe Block	128K
Size	931GB

Method 2: check in UEFI

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

Aptio Setup Utility – Copyright (C) 2019 American Main Advanced IPMI Event Logs Security Boot <mark>Save & Exit</mark>	
Save Options Discard Changes and Exit Save Changes and Reset Save Changes Discard Changes Discard Changes Default Options Restore Optimized Defaults Save as User Defaults Boot Overide UEFI: Built-in EFI Shell UEFI: Built-in EFI Shell (B97/D0/F0) UEFI: PXE IPV4 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidc) (B97/D0/F0) UEFI: PXE IPV4 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) (B97/D0/F0) UEFI: PXE IPV6 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) (B97/D0/F1) UEFI: PXE IPV6 Intel(R) I350 Gigabit Network Connection(MAC:3cecef40aidd) Launch EFI Shell from filesystem device	++: Select Screen 1: Select Item Enter: Select +/-: Change Opt, F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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



3. you can recognized the RAIDO by entering the following command:

≻ info –o vd VD ID:	0
Name:	New_VD
Status:	Functional
Importable:	No
RAID Mode:	RAIDO
size:	931 GB
PD Count:	2
PDs:	0 1
Stripe Block Size:	128K
Sector Size:	512 bytes
Total # of VD:	1

Method 3: check in a windows operating System

- 1. This method assumes you have access to a Windows Server 2019 system and have installed the WebGUI software.
- 2. Open the WebGUI software, it will be displayed under Logical Device Information.

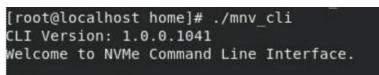
info -o vd

Global View	Physical	Logical	Setting	Event	SHI		ALCONTRA
Create Array	Logical Device Information						
Logical Device	Name Typ	and the second sec		SectorSize		Status	
Rescan	VD_0 RA	ID 0 1.00 TB	128k	512B	HighPoint SSD620	2 Normal	Maintenance
	Physical Device Information						
	Location	Model				Capacity	Max Free
	= 1/1	Samsung S	SD 970 EV	O Plus 500	GB	500.10 GB	0.00 GB
	1/2	Samsung S	SD 970 FV	O Plus 500	GB	500.10 GB	0.00 GB

Method 4: check in a CLI

- 1. This method assumes that you have already prepared a Red Hat system.
- 2. Refer to "Step 2 Create an array→Method 5" to install CLI tool in the system.
- 3. Run CLI by the following command:

./mnv_cli



4. you can recognized the RAID0 by entering the following command:

info -o vd

> info −o vd	
VD ID:	0
Name:	New_VD
Status:	Functional
Importable:	No
RAID Mode:	RAIDO
size:	931 GB
PD Count:	2
PDs:	0 1
Stripe Block Size:	128K
Sector Size:	512 bytes
Total # of VD:	1