

FAQ / Application Note

Subject : Intel Virtual RAID on CPU

FAQ Document No: S23008	Date: 2023/07/27
Model Name: HPM-SRSUA	Rev. 1.0

Category: General H/W S/W Others,

Purpose: Intel VROC introduction, requirements and restrictions.

1. Introduction

The Intel VROC family of products provide enterprise solutions for both NVMe SSD and SATA devices for enterprise servers and workstations. The product family includes the following three products:

Intel VROC interface Types:

- 1. Intel VROC NVMe RAID *
- 2. Intel VROC PCH SATA RAID
- 3. Intel VROC PCH NVMe RAID



HPM-SRSUA is equipped with 4th Gen Xeon SP processor and supports VMD HW Gen 3.0 and VROC 8.0.





Requirements and Restrictions

- Intel VROC is only available when the system is configured for UEFI boot mode.
- To enable Intel VMD VROC, a **hardware key** must be inserted on the motherboard, and the appropriate processor's Virtual Management Devices must be enabled in the BIOS setup.
- Supported SSDs and Operating Sytems
 To see the supported configurations: <u>Intel® Virtual RAID on CPU (Intel® VROC) Supported</u> <u>Configurations Guide 8.0PV</u>

Hardware Key

The key Intel VROC features are activated based on four different configurations that can be used. Standard and Premium Upgrade Keys enable the use of Intel VROC features on Intel and approved 3 rd party NVMe drives. Intel VROC Pass-thru is the default state, where no upgrade key has been plugged into the system, and can be upgraded based on the features desired. These features are also restricted to approved operating systems for proper operational functionality.

		Pass-thru SKU	Standard SKU	Premium SKU	Intel® SSD SKU
	MM#	NA	951605	951606	956822
NVMe* RAID	CPU attached NVMe	√	√	√	√
	3 rd party SSD support	√	√	√	-
	Hot-Plug/ Surprise Removal	√	√	√	√
	LED management	√	√	√	√
	Web UI management	√	√	√	√
	Bootable RAID	-	√	√	√
	RAID 0/1/10	-	√	√	~
	RAID 5	-	-	√	~
	RAID Write Hole closed (BBU replacement)	-	NA	\checkmark	\checkmark
SATA	Bootable RAID Volume	\checkmark	√	√	\checkmark
RAID	RAID 0/1/5/10	\checkmark	√	√	\checkmark

VROC_HW_KEY

GND GND GND GND



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2. Enable VMD in BIOS:

- Power on the system and press [DEL] to enter BIOS 2.1
- Navigate to Socket Config > IIO Configuration > Intel VMD technology >Intel VMD for Volume 2.2 Management Device on Socket 0 >

Select the VMD controller according to your SSD location, for example PCIe Slot2 and Slot4.

So	Aptio Setup – AMI cket Config	
Enable/Disable VMD	[Disable]	Enable/Disable VMD in this
VMD Config for IOU O(PCIe Sloti) Enable/Disable VMD	[Disable]	otdok.
VMD Config for IOU 1(PCIe Slot3) Enable/Disable VMD	[Disable]	
VMD Config for IOU 2(PCIe Slot5) Enable/Disable VMD	[Disable]	
VMD Config for IOU 3(PCIe Slot7) Enable/Disable VMD	[Disable]	
VMD Config for IOU 4(PCIe Slot2.4.6) Enable/Disable VMD	[Disable]	<pre>fl: Select Screen fl: Select Item Enter: Select +/-: Change Opt. Fl: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Enable VMD port C/D/E/F for PCIE slot2 and slot 4. Press [F4] to Save and Exit Setup.

Sol	Aptio Setup – AMI Sket Config	
Enable/Disable VMD	[Disable]	Enable/Disable Hot Plug for
VMD Config for IOU 0(PCIe Sloti) Enable/Disable VMD	[Disable]	
VMD Config for IOU 1(PCIe Slot3) Enable/Disable VMD	[Disable]	
VMD Config for IOU 2(PCIe Slot5) Enable/Disable VMD	[Disable]	
VMD Config for IOU 3(PCIe Slot7) Enable/Disable VMD	[Disable]	++: Select Screen
VMD Config for IOU 4(PCIe Slot2.4.6) Enable/Disable VMD	[Enable]	↑↓: Select Item Enter: Select
VMD port A LAN_X550AT2	[Disable] [Disable]	+/−: Change Opt. F1: General Help
VMD port C PCIE SLOT2	[Enable] [Enable]	F2: Previous Values F3: Optimized Defaults
VMD port E PCIE SLOT4	[Enable] [Enable]	F4: Save & Exit ESC: Exit
VMD port G PCIE SLOT6	[Disable] [Disable]	
Hot Plug Capable	[Disable]	
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When VMD is enabled, PCIe can only be used as a VMD device. For example, if VMD port A/B is enabled, LAN X550AT will not have any functionality.

Create NVMe RAID 3.

- Power on the system and press [DEL] to enter BIOS 3.1
- 3.2 Navigate to Advanced > Intel(R) Virtual RAID on CPU >



Enter "All Intel VMD Controllers" to check if all SSDs are recognized.

	Advanced	MI
F	All Intel VMD Controllers	
▶ 0	Create RAID Volume	
N F F	Non-RAID Physical Disks: WD_BLACK SN770 500GB SN:22412J478904, 465.76GB Port 4:1, Slot 2, CPU0, VMD4, BDF 01:00.0 WD_BLACK SN770 500GB SN:22412G467004, 465.76GB Port 4:2, Slot 4, CPU0, VMD4, BDF 02:00.0	

3.3 Enter "Create RAID Volume" to create RAID. For example, RAID 1.

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	HULIU SELUU - HHI	
Advanced		
Create RAID Volume		X - to Select Disk
Name: RAID Level: Enable RAID Spanned over VMD Controllers:	Volume0 [RAID1(Mirror)] []	
Select Disks: MD_BLACK SN770 500GB SN:22412J478904, 465.76GB Pont 4:1 CPU0 VMD4	[X]	
		++: Select Screen
Capacity (GB):	442.47	Enter: Select +/-: Change Opt.
▶ Create Volume		F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	a 9 99 1997 Copusidet (9)	2022 ANT

3.4 Press [F4] to save and reboot.

4 Installing Windows on a NVME RAID Volume

With RAID boot volumes through Intel VROC available, additional drivers are required in order to properly install a Windows operating system. This is a brief guide to show you the slight difference in order to introduce the F6 Drivers appropriate to utilize your BIOS created RAID volume as a system disk.

4.1 Down load F6 Drivers from avalue web site.

HPM-SRSUA

Wind	Windows 10 64bit						
No.	Release Date	Model	Description	Download			
1	2023-03-08	HPM-SRSUA	Intel QTA2.0 driver Device:Other	U			
2	2023-03-08	HPM-SRSUA	ASPEED VGA Driver Device:Video	0			
3	2023-03-08	HPM-SRSUA	Intel LAN 27.6 Device:Gigabit_Ethernet	U			
4	2023-03-08	HPM-SRSUA	Realtek Audio control panel Device:Video	-			
5	2023-03-08	HPM-SRSUA	Realtek Audio driver Device:Video	U			
6	2023-03-08	HPM-SRSUA	Intel VROC RAID F6 DRIVER Device:Other	-			
7	2023-03-08	HPM-SRSUA	Intel VROC Driver Device:Other	0			
8	2023-03-08	HPM-SRSUA	Intel Chipset driver Device:Chipset	0			

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4.2 Installation Destination Selection Click Load driver. Click Browse.

	Name		Total size	Free space Type		
						Load driver To install the device driver for your drive, insert the installation media containing the driver files, and then click OK.
	* Refresh	Delete	✓ Format	-∰ Ngw		Note: The installation media can be a CD, DVD, or USB flash drive.
4	We couldn't find any d	rives. To get a storag	e driver, click Load driver.		Next	Hide unvers triat aren't compatorie wur uns computer s'hartware.

4.3 Navigate to where you have the correct F6 driver stored. <u>iaStorE drivers are for SATA and sSATA</u> <u>drives, iaVROC will be for NVMe drives</u> (when attached to the Intel VMD controller).

Browse for Folder	
Browse to the driver, and then dick OK.	
This PC	
CENA_X64FRE (C:)	
> drivers	
VROC 8.0.0.4035 F6-drivers	
TintelVROC_f6_iaStorE_win10_64	
IntelVROC_f6_iaVROC_win10_64	
 _ > _ sources	





4.4 Highlight the selected driver and click OK to install. It require several minutes to complete installation of the selected driver.

	Windows Setup		
	Select the driv	er to install	
	Intel(R) Volume N	/lanagement Device NVMe RAID Controller (C	Nintel VROC RAID_Win 11 8.0.0.403
	Hide drivers that	t aren't compatible with this computer's hard	ware.
	Br <u>o</u> wse	Rescan	Next
Illes and the set for	formation	Installing Windows	

4.5 The RAID Volume should now appear once the driver has installed. Select the volume and proceed with your operating system installation for Windows as normal. If the drive does not immediately appear, use the Refresh tool to rescan the system for the RAID volume and proceed.

	🚱 ፈ Windo	ws Setup			×
	Where	do you want to install Wir	ndows?		
		Name	Total size Free space Type		
	A	Drive 6 Unallocated Space	442.5 GB	442.5 GB	
	€ <u>≉ R</u> efrei €9 Load	sh XDelete driver A Extend	Format	<mark>₩</mark> N <u>e</u> w	
				<u>N</u> e	xt
	1 Collecting information	2 Installing Windows			
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4.6 Select the desired volume and click Next to proceed with the installation of your Windows operating system.

5 Install Intel® VROC GUI

The Intel VROC GUI allows for fully integrated management of the disks installed on your Windows system. The VROC driver can be downloaded from avalue website.

Winde	Windows 10 64bit							
No.	Release Date	Model	Description	Download				
1	2023-03-08	HPM-SRSUA	Intel QTA2.0 driver Device:Other	U				
2	2023-03-08	HPM-SRSUA	ASPEED VGA Driver Device:Video	0				
3	2023-03-08	HPM-SRSUA	Intel LAN 27.6 Device:Gigabit_Ethernet	U				
4	2023-03-08	HPM-SRSUA	Realtek Audio control panel Device:Video	0				
5	2023-03-08	HPM-SRSUA	Realtek Audio driver Device:Video	U				
6	2023-03-08	HPM-SRSUA	Intel VROC RAID F6 DRIVER Device:Other	0				
7	2023-03-08	HPM-SRSUA	Intel VROC Driver Device:Other	U				
8	2023-03-08	HPM-SRSUA	Intel Chipset driver Device:Chipset	0				

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Intel® Virtual RAID on CPU			_	- ×
Home Preferences				(intel)
Current Status Your system is functioning normally.				
Rescan Create Volume Devices Intel(R) VROC (Premium) • • •	Volumes NVMe*_Array_0000 Volume0	V N SI SJ B D D U V V P L C	Volume Properties 🖤 Name: VolumeO <u>Rename</u> tatus: Normal ype: RAID O ize: 1,769.86 GB <u>Increase size</u> system volume: Yes sootable volume: No vata strip size: 128 KB 🏵 Verification details <u>Verify</u> Blocks with media errors: 0 hysical sector size: 512 Bytes ogical sector size: 512 Bytes	
Information Your storage system is configured for data protection, increased perf	ormance and optimal data storage capacity. You can further optimize your storage system by creating additional v	volumes	s. To begin the process, click 'Create Volum	e'.
Click any device or volume to display its properties.				

Note: The procedure to create a bootable RAID volume using the Intel VROC UEFI HII should only be used for a newly built system or for reinstallation of the operating system. It is advised to use the Intel VROC GUI within the Windows operating system for the creation of RAID volumes after the operating system is installed.

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