

Advantech AE Technical Share Document

Date	2018 / 07 / 16	Release Note	□Internal ■ External
Category	□FAQ∎SOP	Related OS	Microsoft OS
Abstract	VROC setup on Intel Purley platform.		
Keyword	VROC, Purley, RAID		
Deleted Dreduct	ASMB-815, ASMB-825, ASMB-925, ASMB-975		
Related Product	NOTE: Intel Purley platform.		

Intel VROC overview:

Intel[®] Virtual RAID on CPU (Intel[®] VROC) is a new software package for RAID volume management launched with the new Skylake CPU and Purley Platform. These CPUs have a new hardware architecture. It allows NVMe SSDs to connect via PCIe connections and directly manage on the CPU. Intel VROC leverages this architecture to enable NVMe RAID.



Picture1: Purley architecture to support VROC.

To use VROC function, a hardware VROC key and compatible SSD is required. Intel provide below three kinds of keys. And support below SSDs. (Table 1-2)

Кеу	RAID Support	SSD support
No key	0	Intel SSD
Intel [®] VROC Standard	0/1/10	3rd Party SSD Support
Intel [®] VROC Premium	0/1/5/10	3rd Party SSD Support
Intel [®] VROC Intel [®] SSD Only	0/1/5/10	Intel SSD

Table 1: VROC Keys.



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Intel SSD	All Intel [®] SSDs for Data Center and Professional, with		
	NVMe (Non-Volatile Memory Express)		
3rd Party SSD	 Samsung* SM951, SM961, PM953, PM961, PM963 		
	 Toshiba* XG3, PX04PMB 		
	Micron* 9100		
	Lenovo* Atsani		
	Huawei* ES3600P		

 Table 2:Support SSDs.

Step by step setup:

Below is the BIOS setup to build VROC. Note that if the NVMe SSDs are connected to different VMD (Volume Management Device), the VROC volume can only be used as data disk. (Can't be used as boot disk.)

- Step 1. If connect one PCIE slot to multiple SSD through riser card. Go to Socket Configuration->IIO Configuration->Socket Configuration to configure slot as x4x4x4x4. (Picture 2-3)
- Step 2. Go to Socket Configuration->IIO Configuration->Intel VMD technology->Intel VMD Volume Management Device on Socket 0/1->enable related VMD volume management and ports. (Picture 4) Than user can choose to build RAID under BIOS (Step 3) or OS (Step 4).
- Step 3. Save the BIOS setting and install NVMe drive. Go to Advanced->Intel Virtual RAID on CPU to configure RAID. (Picture 5)
- Step 4. If the OS support Intel RST. Save the BIOS setting in Step 1-2 and enter OS.
- Step 5. Open Intel RST to create RAID volume. (Picture 6-9) Building VROC by Intel RST or BIOS has the same effect. Means that if build VROC by intel RST, the VROC volume will also show up under BIOS, vice versa.



Picture2: Connect one PCIE slot to multiple SSD through expansion board.



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Aptio Setup Utility	– Copyright (C) 2018 American Socket Configuration
IOUO (PCIE SLOTS & SLOT7) IOU1 (PCIE SLOT2) IOU2 (PCIE SLOT8) > IOUO (PCIE X4 SLOT5) - Port 1C IOU0 (PCIE X4 SLOT7) - Port 1D IOU1 (PCIE X16 SLOT2) - Port 2A > IOU2 (PCIE X16 SLOT8) - Port 3A	[Auto] [Auto] [Auto] [Auto] X4X4X4X4 X4X4X4X4 X4X4X8 X8X4X4 X8X4 X8X4 X8X4 X8X4 X16 Auto

Picture3: Use slot 2 as example.

Aptio Setup Utility –	Copyright (C) 2018 American Socket Configuration
VMD Config for PStack1	
Intel® VMD for Volume Management D VMD port 2A VMD port 2B VMD port 2C VMD port 2C VMD port 2D Hot Plug Capable CfgBar size CfgBar attribute MemBar1 size	[Enable] [Enable] [Enable] [Enable] [Enable] [Disable] 25 [64-bit prefetchable] 25
MemBari attribute MemBar2 size MemBar2 attribute	<pre>[32-bit non-prefetch] 20 [64-bit non-prefetch]</pre>

Picture4: Enable Volume management and ports.

Aptio Setup Utility – Advanced	Copyright (C) 2018 American
Create RAID Volume	
Name: RAID Level: Enable RAID spanned over VMD Contr	Volume0 [RAIDO(Stripe)] []
Select Disks: Port 0, VMD0, INTEL SSDPE2MD80064 Port 1, VMD0, INTEL SSDPE2MD80064 Port 2, VMD0, INTEL SSDPE2MD80064 Port 3, VMD0, INTEL SSDPE2MD80064	
Strip Size: Capacity (MB):	[128K8] 0
▶ Create Volume	
Select at least two disks	

Picture5: Choose the NVMe drive and create volume.

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😢 Intel® Rapid Storage Technology enterprise		-
Home Preferences		
Current Status Your system is functioning normally.		
Secon Create Volume		Controller Properties 🕐 Name: Intel(R) VROC (Premium)
Devices ▼ ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●	Volumes	 Type: VMD Upgrade key version: Premium Mode: RAID Number of volumes: 0 Number of spares: 0 Available disks: 4 Rebuild on hot insert: Disabled <u>Enable</u> Manufacturer: 8086 Model number: 201D Product revision: 4





Picture7: Select RAID type.

🔁 Create Volume		
1. Select	Configure Volume	Proposed Configuration
2. Configure	Name: Volume_0000	New Array
3. Confirm	Select the array disks (minimum selection required): NVME SSD on Controller 1, Port 0 (745 GB) NVME SSD on Controller 1, Port 1 (745 GB) NVME SSD on Controller 1, Port 2 (745 GB) NVME SSD on Controller 1, Port 3 (745 GB) Enable VMD controller spanning Volume Size Advanced Volume Size 1,449,886 MB Array allocation:	Volume_0000

Picture8: Select NVMe SSD.

😥 Intel® Rapid Storage Technology enterprise		- 🗆 X
Home Preferences		(intel)
Current Status Your system is functioning normally.		
Rescan Create Volume	Volumes	Volume Properties 🖤 Name: Volume_0000
Devices Intel(R) C600+/C220+ series chipset SATA AHCI Controller SATA SSD (60 GB) (System) Intel(R) VROC (Premium) Intel(R) VROC (Premium)<	Volumes NVMe_Array_0001	Status: Initializing 2% complete Type: RAID 5 Size: 1,449,885 MB System volume: No <u>Delete volume</u> Bootable volume: Yes Data stripe size: 64 KB Initialized: Yes Close RAID Write Hole: Journaling Drive Verification details Parity errors: 0 Blocks with media errors: 0 Physical sector size: 512 Bytes Logical sector size: 512 Bytes

Picture9: Volume is created.

■ <u>Reference</u>:

- 1. Intel VROC product brief
- 2. Intel VROC FAQ