RAID Configuration Guide



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About this guide

This guide contains information that you need to create RAID configurations. You can create different RAID configurations based on your motherboard chipset and software.



The screenshots in this guide are for reference only. The screenshots may vary with models, but the configurations steps are similar.

How this guide is organized

This guide contains the following parts:

Chapter 1: Intel[®] RAID Configuration

This chapter describes the Intel® RAID configurations and lists the setup procedures to create Intel® RAID configurations.

Chapter 2: AMD RAID Configuration

This chapter describes the AMD RAID configurations and lists the setup procedures to create AMD RAID configurations.

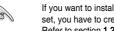
Where to find more information

The ASUS website (<u>www.asus.com</u>) provides updated information on ASUS hardware and software products.

Intel[®] RAID Configuration

1.1 Intel[®] RAID configurations

If your motherboard supports Intel[®] Rapid Storage Technology, you can create RAID 0. RAID 1, RAID 5 or RAID 10 configurations.



If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section 1.2 Installing the RAID controller driver during Windows® 10 OS installation for details.

1.1.1 **BAID** definitions

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

Installing storage devices 1.1.2

The motherboard supports SATA hard disk drives and PCIE SSD storage devices. For optimal performance, install identical drives of the same model and capacity when creating a disk array.



Refer to Chapter 2 in your motherboard's user manual for details on installing storage devices to your motherboard.

1.1.3 Intel[®] Rapid Storage Technology in UEFI BIOS

To enter the Intel® Rapid Storage Technology in UEFI BIOS:

1. Enter the BIOS Setup during POST.



Refer to Chapter 3 in your motherboard's user manual for details on entering and navigating through the BIOS Setup.

2. Go to Advanced > PCH Storage Configuration, then set SATA Mode Selection to [Intel RST Premium With Intel Optane System Acceleration (RAID)].



Due to chipset limitation, when SATA ports are set to RAID mode, all SATA ports run at RAID mode together.

- 3. Configure additional settings for your storage device and RAID configuration:
 - If you are using SATA storage devices, no additional settings are required. Please proceed to next step.
 - If you are using onboard M.2 cards, go to Advanced > PCH Storage Configuration, then set all the corresponding M.2 PCIE Storage RAID Support to [Enabled].
 - If you are using Hyper M.2 cards or PCIE SSDs, go to Advanced > CPU Storage Configuration, then set all the corresponding PCIE slots to [Hyper M.2 X16] or [PCIE X4 SSD Card] accordingly.



The Hyper M.2 card is purchased separately.

- Go to Boot > CSM (Compatibility Support Module), then set Launch CSM to [Disabled].
- 5. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.
- Go to the Advanced > Intel(R) Rapid Storage Technology to display the Intel[®] Rapid Storage Technology menu.



Creating a RAID set

To create a RAID set:

1. From the Intel[®] Rapid Storage Technology menu, select **Create RAID Volume** and press <Enter>. The following screen appears:

UEFI BIOS Utility - Advanced Mode	Qfan Control(F6) QEZ Tur	ning Wizard(F11) ? Hot K	leys	
My Favorites Main Extreme Tweaker <u>Ac</u>	<mark>ivanced</mark> Monitor	Boot Tool Exit	🔄 Hardw	are Monitor
← Advanced\Intel(R) Rapid Storage Technology\Create RAID Vol	ume		CPU	
			Frequency 3700 MHz	Temperature 33°C
Name:	Volume1		BCLK 100.0 MHz	Core Voltage 1.040 V
RAID Level:	RAID0(Str	ripe) -	Ratio 37x	
SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB		-		
SATA 0.2, ST3160812AS 9LS0BJ5H, 149.0GB			Frequency 2133 MHz	Voltage 1.200 V
Strip Size:	16KB		Capacity 8192 MB	
Capacity (MB):	0		Voltage	

- 2. When the Name item is selected, enter a name for the RAID set and press <Enter>.
- 3. When the **RAID Level** item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.
- 4. Under **Select Disks**, press <Enter> and select **X** for the disks you want to include in the RAID set.

UEFI BIOS Utility - Advanced Mode otc350011 10:24 [♥] ⊕ English □MyGavorite(F3) 沙 Qian Control(F6) ♡ tr Tuning Waard(F11) ⑦ Hot Keys	
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Hardware Monitor
← Advanced\Intel(R) Rapid Storage Technology\Create RAID Volume	СРО
	Frequency Temperature 3700 MHz 32*C
Name: Volume1	BCLK Core Voltage 100.0 MHz 1.040 V
RAID Level: RAID0(Stripe) -	Ratio 37x
SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB	Memory
SATA 0.2, ST3160812AS 9LS0BJ5H, 149.0GB	Frequency Voltage 2133 MHz 1.200 V
Strip Size:	Capacity 8192 MB
Capacity (MB):	Voltage

- 5. When the **Strip Size** item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:
 - RAID 0: 128 KB
 - RAID 10: 64 KB
 - RAID 5: 64 KB

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We recommend a lower strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.

UEFI BIOS Utility - Advanced Mode					
05/25/2017 10:24 CEnglish MyFavorite(F3)	みQfan Control(F6) ♀	EZ Tuning Wizard(F11)	? Hot Keys		
My Favorites Main Extreme Tweaker	<u>Advanced</u> Monito	r Boot Too	Exit	🔄 Hardwa	are Monitor
← Advanced\Intel(R) Rapid Storage Technology\Create RAID	/olume			CPU	
				Frequency 3700 MHz	Temperature 33°C
Name:	Volu	ime1		BCLK 100.0 MHz	Core Voltage 1.040 V
RAID Level:	RAII	D0(Stripe)	-		
				37x	
	4KB				
SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB	8KB 16K			Memory	
	32K				Voltage
SATA 0.2, ST3160812AS 9LS0BJ5H, 149.0GB	64K			2133 MHz	1.200 V
	128	KB			
Strip Size:	16K	В	•	8192 MB	
Capacity (MB):	0			Voltage	
					+5V

- When the Capacity (MB) item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
- When the Create Volume item is selected, press <Enter> to create the RAID volume and return to the Intel[®] Rapid Storage Technology menu.

UEFI BIOS Utility - Advanced Mode	⊕ Qfan Control(F6) ♀ EZ Tuning Wizard(F11) ☑ Hot Key	
My Favorites Main Extreme Tweaker	Advanced Monitor Boot Tool Exit	Hardware Monitor
Name: RAID Level:	Volume1 RAID0(Stripe)	CPU Frequency Temperature 3700 MHz 33°C BCLK Core Voltage
Select Disks: SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB SATA 0.2, ST3160812AS 9LS08J5H, 149.0GB	× •	100.0 MHz 1.040 V Ratio 37x
Strip Size:	х • • • • • • • • • • • • • • • • • • •	Memory Frequency Voltage 2133 MHz 1.200 V
Capacity (MB):	305251	Capacity 8192 MB
Create Volume		Voltage
		+12V +5V 12.096 V 5.040 V

Deleting a RAID set



Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the Intel[®] Rapid Storage Technology menu, select the RAID volume you want to delete and press <Enter>. The following screen appears:

UEFI BIOS Utility - Advanced Mode	De Qfan Control(F6) ♀ EZ Tuning Wizard(F11) ☑ Hot Keys	
My Favorites Main Extreme Tweaker	Advanced Monitor Boot Tool Exit	Hardware Monitor
← Advanced\Intel(R) Rapid Storage Technology\RAID VOLL	JME INFO	CPU
RAID VOLUME INFO		Frequency Temperature 3700 MHz 33°C
		BCLK Core Voltage
> Delete		Ratio 37x
Name:	Volume1	Memory
RAID Level:	RAID0(Stripe)	Frequency Voltage
	16KB	2133 MHz 1.200 V
	298.1GB	Capacity
	Normal	8192 MB
Bootable:	Yes	
		Voltage
SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB		+12V +5V
5 CATA 0.2 CT21/00124C 01 C0DICU, 140.0CD		12.192 V 5.040 V

 When the Delete item is selected, press <Enter>, then select Yes to delete the RAID volume and return to the Intel[®] Rapid Storage Technology menu, or select No to cancel.



1.1.4 Intel[®] Virtual Raid on CPU in UEFI BIOS

Some motherboards support Intel[®] Virtual Raid on CPU with RAID 0, RAID 1, RAID 5, and RAID 10 solution. RAID 0 can be created without a KEY module, while RAID 1, RAID 5, and RAID 10 requires a KEY module.



- The KEY module is purchased separately.
- The Hyper M.2 x16 card is purchased separately.
- Due to CPU behavior, CPU RAID functions with Intel[®] CPU RSTe only supports Intel[®] Core[™] X-series Processors (6-core or above) and Intel[®] SSD modules.
- Refer to section Motherboard layout in your motherboard's user manual for the location of the VROC_HW_KEY connector.



If you plan on using the CPU RAID configuration spanned across different PCIE slots as OS drives, please install the Hyper M.2 x16 cards into supported PCIE slots. Refer to section **Expansion slots** in your motherboard's user manual for more information on the PCIE slots.

To enter the Intel® Virtual Raid on CPU in UEFI BIOS:

1. Enter the BIOS Setup during POST.



Refer to Chapter 3 in your motherboard's user manual for details on entering and navigating through the BIOS Setup.

- Go to Boot > CSM (Compatibility Support Module), then set Launch CSM to [Disabled].
- Go to the Advanced > CPU Storage Configuration, then set the PCIE slot(s) that you have installed the Hyper M.2 x16 card(s) or PCIE X4 SSD card(s) to [Hyper M.2 X16] or [PCIE X4 SSD Card] accordingly.
- 4. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.
- Go to the Advanced > Intel(R) Virtual Raid on CPU to display the Intel[®] Virtual Raid on CPU menu.

UEFI BIOS Utility - Advanced Made 6F6F67017 13:03 [✿] ⊕ English		/ /
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	G Hardw	are Monitor
Advanced/Intel(R) Virtual RAID on CPU/RAID VOLUME INFO/PHYSICAL DISK INFO/Reset to non-RAID/Intel VROC Managed VMD All Intel VMD Controllers	CPU Frequency 2800 MHz BCLK	Temperature 50°C Core Voltage
≻ Create RAID Volume	100.0 MHz	0.905 V
	Ratio 28x	
Non-RAID Physical Disks:	Memory	
Port 0, VMD0, INTEL SSDPEDMW012T4 SN:CVCQ5162003M1P2BGN, 1.09TB	Frequency	Vol CHAB
Port 1, VMD0, INTEL SSDPEDMW400G4 SN:CVCQ4393009B400AGN, 372.6GB	2133 MHz	1.200 V
	Capacity 8192 MB	Vol_CHCD 1.200 V

Creating a RAID set

To create a RAID set:

1. From the Intel[®] Virtual Raid on CPU menu, select **Create RAID Volume** and press <Enter>. The following screen appears:

UEFI BIOS Utility - Advanced Mode					/
06/16/2017 13:03 English MyFavorite(F3)	© Qfan Control(F6) ♀ EZ Tu	ning Wizard(F11)	Hot Keys		
My Favorites Main Extreme Tweaker 🗛	dvanced Monitor	Boot Tool	Exit	🔄 Hardwa	are Monitor
 Advanced\Intel(R) Virtual RAID on CPU\RAID VOLUME INFO\I Managed VMD\Create RAID Volume 	PHYSICAL DISK INFO\Reset to	o non-RAID\Intel VRC			
				2800 MHz	50°C
Name:	Volume			100.0 MHz	0.904 V
RAID Level:	RAIDO(St	ripe)	~	Ratio 28x	
Enable RAID spanned over VMD Controllers:			-		
				Memory	
				Frequency 2133 MHz	Vol_CHAB 1.200 V
Port 0, VMD0, INTEL SSDPEDMW012T4 SN:CVCQ5162003M11	P2BGN, 1.09TB		•		
Port 1, VMD0, INTEL SSDPEDMW400G4 SN:CVCQ4393009B4	00AGN, 372.6GB		•	Capacity 8192 MB	Vol_CHCD 1.200 V
				Voltage	
Strip Size:	128KB		•		

- 2. When the Name item is selected, enter a name for the RAID set and press <Enter>.
- 3. When the **RAID Level** item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.
- 4. When the Enable RAID spanned over VMD Controllers item is selected, press <Enter> and select X to enable this function.
- Under Select Disks, press <Enter> and select X for the disks you want to include in the RAID set.

UEFI BIOS Utility – Advanced Mode	EZ Tuning Wizard(F11) Itot Keys		
My Favorites Main Extreme Tweaker Advanced Mor	nitor Boot Tool Exit	🛱 Hardwa	re Monitor
← AdvancedUntel(R) Virtual RAID on CPURAID VOLUME INFO\PHYSICAL DISK INFO Managed VMD/Create RAID Volume Create RAID Volume	NReset to non-RAID\Intel VROC	CPU Frequency 2800 MHz BCLK	Temperature 50°C Core Voltage
Name:	Volume0	100.0 MHz	0.904 V
RAID Level:	RAID0(Stripe) -	Ratio 28x	
Enable RAID spanned over VMD Controllers:	x •	Memory	
		Frequency	Vol_CHAB
Port 0, VMD0, INTEL SSDPEDMW012T4 SN:CVCQ5162003M1P2BGN, 1.09TB)	x -	2133 MHz	1.200 V
Port 1, VMD0, INTEL SSDPEDMW400G4 SN:CVCQ4393009B400AGN, 372.6GB	x	Capacity 8192 MB	Vol_CHCD 1.200 V
Strip Size:	128KB -	Voltage	+5V

- 6. When the **Strip Size** item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:
 - RAID 0: 128 KB
 - RAID 10: 64 KB
 - RAID 5: 64 KB

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We recommend a lower strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.

UEFI BIOS Utility - Advanced Mode		
06/16/2017 13:04 🗢 English 🗐 MyFavorite(F3) 🗞 Qfan Control(F6) Friday	EZ Tuning Wizard(F11) I Hot Keys	
My Favorites Main Extreme Tweaker <u>Advanced</u> M	lonitor Boot Tool Exit	Hardware Monitor
Name:	Volume0	
RAID Level:	RAID0(Stripe) -	Frequency Temperature 2800 MHz 50°C
Enable RAID spanned over VMD Controllers:	× •	BCLK Core Voltage 100.0 MHz 0.905 V
	4KB	Ratio 28x
Port 0, VMD0, INTEL SSDPEDMW012T4 SN:CVCQ5162003M1P2BGN, 1.09TB	8KB 16KB	
Port 1, VMD0, INTEL SSDPEDMW400G4 SN:CVCQ4393009B400AGN, 372.6GB	32KB 64KB	Memory
	128KB	Frequency Vol_CHAB 2133 MHz 1.200 V
Strip Size:	128KB -	Capacity Vol CHCD
Capacity (MB):	724944	8192 MB 1.200 V
		Voltage
 Create Volume 		

- When the Capacity (MB) item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
- When the Create Volume item is selected, press <Enter> to create the RAID volume and return to the Intel[®] Rapid Storage Technology menu.

VEFI BIOS Utility - Advanced Mode 66/16/2017 13:04 [¢] ⊕ English ⊡ My6ivorite(F3) & Qan Control(F6) Q E7 Tuning Wizard(F11) [2]	? Hot Keys
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool	Exit 🔄 Hardware Monito
Name: Volume0	
RAID Level: RAID0(Stripe)	Frequency Temperatu 2800 MHz 50°C
Enable RAID spanned over VMD Controllers:	BCLK Core Volta 100.0 MHz 0.905 V
	Ratio 28x
Port 0, VMD0, INTEL SSDPEDMW012T4 SN:CVCQ5162003M1P2BGN, 1.09TB	·
Port 1, VMD0, INTEL SSDPEDMW400G4 SN:CVCQ4393009B400AGN, 372.6GB X	- Memory
	Frequency Vol_CHAB 2133 MHz 1.200 V
Strip Size: 128KB	Capacity Vol_CHCD
Capacity (MB): 724944	8192 MB 1.200 V
	Voltage
Create Volume	+12V +5V
	11.904 V 5.000 V

Deleting a RAID set



Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the Intel[®] Virtual Raid on CPU menu, select the RAID volume you want to delete and press <Enter>. The following screen appears:

UEFI BIOS Utility - Advanced Mode		
06/16/2017 13:05 English MyFavorite(F3)	& Qfan Control(F6)	
My Favorites Main Extreme Tweaker	Advanced Monitor Boot Tool Exit	Hardware Monitor
← Advanced\Intel(R) Virtual RAID on CPU\RAID VOLUME IN Managed VMD\RAID VOLUME INFO	IFO\PHYSICAL DISK INFO\Reset to non-RAID\Intel VROC	CPU
		Frequency Temperature 2800 MHz 50°C
		BCLK Core Voltage 100.0 MHz 0.905 V
≻ Delete		Ratio 28x
		Memory
		Frequency Vol_CHAB
		2133 MHz 1.200 V
		Capacity Vol_CHCD
		8192 MB 1.200 V
		Voltage
Port 0, VMD0, INTEL SSDPEDMW012T4 SN:CVCQ5162003	3M1P2BGN, 1.09TB	+12V +5V

2. When the **Delete** item is selected, press <Enter>, then select **Yes** to delete the RAID volume and return to the Intel[®] Virtual Raid on CPU menu, or select **No** to cancel.

UEFI BIOS Utility - Advanced Mode 66666001 13:05 [©] ⊕ English	
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Pardware Monitor
Advanced/untel(R) Virtual RAID on CPU/RAID VOLUME INFO/PHYSICAL DISK INFO/Delete/Intel VROC Managed VMD/RAID VOLUME INFO/Delete Delete Delete the RAID volume? ALL DATA ON VOLUME WILL BE LOST!	CPU Frequency Temperature 2800 MHz 50°C BCLK Core Voltage 100.0 MHz 0.905 V Ratio 28x
> Yes	·
≻ No	Verture Vol_CHAB 2133 MHz 1.200 V Capacity Vol_CHCD 8192 MB 1.200 V Voltage

1.1.5 Intel[®] Rapid Storage Technology Option ROM utility

To enter the Intel® Rapid Storage Technology Option ROM utility:

- 1. Turn on the system.
- 2. During POST, press <Ctrl> + <I> to display the utility main menu.

			n - v10.5.1.1070 1 Rights Reserved.
	-	5. Acceler	ry Volume Options ration Options
RAID Volumes: None defined. Physical Devices:	9LSOF4HL	Size 149.0GB 149.0GB	Type/Status(Vol ID) Non-RAID Disk Non-RAID Disk
[↑↓]-Select	[ESC]-E:	xit	[ENTER]-Select Menu

The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.



The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

Creating a RAID set

To create a RAID set:

1. From the utility main menu, select **1. Create RAID Volume** and press <Enter>. The following screen appears:

	orage Technology - Op 4 Intel Corporation.	
RAII Stri	CREATE VOLUME MEI Name: Volume 0) Level: Disks: .p Size: .pacity: Sync: Create volume	10]
Enter a unique volume and is 16 characters		special characters
[↑↓]-Select	[ESC]-Exit	[ENTER]-Select Menu

- 2. Enter a name for the RAID set and press <Enter>.
- 3. When the RAID Level item is selected, press the up/down arrow key to select a RAID level to create, and then press <Enter>.
- 4. When the Disks item is selected, press <Enter> to select the hard disk drives you want to include in the RAID set. The SELECT DISKS screen appears:

Port	Device Model	Serial #	Size	Status
)	ST3160812AS	9LSOHJA4	149.0GB	Non-RAID Disk
1	ST3160812AS	9LSOF4HL	149.0GB	Non-RAID Disk
	ST3160812AS	3LS0JYL8	149.0GB	Non-RAID Disk
	ST3160812AS	9LSOBJ5H	149.0GB	Non-RAID Disk
	Select 2 to			

- Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.
- Use the up/down arrow key to select the strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:
 - RAID 0: 128 KB
 - RAID 10: 64 KB
 - RAID 5: 64 KB



We recommend a lower strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.

- 7. When the **Capacity** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
- 8. When the **Create Volume** item is selected, press <Enter>. The following warning message appears:



 Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the CREATE VOLUME menu.

Deleting a RAID set



Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the utility main menu, select **2. Delete RAID Volume** and press <Enter>. The following screen appears:

Name Level Drives Capacity Status Bootable Volume0 RAID0 (Stripe) 2 298.0GB Normal Yes [HELP]			OLUME MENU]		
Deleting a volume will reset the disks to non-RAID. WARNING: ALL DISK DATA WILL BE DELETED.		Drives	Capacity	Status	
		volume will re NG: ALL DISK	eset the disk DATA WILL BE	DELETED.	AID.

2. Use the up/down arrow key to select the RAID set you want to delete, and then press <Delete>. The following warning message appears:



 Press <Y> to delete the RAID set and return to the utility main menu, or press <N> to return to the DELETE VOLUME menu.

Exiting the Intel® Rapid Storage Technology Option ROM utility

To exit the utility:

1. From the utility main menu, select **6. Exit**, then press <Enter>. The following warning message appears:



2. Press <Y> to exit or press <N> to return to the utility main menu.

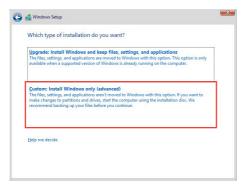
1.2 Installing the RAID controller driver during Windows[®] 10 OS installation

After creating the RAID sets, you are now ready to install an operating system to the independent drives or bootable array. This part provides the instructions on how to install the RAID controller drivers during OS installation.

If you plan on using the CPU RAID configuration spanned across different PCIE slots as OS drives, please install the Hyper M.2 x16 cards to the supported PCIE slots. Refer to section **Motherboard layout** in your motherboard's user manual for more information on the PCIE slots.

To install the RAID controller driver when installing Windows® 10 OS:

- Boot the computer using the Windows[®] 10 OS installation disc. Follow the screen instructions to start installing Windows[®] 10.
- 2. When prompted to choose a type of installation, click **Custom: Install Windows only** (advanced).



3. Click Load Driver.

5

Drive 0 Partition 1: System Reserved	350.0 MB		
	330.0 IVIB	88.0 MB	System
Drive 0 Partition 2	148.7 GB	139.6 GB	Primary
h X Delete	Eormat	-ij€ N <u>e</u> w	
		n X Detete 🖉 Eormat	X []edets

4. A message appears, reminding you to insert the installation media containing the driver of the RAID controller driver. Click **Browse** to continue.



- If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace it with the motherboard Support DVD.
- If you do not have an optical drive, you can use another computer with an optical drive to copy the RAID driver from the support DVD to a USB flash drive.



- 5. Locate the driver in the corresponding folder of the Support DVD or the USB flash drive with RAID driver, then click **OK** to continue.
- 6. Select the RAID controller driver you need from the list and click Next.
- 7. When the system finishes loading the RAID driver, select the drive to install Windows and click **Next**.



If you have ejected the Windows OS installation disc in a previous step, ensure to replace the motherboard Support DVD with the Windows OS installation disc.

	Name	Total size	Free space	Туре
P	Drive 0 Partition 1: System Reserved	350.0 MB	88.0 MB	System
-	Drive 0 Partition 2	148.7 GB	139.6 GB	Primary
* Refr	esh 🗙 Delete	Format	* New	

8. Setup then proceeds with the OS installation. Follow screen instructions to complete.

AMD RAID Configuration



2.1 RAID configurations

If your motherboard supports RaidXpert2 Configuration Utility, you can create Volume, RAIDABLE, RAID 0, RAID 1, or RAID 10 (depends on system licensing) configurations.

If you want to install a Windows[®] operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **2.2 Installing the RAID controller driver during Windows[®] 10 OS installation** for details.

2.1.1 RAID definitions

Volume provides the ability to link-together storage from one or several disks, regardless of the size of the space on those disks. This configuration is useful in scavenging space on disks unused by other disks in the array. This configuration does not provide performance benefits or data redundancy, disk failure will result in data loss.

RAIDABLE arrays (also known as RAID Ready) are a special type of Volume (JBOD) that allows the user to add more storage space or create a redundant array after a system is installed. RAIDABLE arrays are created using Option ROM, UEFI, or rcadm.



The ability to create RAIDABLE arrays may vary per system.

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

2.1.2 Installing storage devices

The motherboard supports SATA hard disk drives and PCIE SSD storage devices. For optimal performance, install identical drives of the same model and capacity when creating a disk array.



Refer to Chapter 2 in your motherboard's user manual for details on installing storage devices to your motherboard.

2.1.3 RaidXpert2 Configuration Utility in UEFI BIOS

To enter the RaidXpert2 Configuration Utility in UEFI BIOS:

1. Enter the BIOS Setup during POST.



Refer to Chapter 3 in your motherboard's user manual for details on entering and navigating through the BIOS Setup.

2. Go to Advanced > SATA Configuration, then set SATA Mode to [RAID].



Due to chipset limitation, when SATA ports are set to RAID mode, all SATA ports run at RAID mode together.

- 3. Configure additional settings for your storage device and RAID configuration:
 - If you are using SATA storage devices, no additional settings are required. Please proceed to next step.
 - If you are setting up an NVMe RAID set, go to Advanced > SATA Configuration (or Advanced > AMD PBS), then set NVMe RAID mode to [Enabled].
 - If you are using Hyper M.2 x16 card(s), go to Advanced > Onboard Devices Configuration, then set the corresponding PCIE slot(s) to [PCIe RAID Mode].



The Hyper M.2 x16 card is purchased separately.

- Go to Boot > CSM (Compatibility Support Module), then set Launch CSM to [Disabled].
- 5. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.
- 6. Go to Advanced > RaidXpert2 Configuration Utility to display the RaidXpert2 Configuration Utility menu.

UEFI BIOS Utility - Advanced Mode	
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Hardware Monitor
← Advanced\RAIDXpert2 Configuration Utility	CPU
➤ Controller Management	Frequency Temperature 3475 MHz 50°C
► Array Management	BCLK Core Voltage
➤ Physical Disk Management	100.0 MHz 1.417 V
	Ratio 34.75 x

Creating a RAID set

To create a RAID set:

1. From the RaidXpert2 Configuration Utility menu, go to **Array Management** > **Create Array** to enter the Create Array menu. The following screen appears:

UEFI BIOS Utility - Advanced Mode 12222071 14:16 [©] = English I MyRward(F1) 2/401Keys	
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Hardware Monitor
← Advanced\RAIDXpert2 Configuration Utility\Create Array	
Select RAID Level: Volume -	Frequency Temperature 3500 MHz 44°C
Select Physical Disks	
Configure Array Parameters:	100.0 MHz 1.417 V
	Ratio 35.0 x
	Memory
Read Cache Policy:	
Write Cache Policy: Write Back Cache 👻	2133 MHz 1.220 V
► Create Array	Capacity Vol_CHCD 4096 MB 1.220 V

- When the Select RAID Level item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.
- 3. When the **Select Physical Disks** item is selected, press <Enter> to enter the Select Physical Disks menu. The following screen appears:

UEFI BIOS Utility - Advanced Mode	
12/22/2017 14:17 C English MyFavorite(F3) & Qfan Control(F6) Ez Tuning Wizard(F11) Phot Keys	
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Hardware Monitor
← Advanced\RAIDXpert2 Configuration Utility\Select Physical Disks\Select Physical Disks	
Select Media Type:	Frequency Temperature 3400 MHz 44°C
Physical Disk 1:1:0, NVMe, 255.9 GB, Ready On Off	
Physical Disk 2:1:0, NVMe, 255.9 GB, Ready On Off	100.0 MHz 1.417 V
Check All	Ratio 34.0 x
Uncheck All	Memory Frequency Vol_CHAB
	2133 MHz 1.220 V
➤ Apply Changes	Capacity Vol_CHCD 4096 MB 1.220 V
	1.220 V

4. Toggle the physical disks that you want to include in the RAID set to **On**, then select **Apply Changes** and press <Enter> to complete selection.

- 5. When the **Array Size:** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
- 6. When the **Array Size Unit:** item is selected, press <Enter> to select the size unit for the RAID array, and then press <Enter>.
- 7. When the **Read Cache Policy:** item is selected, press <Enter> to select the read policy for the RAID array, and then press <Enter>.
- 8. When the **Write Cache Policy:** item is selected, press <Enter> to select the write policy for the RAID array, and then press <Enter>.
- 9. When the **Create Array** item is selected, press <Enter> to create the RAID volume and return to the Array Management menu.

UEFI BIOS Utility - Advanced Mode	D Qfan Control(F6)	⊖ EZ Tuning Wizard(F	11) ? Hot Keys		//
Friday 14.17					
My Favorites Main Extreme Tweaker	Advanced Mc	onitor Boot	Tool Exit	🔄 Hardwa	are Monitor
← Advanced\RAIDXpert2 Configuration Utility\Create Array					
				Frequency 3400 MHz	Temperature 46°C
 Select Physical Disks 				BCLK 100.0 MHz	Core Voltage
Configure Array Parameters:				100.0 11112	
Array Size:		510812		Ratio 34.0 x	
Array Size Unit:		MB (MegaBytes)	•		
				Memory	
Read Cache Policy:		Read Cache	-		Vol CHAB
Write Cache Policy:		Write Back Cache	-	2133 MHz	1.220 V
➤ Create Array				Capacity	Vol_CHCD
				4096 MB	1.220 V

Deleting a RAID set



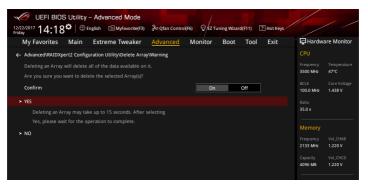
Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the RaidXpert2 Configuration Utility menu, go to **Array Management** > **Delete Array** to enter the Delete Array menu. The following screen appears:

UEFI BIOS Utility - Advanced Mode exclosed by the second	
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Hardware Monitor
← Advanced\RAIDXpert2 Configuration Utility\Delete Array	
Array 1, Volume, 318.8 GB, Normal On Off	Frequency Temperature 3400 MHz 51°C
Check All	BCLK Core Voltage 100.0 MHz 1.427 V
Uncheck All	Ratio 34.0 x
≻ Delete Array(s)	Memory Frequency Voltage
	2133 MHz 1.200 V
	Capacity 4096 MB

- 2. Toggle the array(s) that you want to delete to **On**.
- 3. When the **Delete Array(s)** item is selected, press <Enter>, toggle the **Confirm** item to **On**, then select **YES** to delete the RAID volume, or select **NO** to cancel.



2.2 Installing the RAID controller driver during Windows[®] 10 OS installation

After creating the RAID sets, you are now ready to install an operating system to the independent drives or bootable array. This part provides the instructions on how to install the RAID controller drivers during OS installation.

To install the RAID controller driver when installing Windows® 10 OS:

- Boot the computer using the Windows[®] 10 OS installation disc. Follow the screen instructions to start installing Windows[®] 10.
- 2. When prompted to choose a type of installation, click **Custom: Install Windows only** (advanced).

3. Click Load Driver.

	Name	Total size	Free space	Туре
I.	Drive 0 Partition 1: System Reserved	350.0 MB	88.0 MB	System
3	Drive 0 Partition 2	148.7 GB	139.6 GB	Primary
to Ref	resh X Delete	✓ Format	₩ N <u>e</u> w	



DO NOT delete any of the partitions or format the NVMe devices. Doing so will delete the AMD-RAID metadata and the desired RAID level will be deleted.

4. A message appears, reminding you to insert the installation media containing the driver of the RAID controller driver. Click **Browse** to continue.



- If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace it with the motherboard Support DVD.
- If you do not have an optical drive, you can use another computer with an optical drive to copy the RAID driver from the support DVD to a USB flash drive.



- 5. Locate the driver in the corresponding folder of the Support DVD or the USB flash drive with RAID driver, then click **OK** to continue.
- 6. Select the RAID controller driver (rcbottom.inf) from the list and click **Next**. The available drives will temporary disappear.
- 7. Repeat steps 3 to 5 and select the RAID controller driver (rcraid.inf) from the list and click **Next**. The available drives will reappear.
- 8. Repeat steps 3 to 5 and select the RAID controller driver (rccfg.inf) from the list and click **Next**. The AMD-RAID Virtual Disk will appear.
- 9. Select the drive to install Windows and click Next.



If you have ejected the Windows OS installation disc in a previous step, ensure to replace the motherboard Support DVD with the Windows OS installation disc.

	Name	Total size	Free space	Туре
P	Drive 0 Partition 1: System Reserve	d 350.0 MB	88.0 MB	System
a)	Drive 0 Partition 2	148.7 GB	139.6 GB	Primary
Refr	resh X Delete	Format		

10. Setup then proceeds with the OS installation. Follow screen instructions to complete.

