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 $^{\otimes}$ RAID configurations and lists the setup procedures to create Intel $^{\otimes}$ 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.



Please refer to your motherboard's user manual for details on the actual supported RAID 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 Creating a RAID driver disk** for details.

1.1.1 RAID 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.

1.1.2 Installing storage devices

The motherboard supports Serial ATA 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	ک Qfan Control(F6)	EZ Tuning Wizard(F11) ? Hot Keys		//
My Favorites Main Extreme Tweaker	Advanced Mo	nitor Boot	Tool Exit	Hardwa	are Monitor
← Advanced\Intel(R) Rapid Storage Technology\Create RAID	Volume			СРО	
				Frequency 3700 MHz	Temperature 33°C
Name:		Volume1		BCLK 100.0 MHz	Core Voltage 1.040 V
RAID Level:		RAID0(Stripe)	-	Ratio 37x	
				Memory	
SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB			-	Frequency	Voltage
SATA 0.2, ST3160812AS 9LS0BJ5H, 149.0GB			-	2133 MHz	1.200 V
				Capacity 8192 MB	
Strip Size:		16KB	-	0192 MD	
Capacity (MB):		0		Voltage	
				+12V	

- 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	(F6) Q EZ Tuning Wizard(F11) I 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 Create RAID Volume		CPU Frequency Temperature 3700 MHz 32*C
Name: RAID Level:	Volume1 RAID0(Stripe)	BCLK Core Voltage 100.0 MHz 1.040 V Ratio 37x
SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB	-	Memory
SATA 0.2, ST3160812AS 9LS0BJ5H, 149.0GB	x	Frequency Voltage 2133 MHz 1.200 V Capacity
Strip Size:	16KB 🗸	8192 MB
Capacity (MB):	0	Voltage
		+12V +5V

- 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	ntrol(F6) 🔤 EZ Tuning Wizard(F11) 🕐 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 Create RAID Volume		CPU Frequency Temperature 3700 MHz 33*C
Name:	Volume1	BCLK Core Voltage 100.0 MHz 1.040 V
RAID Level:	RAID0(Stripe) -	Ratio 37x
Select Disks:	4KB	
SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB	8KB 16KB	Memory Frequency Voltage
SATA 0.2, ST3160812AS 9LS0BJ5H, 149.0GB	32KB 64KB	2133 MHz 1.200 V
	128KB	Capacity 8192 MB
Strip Size:	16КВ 👻	0192 110
Capacity (MB):	0	Voltage
		+12V +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	fan Control(F6) 🛛 EZ Tuning Wizard(F11) 🕜 Hot Keys	
My Favorites Main Extreme Tweaker Adva	anced Monitor Boot Tool Exit	Hardware Monitor
Name: RAID Level:	Volume1 RAID0(Stripe) -	CPU Temperature 3700 MHz 33°C BCLK Core Voltage 100.0 MHz 1.040 V
Select Disks: SATA 0.0, ST3160812AS 3LS0JYL8, 149.0GB	X •	Ratio 37x
SATA 0.2, ST3160812AS 9L50BJ5H, 149.0GB Strip Size:		Memory Frequency Voltage 2133 MHz 1.200 V
Capacity (MB):	305251	Capacity B192 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:



 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 Internal connectors 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.



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 conzol1 13:03 [®] ⊕ English ⊞ Myfsvortie(F3) ∂o Qtan Control(F6) ⊙(zZ Tuning Wizard(F1)) ☑ Hot Keys-	
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Hardware Monitor
← Advanced\u00e4Intel(R) Virtual RAID on CPU\RAID VOLUME INFO\PHYSICAL DISK INFO\Reset to non-RAID\Untel VROC Managed VMD\Create RAID Volume	CPU Frequency Temperature
Create RAID Volume	2800 MHz 50°C
	BCLK Core Voltage
Name: Volume0	100.0 MHz 0.904 V
volumeo	Ratio
RAID Level: RAID0(Stripe)	28x
Enable RAID spanned over VMD Controllers:	·
	Memory
	Frequency Vol CHAB
Select Disks:	2133 MHz 1.200 V
Port 0, VMD0, INTEL SSDPEDMW012T4 SN:CVCQ5162003M1P2BGN, 1.09TB	
	Capacity Vol_CHCD 8192 MB 1.200 V
Port 1, VMD0, INTEL SSDPEDMW400G4 SN:CVCQ4393009B400AGN, 372.6GB	0152 110 11200 1
	Voltage
Strip Size:	voltage
	+12V +5V

- 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.

06/16/2017 13		- Advanced Mode English I MyFavorite(F3)	Po Qfan Contro	(F6) 🛛 EZ TU	uning Wizard	i(F11)	Hot Keys		
My Favori	es Main	Extreme Tweaker	<u>Advanced</u>	Monitor	Boot	Tool	Exit	🔄 Hardwa	are Monitor
	D\Create RAID \	ID on CPU\RAID VOLUME I /olume	NFO\PHYSICAL DIS	K INFO\Reset t	o non-RAID	VIntel VRC	ю	CPU Frequency 2800 MHz	Temperature 50℃
Name:				Volume	0			BCLK 100.0 MHz	Core Voltage 0.904 V
RAID Level:				RAID0(S	tripe)		-	Ratio 28x	
Enable RAID	spanned over V	MD Controllers:		x			•	Memory	
								Frequency 2133 MHz	Vol_CHAB 1.200 V
Port 0, VMD	, INTEL SSDPED	MW012T4 SN:CVCQ516200	I3M1P2BGN, 1.091	в х			-		
Port 1, VMD	, INTEL SSDPED	MW400G4 5N:CVCQ43930	09B400AGN, 372.6	GB X				Capacity 8192 MB	Vol_CHCD 1.200 V
Strip Size:				128KB			-	Voltage +12V	

- 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 Control(F6)	EZ Tuning Wizard(F11) THot Keys	
My Favorites Main Extreme Tweaker <u>Advanced</u> M	onitor Boot Tool Exit	Hardware Monitor
Name:	Volume0	
RAID Level:	RAID0(Stripe) -	Frequency Temperature 2800 MHz 50°C
Enable RAID spanned over VMD Controllers:	x	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.

My Favorites	Main	Extreme Tweaker	Advanced	Monitor	Boot	Tool	Exit	🔄 Hardwa	are Monitor
Name:				Volume	0				
RAID Level:				RAID0(S	itripe)		•	Frequency 2800 MHz	Temperature 50°C
Enable RAID spanr	ned over VMD	Controllers:		x			-	BCLK 100.0 MHz	Core Voltage 0.905 V
								Ratio 28x	
Port 0, VMD0, INT	EL SSDPEDMV	V012T4 SN:CVCQ516200	3M1P2BGN, 1.09T	в Х			-		
Port 1, VMD0, INT	EL SSDPEDMV	V400G4 SN:CVCQ439300	19B400AGN, 372.6	GB X			- T	Memory	
								Frequency 2133 MHz	Vol_CHAB 1.200 V
Strip Size:				128KB			•	Capacity	Vol CHCD
Capacity (MB):				724944				8192 MB	1.200 V
								Voltage	
 Create Volume 								+12V	
								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:



 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	///
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	Hardware Monitor
Advanced\Intel(R) Virtual RAID on CPUTRAID VOLUME INFO\PHYSICAL DISK INFO\Delete\Intel VROC Managed VMD\RAID VOLUME INFO\Delete Delete Delete Delete the RAID volume?	CPU Frequency Temperature 2800 MHz 50°C BCLK Core Voltage 100.0 MHz 9.95 V
ALL DATA ON VOLUME WILL BE LOST!	Ratio 28x
≻ Yes	Memory
► No	Frequency Vol_CHAB 2133 MHz 1.200 V Capacity Vol_CHCD 8192 MB 1.200 V
	Voltage +12V +5V

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> + <l> to display the utility main menu.

Intel(R) Rapid Storage Technology - Option - v10.5.1.1070 Copyright(C) 2003-14 Intel Corporation. All Rights Reserved.						
[MAIN MENU] 1. Create RAID Volume 4. Recovery Volume Options 2. Delete RAID Volume 5. Acceleration Options 3. Reset Disks to Non-RAID 6. Exit						
	DISK/VOLUME		[ис			
Physical Devices:	9LSOF4HL 3LSOJYL8	Size 149.0GB 149.0GB 149.0GB 149.0GB				
[1]-Select	[ESC]-Ex:		[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:

	Storage Technology - Opt -14 Intel Corporation.	
RA St.	[CREATE VOLUME MEN Name: Volume 0 ID Level: Disks: rip Size: Capacity: Sync: Create volume	U]
Enter a unique volum and is 16 character	[HELP]	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:

		[SELECT	DISKS1		
Port	Device Model	Serial #	Size	Status	
0	ST3160812AS	9LSOHJA4	149.0GB	Non-RAID Disk	
1	ST3160812AS	9LSOF4HL	149.0GB	Non-RAID Disk	
2	ST3160812AS	3LS0JYL8	149.0GB	Non-RAID Disk	
3	ST3160812AS	9LSOBJ5H	149.0GB	Non-RAID Disk	
	Select 2 to	6 to use in	creating th	ne volume.	
L [†↓]-	Prev/Next [SP	ACE]-Select	Disk [ENT	'ER]-Done 💳	

- 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:

		[DE	lete vo	LUME MEN	U]	
Name	Level		Drives	Capacity	y Status	
Volume0	RAIDO	(Stripe)	2	298.0GB	Normal	Yes
			[#E	LP]		
D	eleting	a volume	will res	et the di	sks to non-R	ATD.
					BE DELETED. ry volumes)	
			<u> </u>			
	Select	[ESC]-I	Previous	Menu [I	EL]-Delete	Volume

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 **Expansion slots** in your motherboard's user manual for more information on the PCIE slots.

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

- 1. 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).

ustom: Install Windows only (advanced) he files, settings, and applications aren't moved to Windows with this option. If you want to make changes to partitions and drives, start the computer using the installation disc. We commend backing use your files before you continue.
commend backing up your mes before you continue.

3. Click Load Driver.

Jai

	Name	Total size	Free space	
S.	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
	resh X Delete	Eormat	-∦∈ N <u>e</u> w	
	resh X Delete	Eormat	-)⊱ N <u>e</u> w	

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
ø,	Drive 0 Partition 1: System Reserved	350.0 MB	88.0 MB	System
-	Drive 0 Partition 2	148.7 GB	139.6 GB	Primary
Refi	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.



Please refer to your motherboard's user manual for details on the actual supported RAID 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 Creating a RAID driver disk** 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 Serial ATA 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				/
12/22/2017 14:16 English MyFavorite(F3)	Qfan Control(F6) QEZ Tuning Wizard(F11)) ? Hot Keys		
My Favorites Main Extreme Tweaker 🧕	dvanced Monitor Boot To	ool Exit I	중 Hardwa	re Monitor
← Advanced\RAIDXpert2 Configuration Utility\Create Array			CPU	
Select RAID Level:	Volume	- 1	requency 3500 MHz	Temperature 44°C
 Select Physical Disks 				
Configure Array Parameters:			100.0 MHz	1.417 V
			Ratio 85.0 x	
			Memory	
Read Cache Policy:	Read Cache	• ,		
Write Cache Policy:	Write Back Cache		2133 MHz	1.220 V
			4096 MB	1.220 V

- 2. 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	Qfan Control(F6) QEZ Tuning Wizard(F11) 🛛	Hot Keys
My Favorites Main Extreme Tweaker A		Exit P Hardware Monitor
Select Media Type:	вотн	Frequency Temperature 3400 MHz 44*C
Physical Disk 1:1:0, NVMe, 255.9 GB, Ready Physical Disk 2:1:0, NVMe, 255.9 GB, Ready	On Off On Off	BCLK Core Voltage 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

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.
- 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		
12/22/2017 14:17 English MyFavorite(F3)	Qfan Control(F6) QEZ Tuning Wizard(F11) PHot Key	rs /
My Favorites Main Extreme Tweaker Ad	lvanced Monitor Boot Tool Exit	Hardware Monitor
← Advanced\RAIDXpert2 Configuration Utility\Create Array		
		Frequency Temperature 3400 MHz 46°C
➤ Select Physical Disks		
Configure Array Parameters:		100.0 MHz 1.417 V
Array Size:	510812	Ratio 34.0 x
Array Size Unit:	MB (MegaBytes)	
Read Cache Policy:	Read Cache	Memory
		Frequency Vol_CHAB 2133 MHz 1.220 V
Write Cache Policy:	Write Back Cache 👻	
≻ 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:



- 2. Toggle the array(s) that you want to delete to **On**.
- 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:

- 1. 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
S	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
Ref	esh 🗙 Delete	Eormat	₩ 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.
- 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	¥
		tion 1: System Reserved	350.0 MB	88.0 MB	
	Drive 0 Parti	tion 2	148.7 GB	139.6 GB	Primary
€n Refi	esh	× Delete	Format		

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

