RAID Configuration Guide (AMD)

E20350 First Edition September 2022

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About this guide

This guide contains information that you need to create AMD 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.

Where to find more information

The ASUS website ($\underline{www.asus.com}$) provides updated information on ASUS hardware and software products.

AMD RAID Configuration

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 **6. Installing the RAID controller driver during Windows[®] 10 and Windows[®] 11 OS installation** for details.

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. 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 guide for details on installing storage devices to your motherboard.

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 guide 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	
> Controller Management	Frequency Temperature 3475 MHz 50°C
➤ Array Management	
➤ Physical Disk Management	100.0 MHz 1.417 V
	Ratio 34.75 x

3.1 Creating 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:

My Favorites Main Extreme Tweaker Advanced Monitor Boot Tool Exit Effective Hardware Monitor <	UEFI BIOS Utility - Advance 2/22/2017 14:16 [¢] ⊕ English (É	ed Mode MyFavorite(F3) & Qfan Control	(F6) Q EZ Tuning Wizard(F11)	P Hot Keys		/ /
 Advanced/RAIDXper2 Configuration Utility/Create Array Select RAID Level: Volume Select Physical Disks Configure Array Parameters: Array Size: O Array Size: O Array Size: Memory Read Cache Policy: Write Eack Cache Create Array Create Array Create Array 	My Favorites Main Extreme	e Tweaker <u>Advanced</u>	Monitor Boot Tool	Exit	🔄 Hardwa	are Monito
Select AND Level: Volume Temperature 3300 Miz Temperature 44°C > Select Physical Disks BCL BCL Core Volta Configure Array Parameters: BCL BCL BCL Array Size: 0 BSC BCL Array Size: 0 BSC BCL Read Cache Policy: Read Cache Progumery Vol.CHAB Vol.CHAB Write Eack Cache 2133 Miz 1220 V > Create Array Capacity Vol.CHAB	← Advanced\RAIDXpert2 Configuration Utili	ty\Create Array				
Select Physical Disks Configure Array Parameters: Array Size: Array Size: Read Cache Policy: Read Cache Policy: Consider Array Consider	Select RAID Level:		Volume	•	Frequency 3500 MHz	Temperature 44°C
Configure Array Parameters: 100.0 Mic 1417 V Array Size: 0 350 × Array Size: 0 350 × Array Size: 0 350 × Mice: Memory Memory Read Cache Policy: Read Cache 120 V Write: Eack Cache 120 V > Create Array Create Array Create Array	 Select Physical Disks 					
Array Size: 0 350 × Array Size Unit: 350 × Read Cache Policy: Read Cache Memory Write Cache Policy: Read Cache Frequency Vol.CHAB Write Cache Policy: Write Eack Cache 2133 Met 1230 V > Create Array Vol.CHAB 1220 V Vol.CHAB	Configure Array Parameters:				100.0 MHz	1.417 V
Array Size Unit:					Ratio	
Read Cache Policy: Read Cache Memory Write Cache Policy: Write Eack Cache 213 Met 1220 V > Create Array Vol C4U8 1220 V 040KB 1220 V					35.0 x	
Read Cache Policy: Read Cache Frequency Vol GMB Write Cache Policy: Write Back Cache 2133 MHz 1220 V > Create Array Create Array 406 MB 1220 V					Memory	
Write Cache Policy: Write Back Cache 2133 Wei 1226 V > Create Array Cipacity Vol.04CD Vol.04CD Vol.04CD	Read Cache Policy:		Read Cache	-		Vol CHAB
Create Array 4096 MB 1.220 ¥	Write Cache Policy:		Write Back Cache	-	2133 MHz	1.220 V
					Capacity 4096 MB	Vol_CHCD 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 1/22/2011 14:17 [©] ⊕ English ⊡Myfavorite(F3) 3v Qtan Control(F6) ⊙ Iz Turning Wazard(F11) ☑ Hot 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	BCLK Core Voltage
Physical Disk 2:1:0, NVMe, 255.9 GB, Ready On Off	Bull
Check All	34.0 x
Uncheck All	Memory Frequency Vol_CHAB
≻ Apply Changes	2133 MHz 1.220 V 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.
- 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.

My Favorites Main Extreme Tweaker Advanced Monitor Boot Tool Exit Plandware Monitor (UEFI BIOS Utility - Advanced Mode	∂ Qfan Controk(F6) ♀ EZ Tu	ining Wizard(F11)	Hot Keys	
 AdvancedRADDXpert2 Configuration Utility/Greate Array Select RADD Level: Volume Select RMD Level: Select RMD Level: Configure Array Parameters: Array Size: States Physical Disks Configure Array Parameters: Array Size: States Physical Disks MB (MegaBytes) Read Cache Policy: Write Back Cache Write Cache Policy: Vol.CrcAB 2130 Mile: 1220 V Select Array Select Array Select Array Select Array Size: Select Array Read Cache Policy: Vol.CrcAB 2130 Mile: 1220 V Select Array Select Array<th>My Favorites Main Extreme Tweaker</th><th>Advanced Monitor</th><th>Boot Tool</th><th>Exit 🔤</th><th>lardware Monitor</th>	My Favorites Main Extreme Tweaker	Advanced Monitor	Boot Tool	Exit 🔤	lardware Monitor
Select RAJD Level: Volume Frequency Temperature 3409 Mre 647C > Select Physical Disks 1000 Mre 1477 Configure Array Parameters: 1000 Mre 1477 Array Size 510812 1417 Array Size Unit: MB (MegaBytes) Memory Read Cache Policy: Read Cache Frequency Write Cache Policy: Write Back Cache 233 Mre > Create Array Vol (CH2B 2304 Vol (CH2D 3409 Mre 1220 V 3496 Mre	← Advanced\RAIDXpert2 Configuration Utility\Create Array				
> Select Physical Disks BCIK Core Voltage Configure Array Parameters: Array Size: 510812 Array Size: 510812 Bad Array Size: MB (MegaBytes) Bad Read Cache Policy: Read Cache 123 Miz Write Cache Policy: Write Back Cache 213 Miz > Create Array Bad 213 Miz				- Freq 3400	ency Temperature MHz 46°C
Configure Array Parameters: 100 b Me: 1417V Array Size: 510812 340 x Array Size: MB (MegaBytes) 340 x Read Cache Policy: Read Cache 100 b Me: Write Cache Policy: Write Back Cache 213 Me: > Create Array Copendity Copendity	➤ Select Physical Disks				
Array Size: 510812 Butto 340 x Array Size Unit: MB (MegaBytes) Memory Read Cache Policy: Read Cache Frequency Write Cache Policy: Write Back Cache 213 Bikr > Create Array Vol Create 4096 MB	Configure Array Parameters:			100.	0 MHz 1.417 V
Array Size Unit: MB (MegaBytes) • Read Cache Policy: Read Cache • Write Cache Policy: Write Back Cache • > Create Array Copies 1220 V	Array Size:	510812		Ratio 34.0	x
Read Cache Policy: Read Cache Memory Write Cache Policy: Write Back Cache Frequency Vol CHAB Virite Cache Policy: Write Back Cache Capachy Vol CHAB > Create Array 4996 MB 1.220 V	Array Size Unit:	MB (Me	zaBytes)	• –	
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Write Cache Policy: Write Back Cache 2133 MHz 1.220 V > Create Array Crpacity Vol. CHCD 4096 M8 1.220 V	Read Cache Policy:	Read Ca	che	Freq	
> Create Array Capacity Vol.CHCD 4096 MB 1.220 V	Write Cache Policy:	Write B	ack Cache	- 2133	MHz 1.220 V
4096 MB 1.220 V	> Croate Array				
				4096	MB 1.220 V

3.2 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.

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**.
- 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.

UEFI BIOS Utility - Advanced Mode		
12/22/2017 14:18 🗢 English 🖆 Myfavorite(F3) 🖉 Qfan Control(F6) 🛛 EZ Tuning Wizard(F11) 🛽 Hot Keys		
My Favorites Main Extreme Tweaker <u>Advanced</u> Monitor Boot Tool Exit	🔄 Hardwa	are Monitor
← Advanced\RAIDXpert2 Configuration Utility\Delete Array\Warning		
Deleting an Array will delete all of the data available on it. Are you sure you want to delete the selected Array(s)? Confirm On Off	Frequency 3500 MHz BCLK 100.0 MHz	Temperature 47°C Core Voltage 1.438 V
► YES		
Deleting an Array may take up to 15 seconds. After selecting Yes, please wait for the operation to complete.	35.0 x Memory Frequency 2133 MHz Capacity 4096 MB	Vol_CHAB 1.220 V Vol_CHCD 1.220 V

4. Installing the RAID controller driver during Windows[®] 10 or Windows[®] 11 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.



The steps and screenshots are for reference only and may change with newer Windows updates.



Your motherboard package may include different installation median which contain the necessary drivers, however, we strongly recommend you download and use the latest drivers of your motherboard product from the ASUS support site.

To install the RAID controller driver when installing Windows® 10 or Windows® 11 OS:

- 1. Boot the computer using the Windows[®] 10 OS or Windows[®] 11 installation media. Follow the screen instructions to start installing Windows[®].
- 2. When prompted to choose a type of installation, click Custom: Install Windows only (advanced).

Custom: Install Windows only (advanced) The files, settings, and applications aren't moved to Windows with this option. If you want to make change to pathtions and drives, start the computer using the installation disc. We recommend backing up your files before you continue.

2. You will need to install two (2) drivers for both SATA and NVMe RAID. The two drivers need to be installed in the order shown below.

For SATA RAID:

A. Click Load Driver.

	Name	Total size	Free space	Туре
P	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

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

drive incert the installation media containing the
anve, insert the instantion mean containing the
e a CD, DVD, or USB flash drive.
Browse OK Cancel

- C. Locate the **Drivers** folder, then navigate to **RAID** > **RAID_driver** > **SATA_RAID** > **rcbottom**, and click **OK**.
- D. Click **Next** and wait for the AMD-RAID Bottom Device driver (rcbottom) to be installed
- E. Repeat steps A and B.
- F. Locate the **Drivers** folder, then navigate to **RAID** > **RAID_driver** > **SATA_RAID** > **rcraid**, and click **OK**.
- G. Click Next and wait for the AMD-RAID Controller [storport] (rcraid) to be installed



Ensure NVMe RAID mode is set to [Enabled] in the BIOS if you wish to install NVMe RAID drivers. For more information on the BIOS settings please refer to RaidXpert2 Configuration Utility in UEFI BIOS.

A. Click Load Driver.

			type
Drive 0 Partition 1: System Reserved	350.0 MB	88.0 MB	System
Drive 0 Partition 2	148.7 GB	139.6 GB	Primary
sh 🗙 Delete	Eormat	-₩ Ngw	
	the Celete	une Ur Antition II system Reserved 3000 Me Drive 0 Partition 2 148.7 GB	une Urantition i system kedeved sou Me eeu Me Drive 0 Partition 2 148.7 GB 139.6 GB

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



- C. Locate the **Drivers** folder, then navigate to **RAID** > **RAID_driver** > **NVME_DID** > **rcbottom**, and click **OK**.
- D. Click **Next** and wait for the AMD-RAID Bottom Device driver (rcbottom) to be installed
- E. Repeat steps A and B.
- F. Locate the **Drivers** folder, then navigate to **RAID** > **RAID_driver** > **NVME_DID** > **rcraid**, and click **OK**.
- G. Click Next and wait for the AMD-RAID Controller [storport] (rcraid) to be installed

3. Select the drive to install Windows and click Next.

	Name	Total size	Free space	Туре
	Drive 0 Partition 1: System Reserved	350.0 MB	88.0 MB	System
-	Drive 0 Partition 2	140.7.00	120.0.00	Deimann
~		148.7 08	139.0 GB	Filmary
* Befr	esh X Delete	€ Format	* Ngw	rimary

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

