Configuring a RAID Set

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RAID Levels

	RAID 0	RAID 1	RAID 5	RAID 10
Minimum Number of Hard Drives	≥2	2	≥3	4
Array Capacity	Number of hard drives * Size of the smallest drive	Size of the smallest drive	(Number of hard drives -1) * Size of the smallest drive	(Number of hard drives/2) * Size of the smallest drive
Fault Tolerance	No	Yes	Yes	Yes

To create a RAID set, follow the steps below:

- A. Install SATA hard drive(s) or SSDs in your computer.
- B. Configure the system BIOS.
- C. Create RAID configurations. (Note 1)
- D. Install the RAID driver and operating system.

Before you begin, please prepare the following items:

- At least two SATA hard drives or SSDs (Note 2) (to ensure optimal performance, it is recommended that you
 use two hard drives with identical model and capacity). (Note 3)
- A Windows setup disc.
- An Internet connected computer.
- A USB thumb drive.

Preparing the Hard Drives and BIOS Settings

A. Installing hard drives

Install the hard drives/SSDs in the Intel[®] Chipset controlled connectors on the motherboard. Then connect the power connectors from your power supply to the hard drives.

- (Note 1) Skip this step if you do not want to create RAID array on the SATA controller.
- (Note 2) An M.2 PCIe SSD cannot be used to set up a RAID set either with an M.2 SATA SSD or a SATA hard drive.
- (Note 3) Refer to the "Internal Connectors" section of the user's manuals for the installation notices for the M.2 and SATA connectors.

B. Configuring the BIOS settings

Step 1:

Turn on your computer and press <Delete> to enter BIOS Setup during the POST (Power-On Self-Test). Go to Settings\IO Ports\SATA Configuration, make sure SATA Controller(s) is enabled. To create RAID configurations, go to Settings\IO Ports\VMD setup menu, set Enable VMD controller to Enabled and set Enable VMD Global Mapping to Disabled. Then depending on the SATA/M.2 connector you use, set the corresponding Map this Root Port under VMD item to Enabled.

Enable VMD controller	Enabled	CPU Frequency	BOLK
Enable VMD Global Mapping	Disabled	5701.22MHz 4400 20	
Enable VMD Global Mapping Map this Root Port under VMD	Endied	Temperature	
Root Port BDF details	SATA Controller	49.0 °C	0.981 V
RAIDO	Enabled	Memory	
RAID1	Enabled		
RAID5	Enabled	4000.00MT/s	16384ME
RAID10	Enabled		
Intel Rapid Recovery Technology	Enabled	Module MFG ID GIGABYTE	DRAM MFG ID
RRT volumes can span internal and eSATA drives	Enabled	GIGABYTE	GIGABYTI
ZPODD	Disabled		
		A.I. Boost	
		93.860 CP	5813
		1.462 V	4454
		1.402 V	44.04
UnMap this Root Port to VMD			

Figure 1

C. Configuring a RAID Array

Step 1:

After the system reboot, enter BIOS Setup again. Then enter the Settings\IO Ports\Intel(R) Rapid Storage Technology sub-menu (Figure 2).

Appendix 3 Seguent A data Seguent Advances Advan	Favorites (F11) A Tweaker	(g) strongs	System Info.	() Boot	🕒 Save & Exit
Opdiesd Life Centrement Enabled Dealed Marrino Y Nove 44 Obtoding Dealed Nove 44 Obtoding Dealed Nove 44 Obtoding Dealed Option 44 Dealed Marrino Y Option 44 Dealed Marrino W	Internal Graphics SPD Write Disable DVMT Pre-Allocated Aperture Size	Enabled TRUE 60M 256MB		Frequency 5701.21MHz 440024 Temperature	100.00MH Voltage
Above 4G MMR0 BDS suggment Dasked Prostative Statis Above 4G MMR0 BDS suggment Dasked 4000 COVIT/s 15380 IOAD C + 19 forms Enabled 4000 COVIT/s 15380 IOAD C + 19 forms Enabled Maximum 2D Ministry 15380 IOAD C + 19 forms Enabled Maximum 2D Ministry 16380 IOAD C + 19 forms Enabled Maximum 2D Ministry GIGAB Indendent/IMI C (Infragramma GIGAB MINISTRY GIGAB MINISTRY GIGAB MINISTRY	OnBoard LAN Controller#2	Enabled			0.981 V
Gipityte Utilities Downloader Configuration GIGABYTE GIGAE Thunderbok(TM) Configuration	Re-Size BAR Support IOAPIC 24-119 Entries	Disabled Enabled		Frequency 4000.00MT/s Module MFG ID	16384MB
	Gigabyte Utilities Downloader Configuration			GIGABYTE AL Boost	GIGABYTE
Network Stack Configuration C/U Bours P Core R NVMA Configuration 93.860 CP 5813 2027 Configuration 93.860 CP 5813	Network Stack Configuration NVMe Configuration			CPU Biscuts 93.860 CP	
Sana Gengardean Portscher Conner 1462 V 4454	VMD setup menu				E Core Frequen 4454

Figure 2



The BIOS Setup menus described in this section may differ from the exact settings for your motherboard. The actual BIOS Setup menu options you will see shall depend on the motherboard you have and the BIOS version. Step 2:

On the Intel(R) Rapid Storage Technology menu, press <Enter> on Create RAID Volume to enter the Create RAID Volume screen. Enter a volume name with 1~16 letters (letters cannot be special characters) under the Name item and press <Enter>. Then, select a RAID level (Figure 3). RAID levels supported include RAID 0, RAID 1, RAID 10, and RAID 5 (the selections available depend on the number of the hard drives being installed). Next, use the down arrow key to move to Select Disks.

Name:	Volume1		Frequency	BOLK
RAD Level	RA/D0 (Stripe)		5701.21MHz 4400.24	100.00M
Select Disks:			Temperature	Voltage
Select Disks: SATA 0.4. TOSHIBA DT01ACA100 763267WFS. 931.5GB			51.0 °C	0.981 V
SATA 0.4, TUSHIBA DT01ALA100 763267WPS, 931.568 SATA 0.5, TOSHIBA DT01ACA100 7632M7MFS, 931.568			51.0 C	0.501 0
SATA 0.5, T05HIBA 0101ADA100 7632M7MP5, 931.568				
Strip Size:	RAID	Level	Memory	
Capacity (MB):			Frequency	Size
cohoris hunt	RAIDO	(Stripe)	4000.00MT/s	16384ME
Create Volume			Module MFG ID	DRAM MEG ID
		Mirror)	GIGABYTE	GIGABYT
	RUDI	(Mirror)		
			AL Boost	
			93.860 CP	5813
			Projection Vcore	E Core Freque
			1.462 V	4454

Figure 3

Step 3:

Under **Select Disks** item, select the hard drives to be included in the RAID array. Press the <Space> key on the hard drives to be selected (selected hard drives are marked with "X"). Then set the stripe block size (Figure 4). The stripe block size can be set from 4 KB to 128 KB. Once you have selected the stripe block size, set the volume capacity.

Volume1			BCLK
Loane (subs)		5701.21MHz 4400.24	100.00M
			Voltage
Y		51.0 °C	0.978 V
			50e 16384MI
11/10 March 11/10			DRAM MEG I
128KB		GIGABTIE	GIGABYT
		CPU Biscuits	
		93.860 CP	5813
		Projection Vcore	
		1.462 V	4454
	RADDO (Sripe)	5/rg Szc 4/0 9/0 2/0 2/0	Ship Ship Ship Ship Ship Ship Ship Ship

Figure 4

Step 4:

After setting the capacity, move to Create Volume and press <Enter> to begin. (Figure 5)

Favorites (F11) A Tweaker	(e) Senings	System Info.	🖒 Boot 🕴 🚺	Save & Exit
Name	Volume1		CPU	
RAD Level	RAIDO (Stripe)		Frequency	BCLK 100.00MH
			5701.21MHz 4400.24	
Select Disks:			Temperature	Voltage
SATA 0.4, TOSHIBA DT01ACA100 763267WFS, 931.5GB	×		51.0 °C	0.981 V
SATA 0.5, TOSHIBA DT01ACA100 763ZM7MF5, 931.5GB	x			
Strip Size	64KB		Memory	
Capacity (MB):	1907734		Frequency	Size
capacity hands	1307734		4000.00MT/s	16384MB
Create Volume			Module MFG ID	DRAM MFG ID
			GIGABYTE	GIGABYTE
			A.L. Boost	
			CPU Biscuits	P Core Frequen
			93.860 CP	5813
			Projection Vcore	E Core Frequen
			1.462 V	4454
a volume with the settings specified above				

Figure 5

After completing, you'll be brought back to the **Intel(R) Rapid Storage Technology** screen. Under **RAID Volumes** you can see the new RAID volume. To see more detailed information, press <Enter> on the volume to check for information on RAID level, stripe block size, array name, and array capacity, etc. (Figure 6)

Volume Actions		CPU	
Delete		Frequency	BCLK
		5701.21MHz 4400.24	100.00MI
		Temperature	Voltage
Name:	Volume1	51.0 °C	0.981 V
RAID Level:	RA/D0 (Stripe)		
Strip Size:	64KB	Memory	
Size:	1.8TB	Frequency	Size
Status:	Normal	4000.00MT/s	16384ME
Bootable:	Yes		
		GIGABYTE	GIGABYTE
SATA 0.4, TOSHIBA DT01ACA100 76		GIGHDTTE	010/10/11
SATA 0.5, TOSHIBA DT01ACA100 76	32M/MF5, 931.508		
		A.I. Boost	
		CPU Biscuits	P Core Freque
		93.860 CP	5813
		Projection Vcore	E Core Freque
		1.462 V	4454

Figure 6

Delete RAID Volume

To delete a RAID array, press <Enter> on the volume to be deleted on the Intel(R) Rapid Storage Technology screen. After entering the RAID VOLUME INFO screen, press <Enter> on Delete to enter the Delete screen. Press <Enter> on Yes (Figure 7).

Generatives (F11) Generatives (F11)	() Boot	Save & Exit
Dates Dates the BAD subare? ALL DATA ON VACUME WILL BE LOST To	CPU Frequency 5701.21MHz 4400.24 Temperature 51.0 °C	BCLK 100.00MH Voltage 0.981 V
* 10	Memory Frequency 4000.00MT/s Module MFG ID GIGABYTE	Size 16384MB DRAM MEG ID GIGABYTE
	AL Boost CPU Biscuts 93.860 CP Projection Vcore 1.462 V	P Core Frequen 5813 E Core Frequen 4454
eting a volume will reset the disks to non-RAD.	For 6 (Fe)	

Figure 7

Installing the RAID Driver and Operating System

With the correct BIOS settings, you are ready to install the operating system.

If you want to install an operating system on an M.2 PCIe SSD or a RAID volume, you need to install the Intel® RST VMD Controller driver first during the OS installation process. Refer to the steps below:

Step 1:

Go to GIGABYTE's website, browse to the motherboard model's web page, download the Intel SATA Preinstall driver file on the Support\Download\SATA RAID/AHCI page, unzip the file and copy the files to your USB thumb drive.

Step 2:

Boot from the Windows setup disc and perform standard OS installation steps. When the screen requesting you to load the driver appears, select **Browse**.

Step 3:

Insert the USB thumb drive and then browse to the location of the driver. When a screen as shown below appears, select **Intel RST VMD Controller A77F** and click **Next** to load the driver and continue the OS installation.

D Controller A77F (C:\	IRST\IRST 19.5 F	ViaStorVD.inf)	

Installing Intel[®] Optane[™] Memory and Storage Management



After entering the operating system, make sure your Internet connection works properly.

Launch the GIGABYTE Control Center (GCC). On the "Not Installed\New Drivers" screen, select Intel[®] Rapid Storage Technology driver to install. Follow the on-screen instructions to continue.

When completed, restart the system.

A. Enabling an Intel[®] Optane[™] Memory

A-1. System Requirements

- 1. Intel[®] Optane[™] memory H10/H20.
- 2. System acceleration with Intel[®] Optane[™] Memory can only be enabled on the M.2 connectors supported by the Chipset.
- Only the system drive partition on the Intel[®] Optane memory being used can be enabled for system acceleration. The system drive partition must be GPT formatted and have Windows 10 64-bit (or later version) installed.
- 4. An Internet connected computer.

A-2. Installation Guidelines

Ministry Ministry Ministry Ministry<	Enable WMO carritollar Enable WMO Global Mapping		Enabled Drapled	5701.22MHz was	100.00M
Minimum American Ameri	Fout Port IDF ortain		SASK Carlboller		0.981 V
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Mining and Antipage and Antipag					16384ME
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Anne and Ann					GIGABYTI
A land and a land		ed elata érves		GIGHDTTC	Chorton II
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Alexandro Marcola Sector	n ar 1107 an			1.462.V	4454
Debundy ¹ EEE Bind Opport Memory Constraints 2, No.11 ~ Method 2, No.12 Method 2, No.12 ~ Method 2, No.12 Method 2, No.12 ~ Stating Inst. organization dates to be accounted. ~	N	Intel® Optane ¹⁴ Me		1.462.V	4454
Performance La do non - Garden - Menologia Jacobiana A do ng	N Manage	Intel® Optane ^{re} Me Status		1.462.V	4454
Settings vrtil, viliPEDRUGBBA (Controller 4, Port IX (CHSTIGA) v	N Manage Eneste RAID Volume	Intel® Optane ^{re} Me Status © Biated	mory and Storage Management	1.462.V	4454
	N Manage Create RAD Volume mol® Optane" Menway	Intel® Optane ^{re} Mo Status © Disabled Select fast Inter Optane ^{re}	mory and Storage Management.	1.462.V	4454
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After re-entering the operating system, launch the

Intel[®] Optane[™] Memory and Storage Management

application from the Start menu. Click Enable Intel®

Optane[™] Memory. When completed, restart the system.

Step 1:

In BIOS Setup, go to Settings\IO Ports\VMD setup menu, set Enable VMD controller to Enabled and set Enable VMD Global Mapping to Disabled. Then depending on the SATA/M.2 connector you use, set the corresponding Map this Root Port under VMD item to Enabled.



Step 3:

Launch the Intel[®] Optane[™] Memory and Storage Management application from the Start menu and make sure the Intel[®] Optane[™] Memory has been enabled.



Step 2:

- Do not abruptly remove the Optane[™] memory. Doing so will cause the operating system to stop functioning correctly.
- If you want to change/remove the Optane[™] memory, you must disable it using the Intel[®] Optane[™] Memory and Storage Management application first.
- After enabling the Optane™ memory, the related BIOS settings will remain even after a BIOS update.

B. Rebuilding an Array

Rebuilding is the process of restoring data to a hard drive from other drives in the array. Rebuilding applies only to fault-tolerant arrays such as RAID 1, RAID 5 or RAID 10 arrays. The procedures below assume a new drive is added to replace a failed drive to rebuild a RAID 1 array. (Note: The new drive must have equal or greater capacity than the old one.)

Turn off your computer and replace the failed hard drive with a new one. Restart your computer.

While in the operating system, launch the Intel[®] Optane[™] Memory and Storage Management utility from the Start menu.





Step 1:

Go to the Manage menu and click Rebuild to another disk in Manage Volume.



The **Status** item on the right of the screen displays the rebuild progress. After the RAID 1 volume rebuilding, the **Status** will display as **Normal**.

Step 2:

Select a new drive to rebuild the RAID and click **Rebuild**.