# Configuring a RAID Set

**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**.

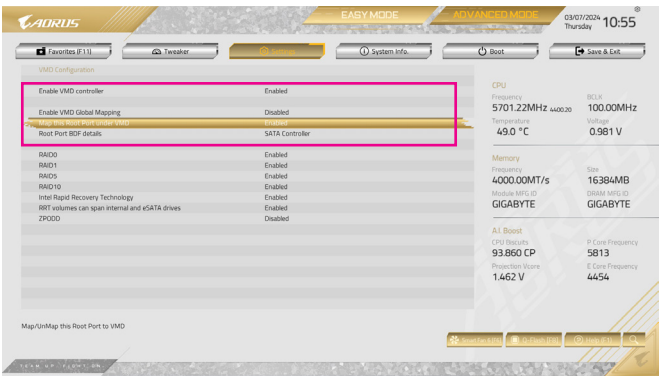



Figure 1

## 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).

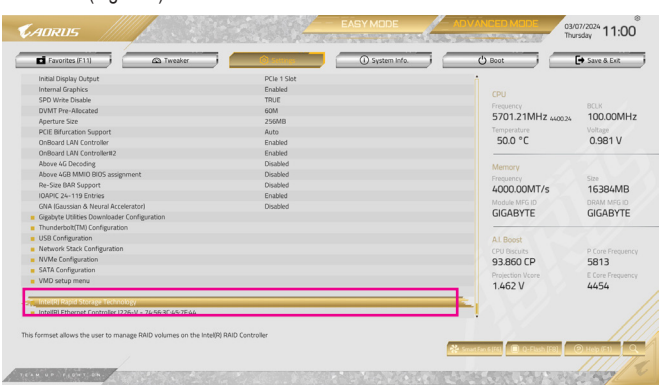



Figure 2

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**.

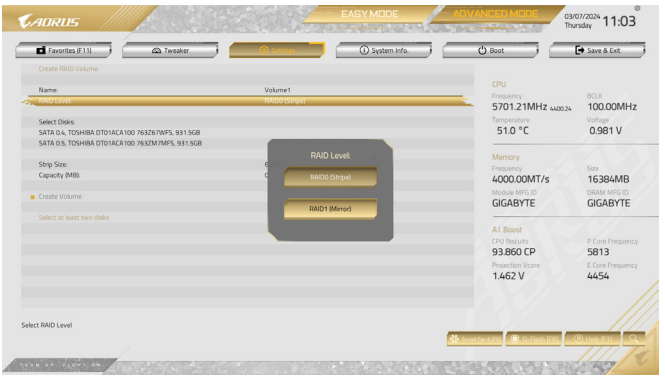



Figure 3

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.

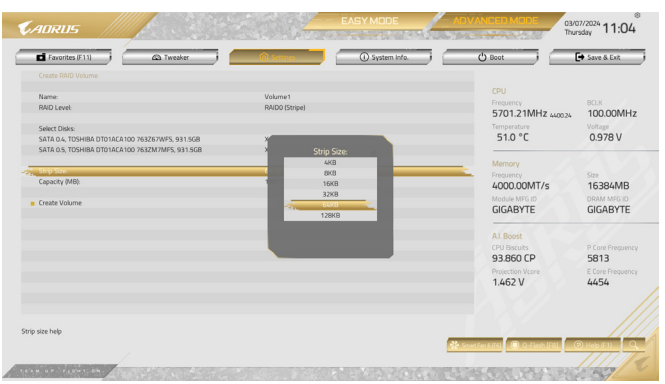



Figure 4

Step 4:
After setting the capacity, move to **Create Volume** and press <Enter> to begin. (Figure 5)

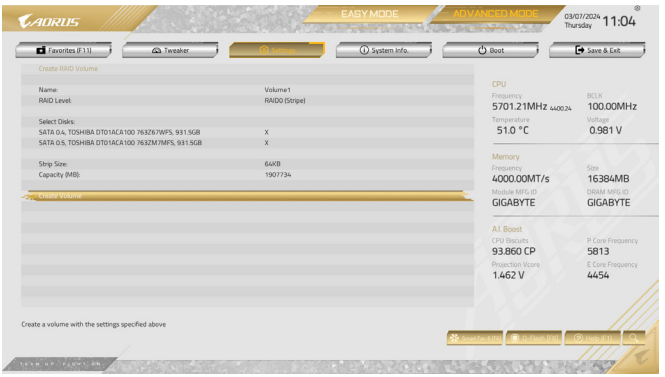



Figure 5

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)

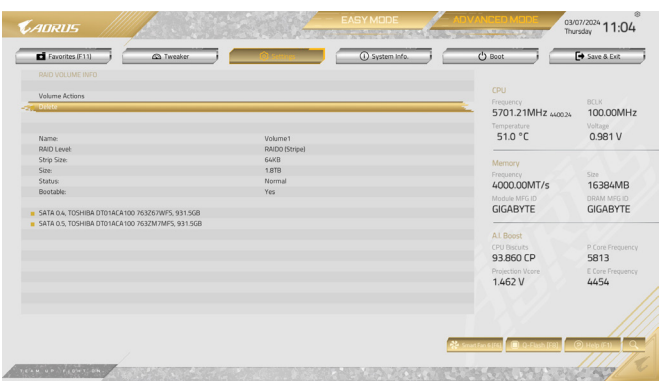



Figure 6

**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).

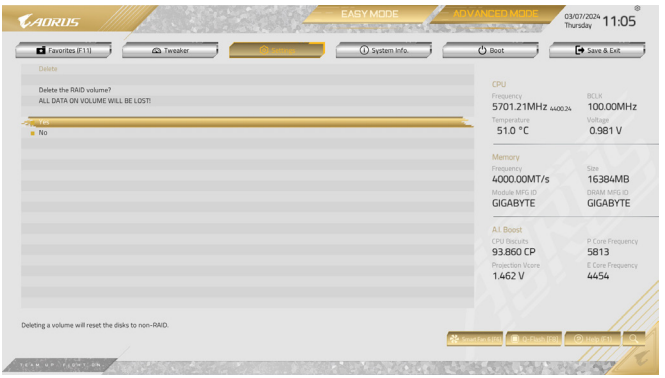



Figure 7

## Installing the RAID Driver and Operating System

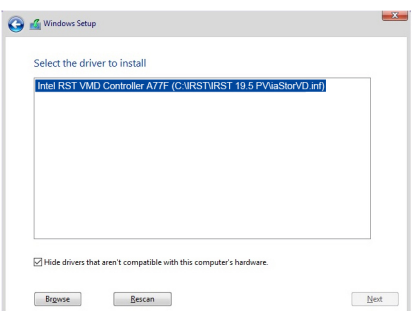
With the correct BIOS settings, you are ready to install the operating system.

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:

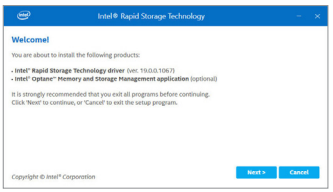
Step 1:
Go to GIGABYTE's website, browse to the motherboard model's web page, download the **Intel SATA Preinstall driver** file on the **Support\Download\SATA RAID/AHCI** page, unzip the file and copy the files to your USB thumb drive.

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.



# 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.

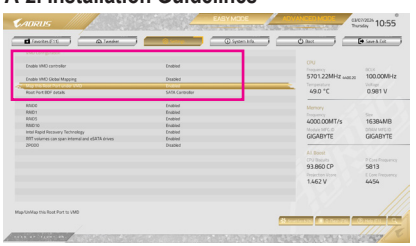
When completed, restart the system.

## A. Enabling an Intel® Optane™ Memory

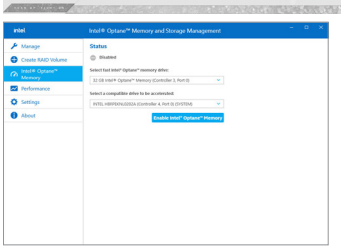
### A-1. System Requirements

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.
3. 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.

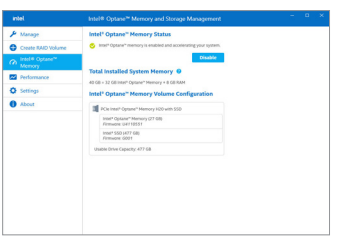
### A-2. Installation Guidelines



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 2:
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 3:
Launch the **Intel® Optane™ Memory and Storage Management** application from the Start menu and make sure the Intel® Optane™ Memory has been enabled.

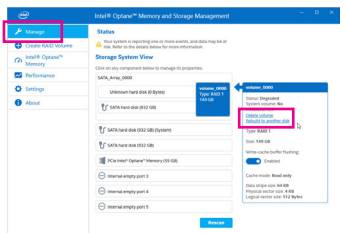
- Do not abruptly remove the Optane™ memory. Doing so will cause the operating system to stop functioning correctly.
- If you want to change/remove the Optane™ memory, you must disable it using the **Intel® Optane™ Memory and Storage Management** application first.
- After enabling the Optane™ memory,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

## B. Rebuilding an Array

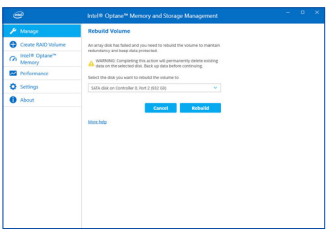
Rebuilding is the process of restoring data to a hard drive from other drives in the array. Rebuilding applies only to fault-tolerant arrays such as RAID 1, RAID 5 or RAID 10 arrays. The procedures below assume a new drive is added to replace a failed drive to rebuild a RAID 1 array. (Note: The new drive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

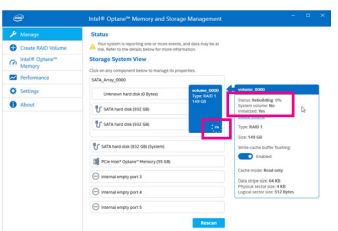
While in the operating system, launch the Intel® Optane™ Memory and Storage Management utility from the Start menu.




Step 1:
Go to the **Manage** menu and click **Rebuild to another disk** in **Manage Volume**.




Step 2:
Select a new drive to rebuild the RAID and click **Rebuild**.




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**.