

# Guide to SATA Hard Disks Installation and RAID Configuration

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# **1. *Guide to SATA Hard Disks Installation***

## **1.1 Serial ATA (SATA) Hard Disks Installation**

Intel Z77 chipset supports Serial ATA (SATA) hard disks with RAID functions, including RAID 0, RAID 1, RAID 5, RAID 10 and Intel Rapid Storage. Please read the RAID configurations in this guide carefully according to the Intel southbridge chipset that your motherboard adopts. You may install SATA hard disks on this motherboard for internal storage devices. For SATA installation guide, please refer to Serial ATA (SATA) Hard Disks Installation of "User Manual" in the support CD. This section will guide you how to create RAID on SATA ports.

## 2. Guide to RAID Configurations

### 2.1 Introduction of RAID

This motherboard adopts Intel southbridge chipset that integrates RAID controller supporting RAID 0 / RAID 1/ Intel Rapid Storage / RAID 10 / RAID 5 function with four independent Serial ATA (SATA) channels. This section will introduce the basic knowledge of RAID, and the guide to configure RAID 0 / RAID 1/ Intel Rapid Storage / RAID 10 / RAID 5 settings.

#### RAID

The term “RAID” stands for “Redundant Array of Independent Disks”, which is a method combining two or more hard disk drives into one logical unit. For optimal performance, please install identical drives of the same model and capacity when creating a RAID set.

#### RAID 0 (Data Striping)

RAID 0 is called data striping that optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. It will improve data access and storage since it will double the data transfer rate of a single disk alone while the two hard disks perform the same work as a single drive but at a sustained data transfer rate.



#### **WARNING!!**

Although RAID 0 function can improve the access performance, it does not provide any fault tolerance. Hot-Plug any HDDs of the RAID 0 Disk will cause data damage or data loss.

#### RAID 1 (Data Mirroring)

RAID 1 is called data mirroring that copies and maintains an identical image of data from one drive to a second drive. It provides data protection and increases fault tolerance to the entire system since the disk array management software will direct all applications to the surviving drive as it contains a complete copy of the data in the other drive if one drive fails.

## **Intel Rapid Storage**

The Intel Rapid Storage technology supported allows you to create a RAID 0 and RAID 1 set using only two identical hard disk drives. The Intel Rapid Storage technology creates two partitions on each hard disk drive to create a virtual RAID 0 and RAID 1 sets. This technology also allows you to change the hard disk drive partition size without losing any data.

## **RAID 10**

RAID 10 is a striped configuration with RAID 1 segments whose segments are RAID 1 arrays. This configuration has the same fault tolerance as RAID 1, and has the same overhead for fault-tolerance as mirroring alone. RAID 10 achieves high input / output rates by striping RAID 1 segments. In some instances, a RAID 10 configuration can sustain multiple simultaneous drive failure. A minimum of four hard disk drives is required for this setup.

## **RAID 5**

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.

## 2.2 RAID Configurations Precautions

1. Please use two new drives if you are creating a RAID 0 (striping) array for performance. It is recommended to use two SATA drives of the same size. If you use two drives of different sizes, the smaller capacity hard disk will be the base storage size for each drive. For example, if one hard disk has an 80GB storage capacity and the other hard disk has 60GB, the maximum storage capacity for the 80GB-drive becomes 60GB, and the total storage capacity for this RAID 0 set is 120GB.
2. You may use two new drives, or use an existing drive and a new drive to create a RAID 1 (mirroring) array for data protection (the new drive must be of the same size or larger than the existing drive). If you use two drives of different sizes, the smaller capacity hard disk will be the base storage size. For example, if one hard disk has an 80GB storage capacity and the other hard disk has 60GB, the maximum storage capacity for the RAID 1 set is 60GB.
3. Please verify the status of your hard disks before you set up your new RAID array.



### **WARNING!!**

Please backup your data first before you create RAID functions. In the process you create RAID, the system will ask if you want to "Clear Disk Data" or not. It is recommended to select "Yes", and then your future data building will operate under a clean environment.

## 2.3 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit With RAID Functions

If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your SATA / SATA2 / SATA3 HDDs with RAID functions, please follow the procedures below.

### STEP 1: Set up UEFI.

- A. Enter UEFI SETUP UTILITY → Advanced screen → Storage Configuration.
- B. Set “SATA Mode Selection” to [RAID] for SATA2\_2 to SATA2\_5 and SATA3\_0 and SATA3\_1 ports.

### STEP 2: Use “RAID Installation Guide” to set RAID configuration.

Before you start to configure the RAID function, you need to check the installation guide in the Support CD for proper configuration. Please refer to the document in the Support CD, “Guide to SATA Hard Disks Installation and RAID Configuration”, which is located in the folder at the following path:

.. \ RAID Installation Guide

### STEP 3: Install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system.

## 2.4 Installing Windows® XP / XP 64-bit With RAID Functions

If you want to install Windows® XP / XP 64-bit on your SATA / SATA2 / SATA3 HDDs with RAID functions, please follow the steps below.

### STEP 1: Set up UEFI.

- A. Enter UEFI SETUP UTILITY → Advanced screen → Storage Configuration.
- B. Set the option “SATA Mode Selection” to [RAID] for SATA2\_2 to SATA2\_5 and SATA3\_0 and SATA3\_1 ports.

**STEP 2: Make a SATA / SATA2 / SATA3 Driver Diskette.**

- A. Insert the Support CD into your optical drive to boot your system.
- B. During POST at the beginning of system boot-up, press <F11> key, and then a window for boot devices selection appears. Please select CD-ROM as the boot device.
- C. When you see the message on the screen, "Do you want to generate Serial ATA driver diskette [YN]?", press <Y>.
- D. Then you will see these messages,

**Please insert a diskette into the floppy drive.  
WARNING! Formatting the floppy diskette will  
lose ALL data in it!  
Start to format and copy files [YN]?**

Please insert a floppy diskette into the floppy drive, and press <Y>.

- E. The system will start to format the floppy diskette and copy SATA / SATA2 / SATA3 drivers into the floppy diskette.

**STEP 3: Use "RAID Installation Guide" to set RAID configuration.**

Before you start to configure the RAID function, you need to check the installation guide in the Support CD for proper configuration. Please refer to the document in the Support CD, "Guide to SATA Hard Disks Installation and RAID Configuration", which is located in the folder at the following path:

.. \ **RAID Installation Guide**

**STEP 4: Install Windows® XP / XP 64-bit OS on your system.**

After making a SATA / SATA2 / SATA3 driver diskette and using "RAID Installation Guide" to set RAID configuration, you can start to install Windows® XP / XP 64-bit on your system. At the beginning of Windows setup, press F6 to install a third-party RAID driver. When prompted, insert the SATA / SATA2 / SATA3 driver diskette containing the Intel® RAID driver. After reading the floppy disk, the driver will be presented. Select the driver to install according to the mode you choose and the OS you install.

After the installation of Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP-64bit OS, if you want to manage RAID functions, you are allowed to use both “RAID Installation Guide” and “Intel Rapid Storage Information” for RAID configuration. Please refer to the document in the Support CD, “Guide to SATA Hard Disks Installation and RAID Configuration”, which is located in the folder at the following path: .. \ **RAID Installation Guide** and the document in the support CD, “Guide to Intel Rapid Storage”, which is located in the folder at the following path: .. \ **Intel Rapid Storage Information**



If you want to use “Intel Rapid Storage” in Windows® environment, install “SATA2 driver” from the Support CD again so that “Intel Rapid Storage” will be installed to your system as well.

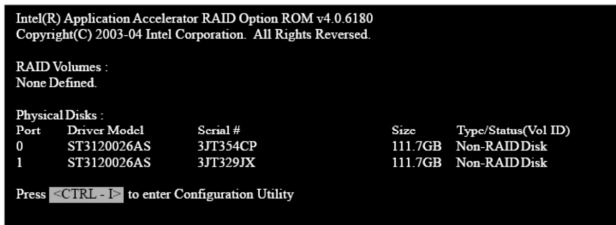


## 2.5 Setting the BIOS RAID Items

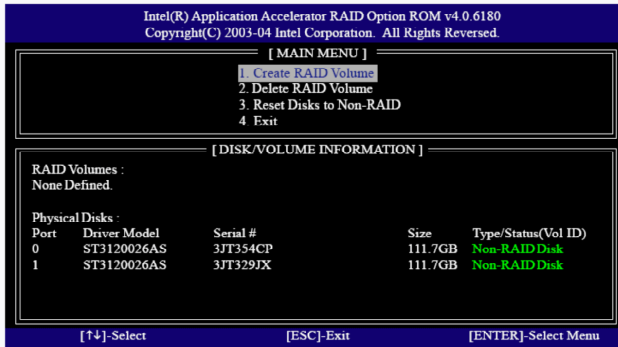
After installing the hard disk drives, please set the necessary RAID items in the BIOS before setting your RAID configuration. Boot your system, and press <F2> key to enter BIOS setup utility. Highlight **Advanced** and press <Enter>, then the main interface of BIOS setup utility will appear. Please set the option **Configure SATA** as to [RAID]. Save your change before you exit BIOS setup.

## 2.6 Configuring the Intel RAID BIOS

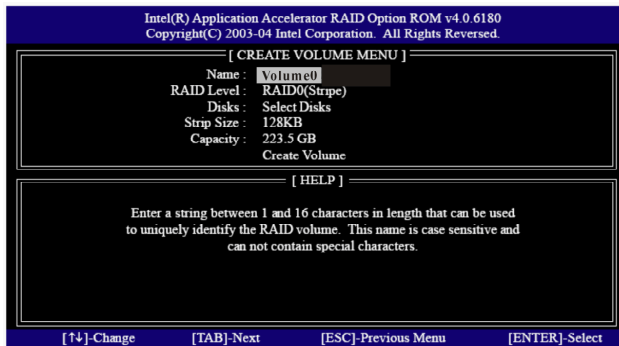
Reboot your computer. Wait until you see the RAID software prompting you to press <Ctrl+I>.



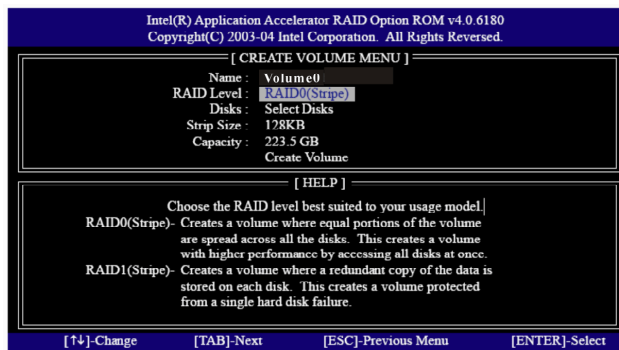
Press <Ctrl+I>. Then, the Intel RAID Utility - **Create RAID Volume** window appears.



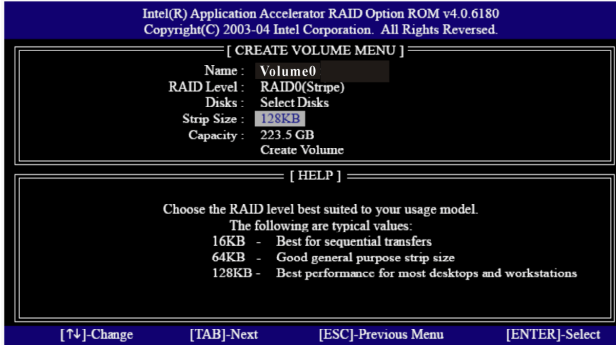
Select the option **Create RAID Volume** and press <Enter>.



In the Create Volume Menu, under **Name** item, please key-in a unique name with 1-16 letters for your RAID volume then press <Enter>.



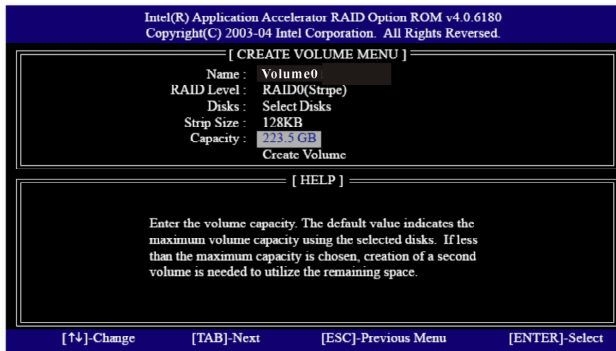
Use the up or down arrow keys to select your desired **RAID Level**. You may select RAID 0 (Stripe), RAID 1 (Mirror), RAID 5 or RAID 10 for your RAID level. Press <Enter>, and then you can select **Strip Size**.



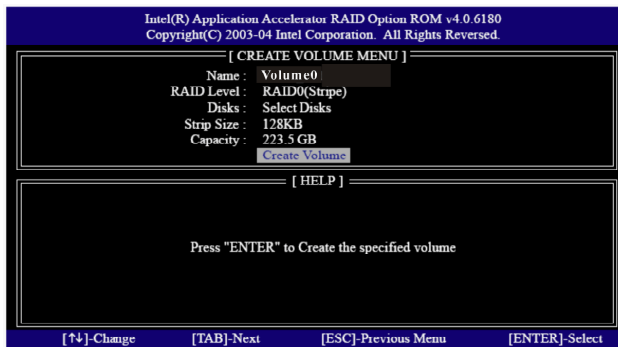
If you selected RAID 0 (Stripe), use the up or down keys to select the stripe size for your RAID 0 array then press <Enter>. The available values range from 8 KB to 128 KB. The default selection is 128 KB. The strip value should be chosen based on the planned drive usage.

- 8/16 KB - low disk usage
- 64 KB - typical disk usage
- 128 KB - performance disk usage

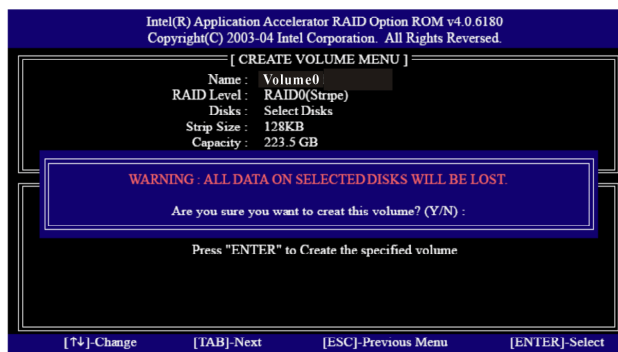
After you set disk block size, press <Enter> to set disk **Capacity**.



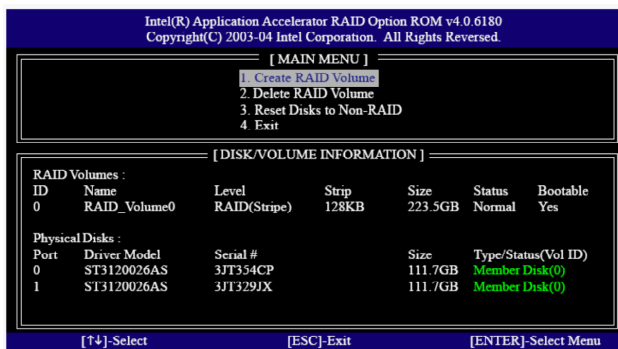
After setting up **Capacity**, please press <Enter>.



Press <Enter> under the **Create Volume** item. The utility prompts a confirmation message as below.



Press <Y> to complete the setup of RAID.



After the completion, you will see the detailed information about the RAID that you set up.



Please note that you are only allowed to create one RAID partition at a time under BIOS RAID environment. If you want to create an extra RAID partition, please use the RAID utility under Windows environment to configure RAID functions after you install OS.

## 2.7 Deleting RAID Volumes

If you want to delete a RAID volume, please select the option Delete RAID Volume, press <Enter>, and then follow the instructions on the screen.

```
Intel(R) Application Accelerator RAID Option ROM v4.0.6180
Copyright(C) 2003-04 Intel Corporation. All Rights Reserved

[ MAIN MENU ]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes :
ID      Name          Level      Strip      Size      Status      Bootable
0       RAID_Volume0  RAID(Stripe) 128KB     223.5GB   Normal     Yes

Physical Disks :
Port    Driver Model    Serial #          Size      Type/Status(Vol ID)
0       ST3120026AS    3JT354CP         111.7GB  Member Disk(0)
1       ST3120026AS    3JT329JX         111.7GB  Member Disk(0)

[↑↓]-Select      [ESC]-Exit      [ENTER]-Select Menu
```