



Intel PCH RAID  
Configuration Utility

USER'S MANUAL

Revision 1.0a

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# Preface

## About This Manual

This manual is written for system integrators, PC technicians and knowledgeable PC users. It provides instructions on how to use the Intel PCH RST RAID Configuration Utility to configure RAID settings for Supermicro motherboards or systems.

## Manual Organization

**Chapter 1** Provides an overview on the Intel PCH RAID Setup and Rapid Storage Technology enterprise (RSTe).

**Chapter 2** Provides instructions on how to configure the BIOS for SATA RAID and how to use the Intel PCH RST RAID Configuration Utility to configure RAID settings.

## Conventions Used in This Manual

Pay special attention to the following symbols for proper installation and to prevent damage to the system or injury to yourself.

**Warning:** Important information given to prevent erroneous RAID configuration and to ensure proper system setup.

 **Note:** Additional information given to ensure correct RAID configuration setup.

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# Chapter 1

## Intel PCH RAID Setup Overview

After all hardware has been installed, you must first configure the Intel PCH RSTe (Rapid Storage Technology enterprise) RAID settings before you install the Windows Operating System and other software drivers. For instructions on installing the Windows OS and Intel RSTe driver, go to section 2-3 on page 2-11.

### Notes

1. This setup guide describes RAID configuration instructions for the Intel PCH RAID controllers designed for the Windows OS.
2. Two RAID controllers (AHCI and SCU) are supported by the Intel PCH. The AHCI controller supports SATA drives and the SCU controller supports both SATA and SAS drives (**Note:** The SCU controller for PCH C602 supports SATA only).
3. The current version (v 3.5) of the Intel PCH RSTe SATA/SAS RAID utility supports Windows 7 & 8 and Windows Server 2003 (64 bit), 2008, and 2012 OS.
4. The AHCI controller supports SATA RAID 0, 1, 5, and 10. The SCU controller supports the following: SAS/SATA RAID 0, 1, and 10 for PCH C606 and SATA RAID 0, 1, 5, and 10 for PCH C602.

### Intel Rapid Storage Technology Enterprise

Intel's Rapid Storage Technology enterprise (RSTe) protects data against hard drive failure when the system is configured for RAID 1, RAID 5, or RAID 10. These RAID settings are fault-tolerant because they copy and store data on multiple hard drives to avoid data loss or system downtime caused by single hard drive failure. A RAID 0 setting, however, increases response time on data intensive applications because it will access data on multiple hard drives simultaneously.

 **Note:** The above RAID configurations will protect against drive failure, but none provide 100% protection against data loss. Data backup is always recommended.

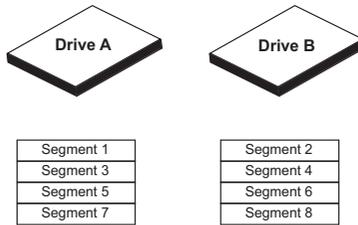
## Intel PCH RAID Configurations

The following types of RAID configuration are supported by Intel PCH Rapid Storage Technology enterprise:

### **RAID 0**

RAID 0 writes data in parallel, interleaved (striped) sections between multiple hard drives. RAID 0 is used to double data transfer rate (over a single hard drive) in order to enhance system performance. To use RAID 0, a minimum of two hard drive disks are required.

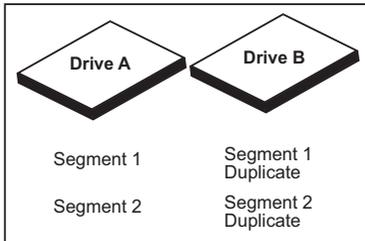
The following illustration provides a visual example of a RAID 0 configuration.



**RAID 0 Example**

### **RAID 1**

RAID 1 allows identical data to be copied from one disk drive to another. By doing so, a mirror of source data is created in order to enhance data security. To use RAID 1, two hard drive disks are required. The following illustration provides a visual example of a RAID 1 configuration.

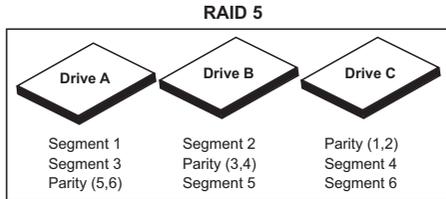


**RAID 1 Example**

## RAID 5

With a RAID 5 configuration, both data and parity information are striped and mirrored across three or more hard drives. To use RAID 5, a minimum of three hard drive disks are required. The following example provides a visual example of a RAID 5 configuration.

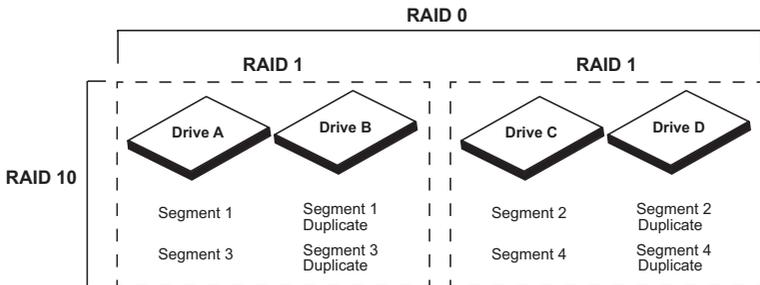
 **Note:** RAID 5 is only available for the PCH AHCI controller.



**RAID 5 Example**

## RAID 10

RAID 10 (a combination of RAID 1 and RAID 0) provides superb system performance and system security. RAID 10 stripes data across the primary disks in a drive group and then duplicates that data to the secondary disks in a drive group. To use RAID 10, a minimum of four hard drive disks are required. Any additional drives must be added in pairs. The following illustration provides a visual example of a RAID 10 configuration.



**RAID 10 Example**

## **Notes**

## Chapter 2

### Configuring the PCH RAID Settings

This chapter provides instructions on how to configure the BIOS for RAID settings and how to use the PCH RST RAID configuration utility for the AHCI and SCU controller. If you do not wish to configure RAID settings, skip this section and go directly to OS Installation. For OS installation instructions, please refer to our web site at [www.supermicro.com](http://www.supermicro.com).

 **Note:** For system stability, do not use both SAS and SATA drives or both SATA 2.0 and SATA 3.0 hard drives in the same array.

#### 2-1 Configuring the AMI BIOS for SATA RAID Settings

You may need to configure RAID settings in the BIOS before using the PCH RAID configuration utility. Follow the below instructions to ensure the BIOS is configured for SATA RAID.

1. Press the <Delete> key during system boot to enter the BIOS Setup Utility.
2. Use the arrow keys to select **Advanced** in the BIOS menu bar at the top of the screen.
3. In the **Advanced** menu, navigate to *SATA Configuration* and press <Enter> to enter the SATA Configuration submenu.
4. In the SATA configuration submenu, navigate to *SATA Mode* and press <Enter>. The Options window displays.
5. From the Options window, highlight **RAID** and press <Enter> to select it.
6. In the **Advanced** menu, navigate to *SCU Configuration* and press <Enter> to enter the SCU configuration submenu.
7. In the SCU Configuration submenu, make sure that **Storage Controller Unit** and **OnChip SCU Option ROM** are set to Enabled.
8. Press <ESC> to return to the previous menu and use the arrow keys to select **Save & Exit** from the BIOS menu bar.

9. From the **Save & Exit** submenu, navigate to *Save Changes and Re-set*. Press <Enter> to save the changes and exit the BIOS. The system will reboot.

10. During the system bootup, you are prompted to:

Press <Ctrl> <I> to enter Configuration Utility...

This prompt appears twice, first for the SCU controller and a second time for the AHCI controller (as shown below).

Press <Ctrl> <I> at the appropriate prompt to enter the Rapid Storage Technology enterprise RAID configuration utility for the desired controller.

```
Intel(R) Rapid Storage Technology enterprise SCU Option ROM - 3.5.0.1005
Copyright(C) 2003-12 Intel Corporation. All Rights reserved.

RAID Volumes:
None defined.

Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
0 ST314685SS RCXG000097389NUU 136.7GB Non-RAID Disk
1 ST314685SS ZJ3H0000973710EF 136.7GB Non-RAID Disk
2 ST314685SS JETS00009803U63L 136.7GB Non-RAID Disk
Press [CTRL-I] to enter Configuration Utility.

Intel(R) Rapid Storage Technology enterprise SATA Option ROM - 3.5.0.1005
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.

RAID Volumes:
None defined.

Physical Devices:
ID Device Model Serial # Size Type/Status(Vol ID)
0 ST91000640MS 9XG035JC 931.5GB Non-RAID Disk
1 ST91000640MS 9XG04JB1 931.5GB Non-RAID Disk
3 ST91000640MS 9XG04UW8 931.5GB Non-RAID Disk
Press [CTRL-I] to enter Configuration Utility..
```

 **Note:** The Intel RAID Configuration Utility is only available for systems with two or more drives installed. The Intel RAID Utility screen will not display in systems with one drive installed, unless a RAID configuration exists.

## 2-2 Using the Intel PCH RSTe RAID Configuration Utility

When the system is booting, press <Ctrl> and <I> simultaneously to enter the Intel Rapid Storage Technology enterprise RAID configuration utility. The main menu of the RSTe RAID utility displays as shown below.

```

Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.5.0.1005
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.

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

[ DISK/VOLUME INFORMATION ]
RAID Volumes:
None defined.

Physical Devices:
ID Device Model      Serial #              Size Type/Status(Vol ID)
0  ST91000640NS      9XG035JC             931.5GB Non-RAID Disk
1  ST91000640NS      9XG04JB1             931.5GB Non-RAID Disk
3  ST91000640NS      9XG04WU8             931.5GB Non-RAID Disk

[F1]-Select      [ESC]-Exit      [ENTER]-Select Menu

```

 **Note:** All graphics and screen shots shown in the manual are for reference only. The screen shots shown in the manual do not imply Supermicro's endorsement or non-endorsement of any third-party products. Your screen may or may not look exactly the same as the graphics shown in this manual.

## Creating RAID Volumes

### Creating a RAID 0 Volume

1. From the configuration utility main menu, select **Create RAID Volume** and press <Enter>. The following screen appears:



2. In the *Name* field, specify a name for the RAID 0 set and press the <Tab> key or <Enter> to go to the next field. (To select the previous menu, press <Esc>.)
3. In the *RAID Level* field, use the up/down arrow keys to select RAID 0 (Stripe) and press <Enter>.
4. In the *Disks* field (if available), press <Enter> to select the hard drives you want to configure for RAID. Use the up/down arrow keys to highlight a drive and press the spacebar to select it. A triangle appears to confirm the drive selection. Press <Enter> when finished selecting drives.
5. In the *Stripe Size* field, use the up/down arrow keys to select the stripe size (from 4KB to 128KB) for your RAID 0, and press <Enter>. The default size is 128KB. (**Note:** For a server, use a lower stripe size. For a multimedia system, use a higher stripe size.)
6. In the *Capacity* field, press <Enter> to specify the disk capacity you want to configure for RAID 0. (**Note:** Unclaimed space on a disk can be used to create another RAID array by following the above procedures with the same group of drives.)

- After entering the parameters for each field, highlight **Create Volume** and press <Enter>. A warning message displays, indicating that all data on the selected disks will be lost.
- Press <Y> to create the RAID volume, or press <N> to return to the main menu.



### Creating a RAID 1 Volume

- From the configuration utility main menu, select **Create RAID Volume** and press <Enter>. The following screen appears:
- In the *Name* field, specify a name for the RAID 1 set and press the <Tab> key or <Enter> to go to the next field. (To select the previous menu, press <Esc>.)
- In the *RAID Level* field, use the up/down arrow keys to select RAID 1 (Mirror) and press <Enter>.
- In the *Disks* field (if available), press <Enter> to select the hard drives you want to configure for RAID. Use the up/down arrow keys to highlight a drive and press the spacebar to select it. A triangle appears to confirm the drive selection. Press <Enter> when finished selecting drives.
- In the *Capacity* field, press <Enter> to specify the disk capacity you want to configure for RAID 0. (**Note:** Unclaimed space on a disk can be used to create another RAID array by following the above procedures with the same group of drives.)

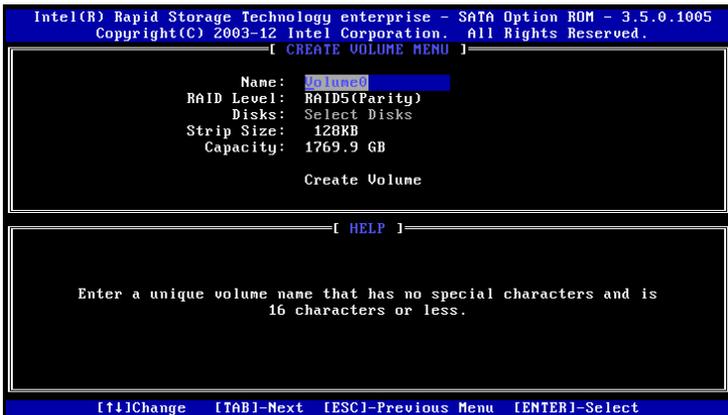
- After entering the parameters for each field, highlight **Create Volume** and press <Enter>. A warning message displays, indicating that all data on the selected disks will be lost.
- Press <Y> to create the RAID volume, or press <N> to return to the main menu.



### Creating a RAID 10 (RAID 1+ RAID 0)

- From the configuration utility main menu, select **Create RAID Volume** and press <Enter>. The following screen appears:
- In the *Name* field, specify a name for the RAID 10 set and press the <Tab> key or <Enter> to go to the next field. (To select the previous menu, press <Esc>.)
- In the *RAID Level* field, use the up/down arrow keys to select RAID 10 (RAID1 + RAID0) and press <Enter>.
- In the *Disks* field (if available), press <Enter> to select the hard drives you want to configure for RAID. Use the up/down arrow keys to highlight a drive and press the spacebar to select it. A triangle appears to confirm the drive selection. Press <Enter> when finished selecting drives.
- In the *Stripe Size* field, use the up/down arrow keys to select the stripe size (from 4KB to 64KB) for your RAID 10, and press <Enter>. The default setting is 64KB. (**Note:** For a server, use a lower stripe size. For a multimedia system, use a higher stripe size.)

6. In the *Capacity* field, press <Enter> to specify the disk capacity you want to configure for RAID 10. The default setting is the maximum capacity allowed. (**Note:** Unclaimed space on a disk can be used to create another RAID array by following the above procedures with the same group of drives.)
7. After entering the parameters for each field, highlight **Create Volume** and press <Enter>. A warning message displays, indicating that all data on the selected disks will be lost.
8. Press <Y> to create the RAID volume, or press <N> to return to the main menu.



### Creating a RAID 5 Set (Parity)

1. From the configuration utility main menu, select **Create RAID Volume** and press <Enter>. The following screen appears:
2. In the *Name* field, specify a name for the RAID 5 set, and press the <Tab> key or <Enter> to go to the next field. (To select the previous menu, press <Esc>.)
3. In the *RAID Level* field, use the up/down arrow keys to select RAID 5 (Parity) and press <Enter>.
4. In the *Disks* field (if available), press <Enter> to select the hard drives you want to configure for RAID. Use the up/down arrow keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the drive selection. Press <Enter> when finished selecting drives.

5. In the *Stripe Size* field, use the up/down arrow keys to select the strip size (from 16KB to 128KB) for your RAID 5, and press <Enter>. The default setting is 128KB. (**Note:** For a server, use a lower stripe size, For a multimedia system, use a higher stripe size.)
6. In the *Capacity* field, press <Enter> to specify the disk capacity you want to configure for RAID 5. The default setting is the maximum capacity allowed. (**Note:** Unclaimed space on a disk can be used to create another RAID array by following the above procedures with the same group of drives.)
7. After entering the parameters for each field, highlight **Create Volume** and press <Enter>. A warning message displays, indicating that all data on the selected disks will be lost.
8. Press <Y> to create the RAID volume, or press <N> to return to the main menu.

## Deleting a RAID Volume

1. From the main menu, select **Delete RAID Volume** (as shown below) and press <Enter>.



2. Use the up/down arrow keys to select the RAID set you want to delete and press the <Delete> key. A warning message displays.
3. Press <Y> to delete the RAID volume, or press <N> to return to the Delete Volume menu.

**Warning:** Be sure to back up your data before deleting a RAID set. You will lose all data on the disk drives when deleting a RAID set.

## Resetting to Non-RAID

- From the main menu, select **Reset Disks to Non-RAID** (as shown below) and press <Enter>.



- Use the up/down arrow keys to highlight the RAID drives to reset, and press the Spacebar to select it.
- Press <Enter> to reset the RAID set drive. A warning message displays.
- Press <Y> to reset the drive, or press <N> to return to the main menu.

**Warning:** Be cautious when you reset a RAID volume HDD to a non-RAID HDD. Resetting a RAID member HDD will remove its RAID structures and revert it to a non-RAID disk. Depending on the RAID setup, the RAID array will either be degraded or fail completely.

## Exiting the Intel RSTe RAID Configuration Utility

1. From the main menu, select **Exit** and press <Enter>. A warning message appears as shown below.



2. At the prompt, press <Y> to delete the drive, or press <N> to return to the main menu.

## 2-3 Installing Windows OS and RSTe RAID Drivers

After all hardware components have been installed, you can then install the Windows OS and perform the necessary driver updates. This section provides instruction on how to install Windows Server 2008 and Windows 2003 OS only. If you are installing a different Windows OS, follow the instructions displayed on your screen.

 **Note:** To download the necessary RSTe driver, go to:  
[ftp://ftp.supermicro.com/driver/SATA/Intel\\_PCH\\_RAID\\_Romley\\_RSTe/Windows](ftp://ftp.supermicro.com/driver/SATA/Intel_PCH_RAID_Romley_RSTe/Windows)

### Installing Windows Server 2008 OS

The following installation instructions only describe how to install Windows Server 2008 in Intel RSTe RAID, non-RAID, and AHCI mode (it is assumed that Intel RSTe is enabled in the BIOS setup).

1. In the initial Windows Server 2008 installation screen, select the desired language, time and keyboard input method and click **Next**.
2. Click **Install now** to start the Windows Server 2008 installation.
3. If prompted, select the OS version to install and click **Next**.
4. Accept the Windows Server 2008 license agreement and click **Next**.
5. Select the **Custom (advanced)** installation type.
6. If the Intel RSTe RAID volume is already created, the Intel RSTe driver must be loaded to continue the installation process. Insert the USB drive that contains the RSTe driver. Select **Load Driver**, then select **Browse** to locate the driver file.
7. Navigate to the appropriate driver (highlight it) and click **Next**.  
 **Note:** By default, a check mark should appear next to *"Hide drivers that are compatible with hardware on this computer."* Do not un-check this item.
8. Follow the remaining standard on-screen steps to complete the OS installation.

## Installing Windows 2003 OS

1. Before creating any RAID volumes, make sure the Intel RAID setting is enabled in the motherboard BIOS (see section 2-1).
2. Copy the RAID driver to a floppy disk and connect the floppy disk device to the motherboard. (Do **not** create any RAID array at this time).
3. Insert the Microsoft Windows 2003 Setup CD in the CD drive. The system will boot from CD.
4. Press the <F6> key when the following message displays: "*Press F6 if you need to install a third-party SCSI or RAID driver.*"
5. When the Windows 2003 Setup screen displays, press <S> to specify additional devices.
6. Load the driver from the floppy disk and select the device "*Intel(R) C600 Series Chipset SATA RAID Controller*" and press <Enter>.
7. Press the <Enter> key again to continue with installation. (If you need to specify additional devices to install, do so at this time). Once all devices are specified, press <Enter> to continue with the installation.
8. From the Windows 2003 Setup screen, press the <Enter> key. The 2003 Setup will automatically load all device files and then continue with the Windows 2003 installation.
9. Install Windows 2003 on single disk connected to the SATA port. The system will automatically reboot once the Windows 2003 OS installation is complete.
10. Install all chipset drivers and install Intel Rapid Storage Technology Enterprise, located at:  

```
ftp://ftp.supermicro.com/driver/SATA/Intel_PCH_RAID_Romley_RSTE/Management
```
11. Download the Hot-Fix from the Microsoft website (<http://support.microsoft.com/kb/932755>) and run the .exe file, then reboot.
12. Open Intel Rapid Storage Technology Enterprise and begin creating RAID volumes using your system disk. Choose to keep the data on the system disk.

To install Windows 2003 using an alternative method, refer to FAQ 14616 located at: <http://www.supermicro.com/FAQ/index.aspx>

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