Intel ICH5R Serial ATA RAID

Shuttle® ICH 5R Serial ATA RAID

Manual Version 1.0

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1 INTRODUCTION

1.1 Introduction

Following are the Parallel ATA (P-ATA) and Serial ATA (S-ATA) device configurations supported by Intel ICH5R.

ATA Operate Mode

There are two modes to select: Legacy mode and Native mode.

Legacy Mode:

- ★ In this mode, system BIOS just assign the traditional 14 and 15 IRQs to use for HDD.
- ★ Older OSs that do not support switch to Native Mode (DOS, Win2K, Win98/ME...) should set SATA and PATA to Legacy Mode.
- * Maximum 4 ATA devices to connect.
- * Combine mode and Non-Combine mode.

>Non-Combined Mode: P-ATA devices only. Maximum of 4 devices.

>Non-Combined Mode: S-ATA devices only. Maximum of 2 devices.

Combined Mode: S-ATA devices. P-ATA devices. Maximum of 2 devices each, thus total 4 devices at maximum.

Native Mode:

- ★ In this mode, system BIOS will search all available IRQs to use for HDD.
- ★ New OS that support switch to Native Mode (WinXP, Windows .NET Server) can set SATA and PATA to Native Mode.
- * Comprehend both Legacy and/or Native Modes.
- ★ Maximum 6 ATA deivces to connect (4 for P-ATA & 2 for S-ATA).

2 M/B BIOS CONFIGURATION

2.1 BIOS Configuration

Assumption: Have Intel RAID driver on floppy disk Assemble new system with ICH5R motherboard + 2 SATA HDDs.

2.1.1.System BIOS Setup:

1.Select Integrated Peripherals, Press < Enter>.



2.Select OnChip IDE Device, Press < Enter>

Phoenix - AwardBlOS CMOS Setup Uti Integrated Peripherals	lity
OnChip IDE Device [Press Enter] Onchip IDE Device [Press Enter]	Item Help
• Superior Entering Superior Device (Press Entering) Lan Root ROM of Realtek (Disabled)	Menu Level ►
↑↓→+:Move Enter:Select +/-/PU/PD:Ualue F10:Save H F5: Previous Values F6: Fail-Safe Defaults H	SC:Exit F1:General Help 7: Optimized Defaults

3.Change SATA Mode to RAID,On-Chip Serial ATA to Enhanced Mode and Serial ATA Port0/1 Mode to SATA0/1 master.

Phoenix - AwardBIOS CMOS Setup Uti OnChip IDE Device	ility
IDE HDD Block Mode (Enabled) On-Chip Primary PCI IDE (Enabled) IDE Primary Master PIO (Auto) IDE Primary Master PIO (Auto) IDE Primary Master DDMA (Auto) IDE Primary Master UDMA (Auto) IDE Scondary Slave UDMA (Auto) IDE Scondary Master UDMA (Auto) Scondary Master UDMA (Auto) IDE Scondary Master UDMA (Auto) Scondary Master (Master) Scondary Master (Master) Scondary Master (Master)	Iten Help Menu Level →→ If your IDE hard drive supports block mode select Enabled for actomatic offic the optimal number of block read/writes per sactor the drive can support
↑↓→+:Move Enter:Select +/-/PU/PD:Value F10:Save H F5: Previous Values F6: Fail-Safe Defaults H	SC:Exit F1:General Help 77: Optimized Defaults

3 CREATE INTEL RAID DRIVER

3.1 Create Intel RAID Driver Floppy Disk

This procedure should be used to create a floppy disk containing the Intel RAID driver for use in installing the RAID driver using the F6 method.

1.On a system running Windows, insert Motherboard Driver CD.

2. Insert a blank floppy diskette into the floppy drive.

3.Double-click on the D:\Intel\Raid\F6 install\F6 install.exe and answer all prompts presented, if your CD ROM Driver's label is D.

4. When installation is complete, your floppy should contain the following files:

iaStor.cat iaStor.inf iaStor.cat License.txt readme.txt TXTSETUP.oem

4 BIOS CONFIGURATION

4.1 Using the Intel RAID Option ROM

4.1.1 Creating, Deleting, and Resetting RAID Volumes

The Serial ATA RAID volume may be configured using the RAID Configuration utility stored within the Intel RAID Option ROM. During the Power-On Self Test (POST), the following message will appear for a

few seconds:

RAID Volumes: None defined. Non-RAID Disks: Port Drive Model Serial # Size Status Bootable 0 ST3120023AS 3KA0J1ZJ 111.7GB Normal Yes						
None defined. Non-RAID Disks: Port Drive Model Serial # Size Status Bootable 0 ST3120023AS 3KA0J1ZJ 111.7GB Normal Yes 1 ST3120023AS 3KACHOMO 111.7GB Normal Yes	RAID	Volumes:				
Non-RAID Disks: Port Drive Model Serial # Size Status Bootable O ST3120023AS 3KA0J1ZJ 111.7GB Normal Yes 1 ST3120023AS 3KA0H0M0 111.7GB Normal Yes	None	defined.				
Non-RAID Disks: Port Drive Model Serial # Size Status Bootable 0 ST3120023AS 3KA0J1ZJ 111.7GB Normal Yes 1 ST3120023AS 3KA0H0M0 111.7GB Normal Yes						
Port Drive Model Serial # Size Status Bootable 0 ST3120023AS 3KA0J12J 111.7GB Normal Yes 1 ST3120023AS 3KA0H0M0 111.7GB Normal Yes	Non-	RAID Disks:				
0 ST3120023AS 3KA0J1ZJ 111.7GB Normal Yes 1 ST3120023AS 3KA0H0M0 111.7GB Normal Yes	Port	Drive Model	Serial #	Size	Slalus	Bootable
1 ST3120023AS 3KA0H0M0 111.7GB Normal Yes		ST3120023AS	3KA0J1ZJ	111.7GB	Normal	Yes
	1	ST3120023AS	3KA0H0M0	111.7GB	Normal	Yes

After the above message shows, press <Ctrl> and <I> keys simultaneously to enter the RAID Configuration Utility.

4.1.2 Create RAID Volume

Note: The following procedure should only be used with a newly-built system or if you are reinstalling your operating system. The following procedure should not be used to migrate an existing system to RAID 0.

After pressing the <Ctrl> and <i> keys simultaneously, the following window will appear:

Intel(R) RAID for Serial ATA - RAID Configuration Utility Copyright(C) 2003 Intel Corporation. All Rights Reserved. v3.0.0.2344					
	I MAIN MENU J 1. Create RAID Volum 2. Delete RAID Volum 3. Reset Disks to No 4. Exit	19 18 19 - RA I D			
	C DISK/VOLUME INFORMA	TION 1			
RAID Volumes: None defined.					
Non-RAID Disks: Port Drive Model A ST3800236S	Serial # Экврицав	Size	Status Normal	Bootable Yes	
1 ST380023AS	3KB10RYW	74.5GB	Norma l	Yes	
[↑↓]-Select	[ESC]-Exit	FENTER	1-Select Me	<u>ли</u>	

Step 1. Select this option "Create RAID_Volume1" and press <Enter>. The followin screen appears:



Step 2. Specify a RAID Volume name and then press the <TAB> or <Enter>key to go to the next field.

Intel(R) RAID for Serial ATA - RAID Configuration Utility Copyright(C) 2003 Intel Corporation. All Rights Reserved. v3.0.0.2344
Name: RAID_Volume1 Strip Size: IZBKB RAID Level: RAID0(Striping) Capacity: 149.0GB Create Volume
[HELP]
Choose the strip value best suited to your RAID usage model. The following are typical values. 16KB - Best for sequential transfers 64KB - Good general nurnose strin size
128KB - Best performance for most desktops and workstations

Step 3. Select the strip value for the RAID 0 array by scrolling through the available values by using the "upper arrow" or "down arrow" keys and pressing the <Enter> key to select and advance to the next field.

- ★ The available values range from 4KB to 128 KB in power of 2 increments. The strip value should be chosen based on the planned drive usage. Here are some suggested selections:
 - ≻16 KB Best for sequential transfers
 - ≻64 KB Good general purpose strip size
 - 128 KB Best performance for most desktops and workstations. The default value.

Step 4. From the Strip size, press the <Tab> or <ENTER> key to advance to the "Create Volume" prompt. The window will appear as follows:

Intel(R) RAID for Se Copyright(C) 2003 Intel Cor	rial ATA - RAID Configuration Utility poration. All Rights Reserved. v3.0.0.2344
Name: Strip Sizo: RAIN Level: Capacity:	RAID_Volume1 128KB RAINA(Striping) 149.0GB
	Create Volume
	HELP J
Press "ENTER"	to Create the specified volume
[1] IChango [TOB]-Nov	t [FSC] Dwowiewe Menny [FNTED] Select

Step 5. Then Press <Enter> to create the specified volume and the following prompt will show:



Step 6. Press <Y> to confirm the selection or press <N> to create the RAID volume again.

Intel(R) R Copyright(C) 2003	AID for Serial ATA Intel Corporation.	- RAID All F	Configura lights Res	tion Utili erved. v3.6	ty 0.0.2344
	1. Create RAJ 2. Delete RAJ 3. Reset Disk 4. Exit	MENO J= ID Volum ID Volum Ks to No	le 10 11 - RAID		
	DISK/VOLUME	INFORM	TION 1-		
DAID Holumos'					
ID Name Ø RAID Volume1 L ST380023AS ST380023AS	Level RAIDO(Stripe) 3KBOVWDR 3KB10RYW	Strip 128KB Port0 Port1	Size 149.0GB 74.5GB 74.5GB	Status Normal Normal Normal	Bootable Yes
Non-RAID Disks: None defined.					
[↑↓]-Select	[ESC]-Exit	;	LENTE	R1-Select N	lenu

Step 7. Scroll to option 4 Exit and press <Enter> to exit the RAID Configuration utility. The following prompt appears:

Copyr i g	Intel(R) Rf (ht(C) 2003	AID for So Intel Co	erial ATA - rporation. [MAIN MI	RAID Conf All Right	igura s Res	ation Util: served, v3.	ity .0.0.2344
		1. (2.) 3. 4.) Are you :	Create RAID Delete RAID Reset Tisks Exit —[CONFIRM sure you wat	Volume Volume to Non-RA EXIT] nt to exit	ידח ? נצי	(N):	
RAID Volum None defir	nes: red.						
Non-RAID I Port Drive Ø ST380 1 ST380	Disks: Model 0023AS 0023AS	Serial 4 3KBØVWD1 3KB1ØRYI	# R W	Siz 74. 74.	e 5GB 5GB	Status Normal Normal	Bootable Yes Yes
[1	`↓]-Select		[ESC]-Exit		LENT	ER1-Select	Menu

Step 8. Click <Y> to confirm the exit.

4.1.3 Delete RAID Volume

Here you can delete the RAID volume, but please be noted that all data on RAID drives will be lost.

Intel(R) R Copyright(C) 2003	AID for Serial ATA Intel Corporation.	- RAID All R	Configura lights Res	tion Utili erved. v3.	ity 0.0.2344	
1. Create RAID Volume 2. Delete RAID Volume 3. Reset Disks to Non-RAID 4. Exit						
	C DISK/VOLUME	INFORMA	TION 1			
RAID Volumes:						
ID Name	Level	Strip	Size	Status	Bootable	
- ST380023AS	3KBØVWDR	Port0	74.5GB	Normal	ies	
ST380023AS	3KB10RYW	Port1	74.5GB	Normal		
Non-RAID Disks: None defined.						
[↑↓]-Select	[ESC]-Exit	ŧ	LENTE	Rl-Select	Menu	

Step 1. Select option 2 "Delete RAID Volume" from the main menu window and press the <Enter> key to select a RAID volume for deletion. The following window will appear:

Intel(R) RAID for Serial ATA - RAID Configuration Utility Copyright(C) 2003 Intel Corporation. All Rights Reserved. v3.0.0.2344						
Name	Level	Drives	Capacity	Status	Bootable	
RAID_Volume1	RAIDO(Stripe) 2	149.0GB	Normal	Yes	
THELP J						
Deleting a volume will destroy the volume data on the drive(s) and cause any member disks to become available as non-RAID disks.						
WARNING: EXISTING DATA WITHIN THIS VOLUME WILL BE LOST AND NON-RECOVERABLE						
[↑]	1Select (KESC)	1-Previous Me	enu [<nel>1-</nel>	-Nelete Vol	ume	

Step 2. Select the volume and press <Delete> key to delete the RAID volume. The following prompt appears:



Step 3. Press <Y> key to accept the volume deletion.

4.1.4 Reset Disks to Non-RAID

Step 1. Select option 3 **Reset Disks to Non-RAID** and press <Enter> to delete the RAID volume and remove any RAID structures from the drives. The following screen appears:



Step 2. Press <Y> key to accept the selection.

5 INSTALLING SOFTWARE

5.1 Install Driver in Windows XP

> New Windows XP Installation

The following details the installation of the drivers while installing Windows XP.

- 1. Start the installation: Boot from the CD-ROM. Press F6 when the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
- 2. When the Windows XP Setup window is generated, press S to specify an Additional Device(s).
- 3. At the beginning of Windows XP Setup, press F6 to install a third-party SCSI or RAID driver. When prompted, insert a floppy disk containing the Intel RAID driver. After reading the floppy disk. the 'Intel 82801ER SATA RAID Controller' will be presented -- select this driver to install.
- 4. Finish the Windows XP installation and install all necessary drivers.

5.2 Installation Intel Application Accelerator RAID Edition 3.0 software:

Click on the Next button to proceed the installation in the welcoming window.



After reading the license agreement in the following window, click **Yes** button to continue.



Select the folder in which you want the program to be installed in the following window, and click **Next** button to start installation.



Select a program folder in the following window where you want Setup to add the program icon.

Intel(R) Application Accelerator RAID Ec	lition Setup 🛛 🗙
Select Program Folder Please select a program folder.	
Setup will add program icons to the Program Fo name, or select one from the existing folders list Program Folders:	slder listed below. You may type a new folder t. Click Next to continue.
Intel(R) Application Accelerator RAID Edition Existing Folders: Accessories	
Administrative Tools DVD Encoder Games bonestech	
Intel(R) Application Accelerator RAID Edition MadOnion.com Realtek Sound Manager Startun	
InstallShield	
	<pre></pre>

The following window appears to show the Intel Application Accelerator RAID Edition Setup installation status.

Intel(R) Application Accelerator RAID Edition Setup	×
Setup Status	
Intel(R) Application Accelerator RAID Edition Setup is performing the requested operation	ons.
Installing;	
64%	
InstallShield	
	ancel

Once the installation is complete, the following window appears.



6 RAID MIGRATION INSTRUCTIONS

6.1 RAID Migration Instructions

The Intel Application Accelerator RAID Edition offers the flexibility to upgrade from a single Serial ATA (SATA) hard drive to a two drive RAID 0 configuration when an additional SATA hard drive is added to the system.

This process will create a new RAID volume from an existing disk. However, several important steps must be followed at the time the system is first configured in order to take advantage of RAID when upgrading to a second SATA hard drive:

- 1. BIOS must be configured for RAID before installing Windows* XP on the single SATA hard drive.
- 2. Install the Intel Application Accelerator RAID driver during Windows Setup.
- 3. Install the Intel Application Accelerator RAID Edition after the operating system is installed.

*Note:*A "Create from Existing Disk" operation will delete all existing data from the added disk and the data cannot be recovered. It's critical to backup all important data on the added disk before proceeding. However, during the migration process, the data on the source disk is preserved.

6.2 Create RAID Volume from Existing Disk

To create a RAID volume from an existing disk, right-click on **RAID Volume** and select **Create From Existing Disk** to create a new RAID volume as the screen below. You may also use the **RAID** drop-down menu and click on **Create Volume from Existing Disk**.

🔹 Intel(R) Application Accelerator RAID Edition	
File RAID View Help	
File RAID View Help RAID Device Information Report Support HAID SubSystem Device Information Right click on the device for actions. RAID Volum Image: Thot(R) 82801ER SATA RAID Controller Image: Thot(R) 82801ER SATA RAID Controller Image: Thot(R) 82801ER Create Manually Image: Port 1: ST380023AS Right click on 'RAID Volumes' to create a new Main Right click on 'RAID Volumes' to create a new Main	ormation mes er Value ata

6.2.1 Step 1 of 3: Select the source disk

For Step 1, select the source disk that you wish to use and then click **Next**. It is very important to note which disk is the source disk (the one containing all of the information to be migrated) and which one is the target disk. On a RAID Ready system, this can be determined by making a note during POST of which port (e.g. Port 0 or Port 1) the single disk is attached to.

You can also use the Intel Application Accelerator RAID Edition utility before the second disk is installed to verify the Port and serial number of the drive that contains all the data.

efore creating your new F isks. The current data on our new RAID Volume. Select Existing Disk ——	AID Volume you the disk you cho	must choose a source disk ose will automatically be tra	: from existing Insferred to
Member	Serial Number	GB (Free/Total)	
Port 0: ST380023AS Port 1: ST380023AS	3KB0VWDR 3KB10RYW	74.5 / 74.5 74.5 / 74.5	
		<< Back Next >>	Cancel

6.2.2 Step 2 of 3: Select the RAID Volume Name and Strip Size

In Step 2, select the RAID volume name and strip size, and click Next:

Step 2 of 3
Select the RAID volume name and strip size.
Select Name (Maximum of 16 characters) RAID_Volume1
Select RAID Level RAID 0
Select Strip Size C 4KB C 8KB C 16KB C 32KB C 64KB C 128KB
The optimal setting is 128KB. Selecting any other option may result in performance degradation.
<< Back Next >> Cancel

➢RAID Volume Name:

A desired RAID volume name needs to be typed in where the 'RAID_Volume1' text currently appears above. The RAID volume name has a maximum limit of 16 characters. The RAID volume name must also be in English alphanumeric ASCII characters.

≻Strip Sizes:

Select the desired strip size setting. As indicated, the optimal setting is 128KB. Selecting any other option may result in performance degradation. Even though 128KB is the recommended setting for most users, you should choose the strip size value which is best suited to your specific RAID usage model. The most typical strip size settings are:

4KB: For specialized usage models requiring 4KB strips

8KB: For specialized usage models requiring 8KB strips

16KB: Best for sequential transfers

32KB: Good for sequential transfers

64KB: Good general purpose strip size

128KB: Best performance for most desktops and workstations

Before you continue to Step 3 of 3 by clicking Next in Step 2 of 3, read the next 2 dialog boxes carefully. Please note that once you have selected **Migrate** on Step 3 of 3, the Intel Application Accelerator RAID Edition will have claimed the disks to be used in creating a new volume and this operation cannot be undone. It is critical that you backup all important data before selecting **Yes** to these dialog boxes:

Intel(R)	Application Accelerator
	The Intel Application Accelerator will now claim disks to be used in creating a new volume.
	This operation will DELETE ALL EXISTING DATA from the RAID-controlled hard drive(s) and the data cannot be recovered. Backup all important data before proceeding.
	The following disk(s) will be claimed: Port 1: ST380023AS
	Do you want to continue?
	Yes No
Intel(R)	Application Accelerator
	This operation will DELETE ALL EXISTING DATA from the RAID-controlled hard drive(s) and the data cannot be recovered. Backup all important data before proceeding.
	Do you want to continue?
	Yes No

6.2.3 Step 3 of 3: Confirm the creation of new RAID volume

In Step 3, confirm the creation of the new RAID volume and then click Migrate:

Step 3 of 3	×
Confirm creation of the new RAID volur	ne.
Parameter	Value
RAID Volume Name	RAID_Volume1
RAID Level	0
Size	149 GB
Strip Size	128 KB
Source Disk	
Non-RAID Disk	3KB0VWDR
Serial Number(s) of Target Disk(s)	2423 4 422
Member Disk	3KBUVWDR
Member Disk	3KBTURYW
	<< Back Migrate Cancel

6.3 Migration Process

The migration process may take up to two hours to complete depending on the size of the disks being used and the strip size selected. A dialog window will appear stating that the migration process may take considerable time to complete and you must click **Yes** in order to start the migration. While you can still continue using your computer during the migration process, once the migration process starts, it cannot be stopped. If the migration process gets interrupted and your system is rebooted for any reason, it will pick up the migration process where it left off. You will be provided with an estimated completion time (the remaining time will depend on your system) once the migration process starts as illustrated in the following example:



The following screen appears if the migration process is completed successfully. Then you have to reboot your system to use the full capacity of the new volume.

Intel(R)	Application Accelerator
2	RAID volume created from an existing disk successfully! The system will need to be rebooted to use the full capacity of your new volume.
	Do you want to reboot your system now?
	Yes No

7. Intel Application Accelerator RAID Edition Help System Requirements

In order to use the Intel Application Accelerator RAID Edition. the followingsystem reauirements must be met:

Desktop-based computer system Intel Pentium 4 processor Intel 865 chipset with an Intel 82801ER I/O Controller Hub Minimum 128 MB physical memory Two Serial ATA (SATA) hard drives Microsoft Windows XP Home Edition or Windows XP Professional. System BIOS with the Intel RAID Option ROM

8.Intel Application Accelerator RAID Edition Help RAID Overview

RAID (Redundant Array of Independent Disks) refers to multiple independent hard drives combined to form one large logical array. With RAID in place, the operating system (e.g. Windows XP) no longer deals with individual drives, but instead with the entire disk array as one logical drive.

The major objectives of RAID are to improve data availiability and security. This version of the Intel Application Accelerator RAID Edition supports RADI Level 0. RAID Levels 1,4,5, and 10 are currently not supported.

Installation CAUTION: When setting up RAID configurations and creating a volume, it is important to understand that installing the Intel Application Accelerator RAID Edition on a system will DELETE ALL EXISTING DATA from the RAID-controlled hard drive(s) and the data cannot be recovered. It is important to backup all important data before proceeding with installation.

Uninstall CAUTION: It is important to understand that uninstalling the Intel Application Acclerator RAID Edition from a RAID-configured system will DELETE ALL EXISTING DATA from the RAID-controlled hard drive(s) and the data connot be recovered. It is important to backup all important data before uninstalling.

RAID Levels How the Drivers are Organized

Each level of RAID spreads the data across the drives of the array in different way and is optimized for specific situations.

RAID0

RAID Level 0 combines two or more hard drives in a way that the data coming from the use is cut into manageable blocks. These blocks are striped across the different drives of the RAID 0 sequential access, can be improved. However, no read/write performance, especially for array, which means that if one hard driver fails, all data is lost. This lack of redundancy is also stated in the number 0, which indicates no redundancy. RAID 0 is thus usually not used in servers where security is a concern.

RAID0 Advantage:	Highest transfer rates
RAID0 Disadvantage:	No redundancy if one disk fails, all data will be lost
RAID 0 Application: high I/O rate	Tryically used in workstations for temporary data and

9.Intel Application Accelerator RAID Edition Why don't I see extra hard drive afer a RAID migration?

To ensure that non-Windows* partitions are kept intact, the migration to RAID 0 does not utilize the extra space made available by adding a second hard drive. To take advantage of the extra hard drive space you will need to do one of the following:

1.Create a new partition using Windows* Disk Management (See below for instructions)

-or-

2.Extend the partition to fill the rest of the available space. Windows does not natively include tools to do this, but there are 3rd party software utilities to accomplish this such as PartitionMagic* or Partition Commander*.

Installation for Creating a New Partition Using Windows Disk Management

To create a new partition using Windows Disk Management, complete the following steps:

Complete one of the following Step 1 tasks, then proceed with the remaining steps:

1. a) Right-Click "My Computer", select "Manage". In the Computer Management program window, left-click "Disk Management" in the program tree on the left(located under "Storage" subsection).

-or-

- 1. b)Within the Control Panel (Start/Control Panel), double-click "Administrative Tools". In the windows that appears, double-click "Computer Management". In the Computer Management program window, left-click "Disk Management" in the program tree on the left(located under "Storage" subsection).
- 2. Maximize the Computer Management program window for easier viewing.
- 3. In the Computer Management program window, you should see your RAID Volume represented as a physical disk. Notice that the RAID Volume size of the two Serial ATA disks combined. At this point, you sjould see the partitions within the RAID Volume that were originally on the single disk you used as your source. After the partitions, you should see a grey area labeled "Free Space". This area will have to be partitioned and formatted before it may be used.