
User's Guide
for
ICH7R RAID

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1.1 Introduction

Following are the Parallel ATA (P-ATA) and Serial ATA (S-ATA) device configurations supported by Intel ICH7R.

➤ **ATA Operate Mode:**

There are two modes to select: SATA Only mode and Native mode.

➤ **SATA Only Mode:**

Supports 4 S-ATA devices.

➤ **Native Mode:**

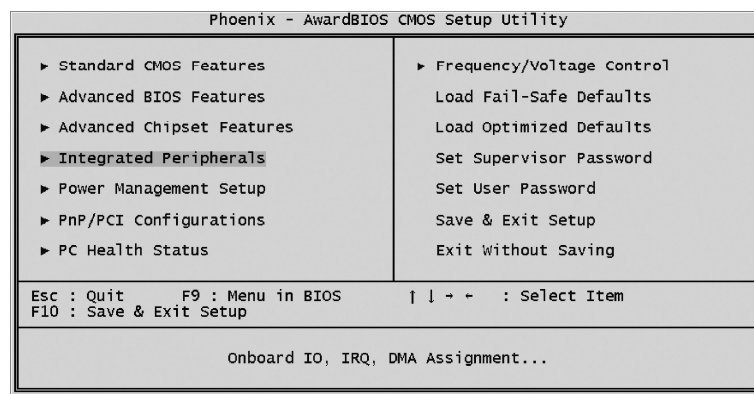
1. In this mode, system BIOS will search all available IRQs to use for HDD.
2. New OS that support switch to Native Mode (Win2K, WinXP, Windows .NET Server) can set SATA and PATA to Native Mode.
3. Enhanced Mode : Maximum of 4 ATA devices.
4. RAID Mode : Maximum of 4 ATA devices.
5. Supports 2 P-ATA and 4 S-ATA devices.

2.1 BIOS Configuration

Assumption: Have Intel RAID driver on floppy disk Assemble new system with ICH7R motherboard + 4 SATA HDDs.

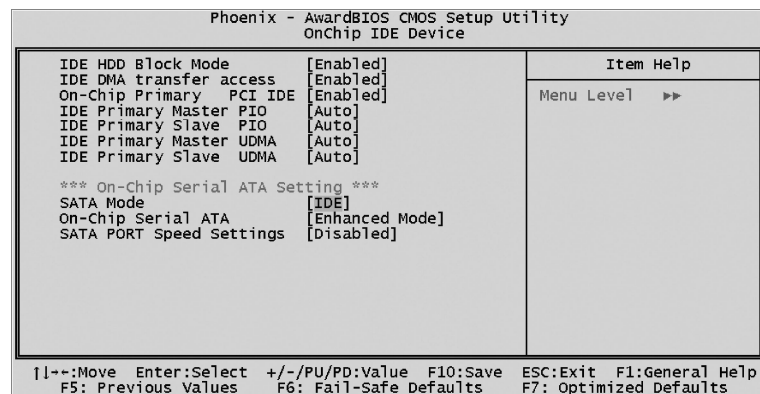
2.1.1 System BIOS Setup:

1. Select Integrated Peripherals, Press <Enter>.



2. Select OnChip IDE Device, Press <Enter>.

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



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\945\F6_disk\32bit\F6flpy32.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:

<u>iaahci.cat</u>	<u>iaahci.inf</u>	<u>iastor.cat</u>
<u>iastor.inf</u>	<u>iastor.sys</u>	<u>license.txt</u>
<u>readme.txt</u>	<u>txtsetup.oem</u>	

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.

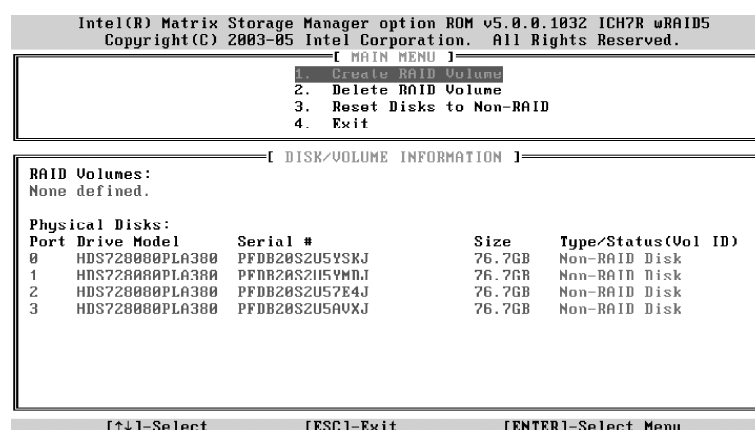
During the Power-On Self Test (POST), the following message will appear for a few seconds.

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:



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

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[ CREATE VOLUME MENU ]

Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 0.0 GB

Create Volume

[ HELP ]

Enter a string between 1 and 16 characters in length that can be used
to uniquely identify the RAID volume. This name is case sensitive and
can not contain special characters.

[↑↓]Change [TAB]Next [ESC]Previous Menu [ENTER]Select
```

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

Step 2. Choose the RAID level : RAID0(Stripe) or RAID1(Mirror) or RAID10 or RAID5 best suited to your usage model.

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[ CREATE VOLUME MENU ]

Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 0.0 GB

Create Volume

[ HELP ]

Choose the RAID level best suited to your usage model.

RAID0 - Data striped across multiple physical drives for performance.
RAID1 - Data mirrored across multiple physical drives for redundancy.
RAID10 - Striped volume whose segments are RAID 1 volumes. Requires
four hard drives. Functionally equivalent to RAID0+1.
RAID5 - Data and parity striped across three or more physical drives
for performance and redundancy.

[↑↓]Change [TAB]Next [ESC]Previous Menu [ENTER]Select
```

After choose RAID level, use the “upper arrow” or “down arrow” keys and press the <Tab> or <Enter> key to select and advance to the next field.

If select the strip value for the RAID 0 array ,the available values range from 4KB to 128 KB in power of 2 increments. The strip size 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 3. 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) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[ CREATE VOLUME MENU ]

      Name: Volume0
  RAID Level: RAID0(Stripe)
      Disks: Select Disks
  Strip Size: 128KB
   Capacity: 306.8 GB

          Create Volume

[ HELP ]

Enter the volume capacity. The default value indicates the
maximum volume capacity using the selected disks. If less
than the maximum capacity is chosen, creation of a second
volume is needed to utilize the remaining space.

[↑↓]Change [TAB]-Next [ESC]-Previous Menu [ENTER]-Select
```


Step 4. Then Press <Enter> to create the specified volume and the following prompt will show:

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[ CREATE VOLUME MENU ]

Name: Volume8
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 306.8 GB
Create Volume

[ HELP ]

Press "ENTER" to Create the specified volume.

[↑↓]Change [TAB]Next [ESC]Previous Menu [ENTER]Select
```

Step 5. Press <Y> to confirm the selection and the following prompt will show:

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[ CREATE VOLUME MENU ]

Name: Volume8
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 306.8 GB

WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N):

Press "ENTER" to Create the specified volume.

[↑↓]Change [TAB]Next [ESC]Previous Menu [ENTER]Select
```

or press <N> to create the RAID volume again.

Step 6. Scroll to option 4 Exit and press <Enter> to exit the RAID Configuration utility. The following prompt appears:

```

Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 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 Volume0 RAID0(Stripe) 128KB 153.4GB Normal Yes

Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 HDS728080PLA380 PFDB20S2U5VMDJ 76.7GB Member Disk(0)
1 HDS728080PLA380 PFDB20S2U5AUXJ 76.7GB Member Disk(0)
2 HDS728080PLA380 PFDB20S2U57E4J 76.7GB Non-RAID Disk
3 HDS728080PLA380 PFDB20S2U5YSKJ 76.7GB Non-RAID Disk

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

```

Step 7. 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) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 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 Volume0 RAID0(Stripe) 128KB 306.8GB Normal Yes

Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 HDS728080PLA380 PFDB20S2U5YSKJ 76.7GB Member Disk(0)
1 HDS728080PLA380 PFDB20S2U5VMDJ 76.7GB Member Disk(0)
2 HDS728080PLA380 PFDB20S2U57E4J 76.7GB Member Disk(0)
3 HDS728080PLA380 PFDB20S2U5AUXJ 76.7GB Member Disk(0)

[↑↓]-Select [ESC]-Exit [ENTER]-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) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[ DELETE VOLUME MENU ]
Name      Level      Drives    Capacity  Status    Bootable
Volume0   RAID0(Stripe)  4         386.8GB   Normal    Yes

[ HELP ]

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.

[↑↓]Select  [ESC]>1-Previous Menu  [DEL]>1-Delete Volume

```

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

```

Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[ DELETE VOLUME MENU ]
Name      Level      Drives    Capacity  Status    Bootable
Volume0   RAID0(Stripe)  4         386.8GB   Normal    Yes

[ DELETE VOLUME VERIFICATION ]

ALL DATA IN THE VOLUME WILL BE LOST!
Are you sure you want to delete volume "Volume0"? (Y/N):

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.

[↑↓]Select  [ESC]>1-Previous Menu  [DEL]>1-Delete Volume

```

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

4.1.4 Reset Disks to Non-RAID

Here you can reset RAID data, but please be noted that the reset drive will revert back to Non-RAID disks.

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 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 Volume0 RAID0(Stripe) 128KB 306.0GB Normal Yes

Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 HDS728000PLA300 PFD020S2U5Y3KJ 76.7GB Member Disk(0)
1 HDS728000PLA300 PFD020S2U5YMDJ 76.7GB Member Disk(0)
2 HDS728000PLA300 PFD020S2U57E4J 76.7GB Member Disk(0)
3 HDS728000PLA300 PFD020S2U5AUXJ 76.7GB Member Disk(0)

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

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. Use the “upper arrow” or “down arrow” keys to choose which disks to reset. The following screen appears:

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume
[ RESET RAID DATA ]

Resetting RAID data will remove internal RAID structures
from the selected RAID disks. By removing these structures,
the drive will revert back to a non-RAID disk.

WARNING: Resetting a disk causes all data on the disk to be lost.

RAID ID 0
Port Drive Model Serial # Size Status
0 HDS728000PLA300 PFD020S2U5Y3KJ 76.7GB Member Disk
1 HDS728000PLA300 PFD020S2U5YMDJ 76.7GB Member Disk
2 HDS728000PLA300 PFD020S2U57E4J 76.7GB Member Disk
3 HDS728000PLA300 PFD020S2U5AUXJ 76.7GB Member Disk

Select the disks that be reset.

[↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete

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

Step 2. Press <SPACE> key to select the disk.

The following screen appears:

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume
[ RESET RAID DATA ]

Resetting RAID data will remove internal RAID structures
from the selected RAID disks. By removing these structures,
the drive will revert back to a non-RAID disk.

WARNING: Resetting a disk causes all data on the disk to be lost.

RAID 0
Ph Po A 1 2 3
Port Drive Model      Serial #      Size Status
▶ 0 HDS728080PLA380    PFD820S2U5YSKJ  76.7GB Member Disk
▶ 1 HDS728080PLA380    PFD820S2U5YMDJ  76.7GB Member Disk
▶ 2 HDS728080PLA380    PFD820S2U57E4J  76.7GB Member Disk
▶ 3 HDS728080PLA380    PFD820S2U5AUXJ  76.7GB Member Disk
Are you sure you want to reset RAID data on selected disks? (Y/N):

[↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete

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

Step 3. Press <Y> key to accept the selection.

5.1 Install Driver in Windows XP

➤ New Windows XP InstallationResetting RAID Volumes

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

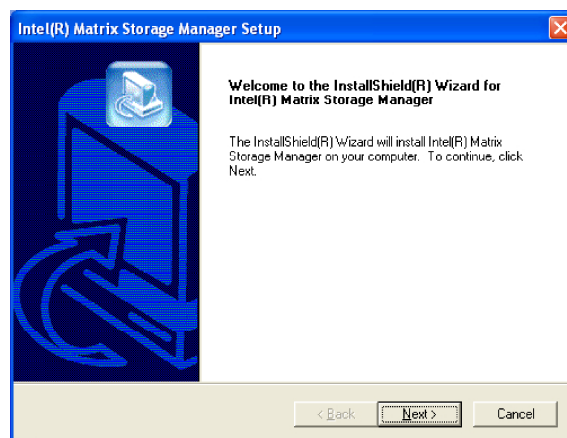
1. Start the installation: Boot from the CD-ROM. Press **F6** when the message “**Press F6 if you need to install third party SCSI or RAID driver**” appears.
2. When the Windows XP Setup window is generated, press **S** to specify an Additional Device(s).
3. At the beginning of Windows XP Setup, press **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 82801GR SATA RAID Controller**' will be presented -- select this driver to install.

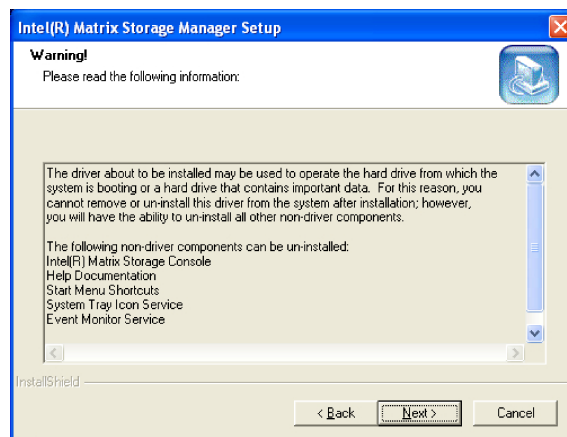
4. Finish the Windows XP installation and install all necessary drivers.

5.2 Installation Intel Matrix Storage RAID Edition 5.0 software:

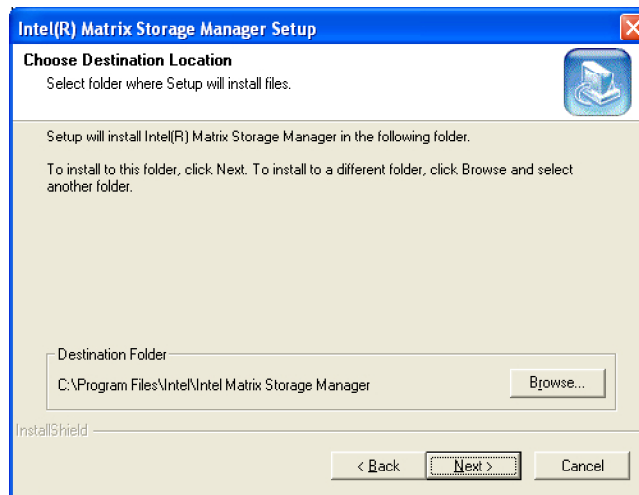
1. Click on the Next button to proceed the installation in the welcoming window.



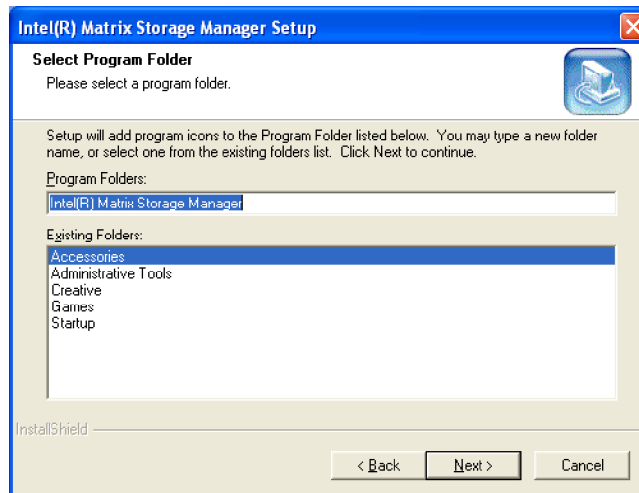
2. After reading the license agreement in the following window, click Yes button to continue.



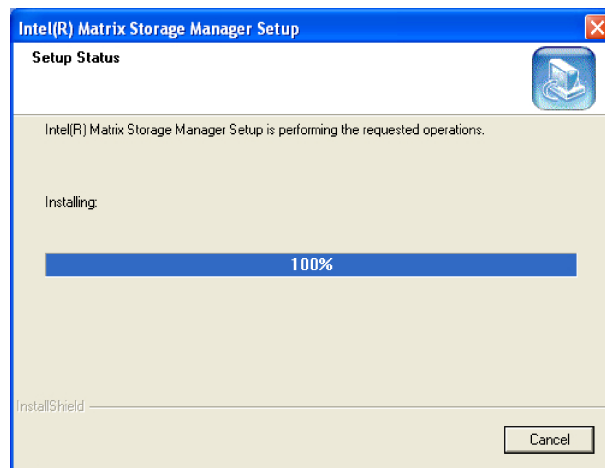
-
3. Select the folder in which you want the program to be installed in the following window, and click Next button to start installation.



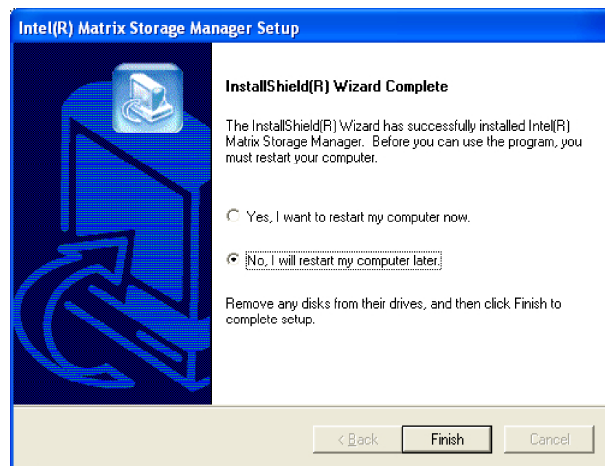
4. Select a program folder in the following window where you want Setup to add the program icon.



-
5. The following window appears to show the Intel Matrix Storage RAID Edition Setup installation status.



6. Once the installation is complete, the following window appears.



7. Click Finish button to continue.

6.1 RAID Migration Instructions

The Intel Matrix Storage 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.

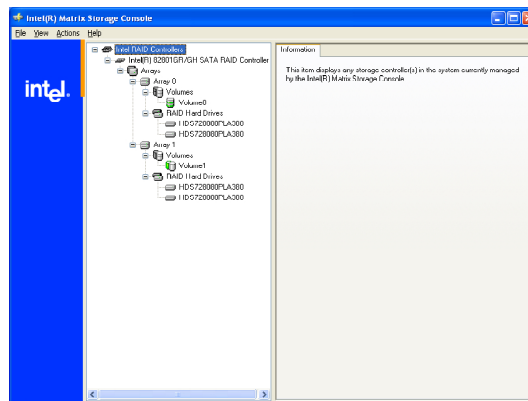
This process will create a new RAID volume from an existing disk. However, several important steps must be followed at the time the system is first configured in order to take advantage of RAID when upgrading to a second SATA hard drive:

1. BIOS must be configured for RAID before installing Windows* XP on the single SATA hard drive.
2. Install the Intel Matrix Storage RAID driver during Windows Setup.
3. Install the Intel Matrix Storage 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 Disk

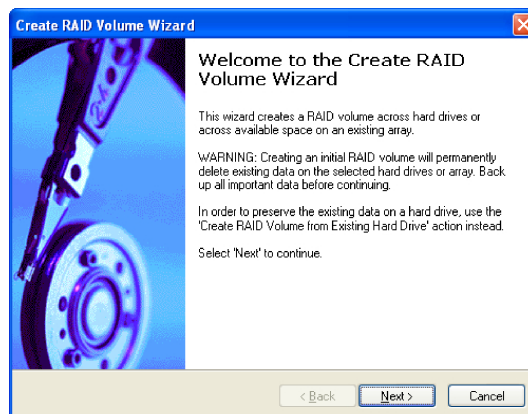
1. Run Intel Matrix Storage software. The following window appears:



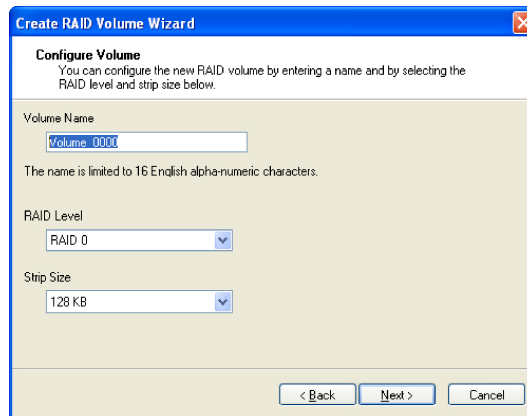
6.2.1 Create RAID volume

The following steps outline how to build a RAID 1 or RAID 0 or RAID 5 or RAID 10 system with Microsoft Windows XP installed using two SATA hard drives.

- Step 1.** Click **Actions** and select **Create RAID volume** to create a new RAID volume, click **NEXT** button to connect.



Step 2. Select the RAID volume name, RAID Level, and select Strip Size. Then click **NEXT**.



➤ **RAID Volume Name:**

A desired RAID volume name needs to be typed in where the "RAID_Volume0" 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.

➤ **RAID Level:**

RAID0 : Striped Disk Array without Fault Tolerance

RAID1 : Mirroring and Duplexing.

RAID5 : Independent Data Disk with Distributed Parity Blocks

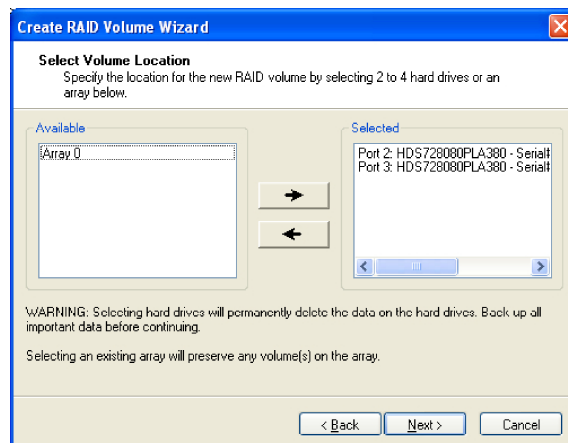
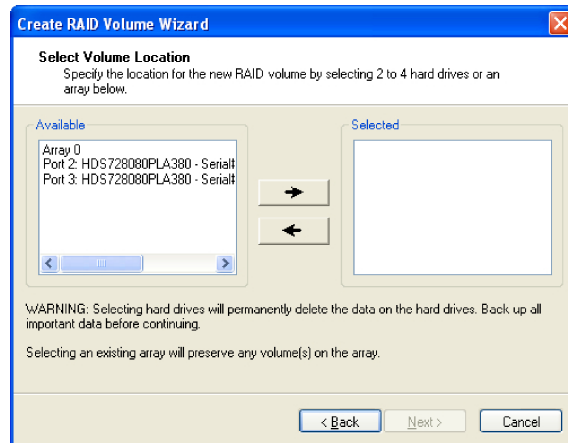
RAID10: Very High Reliability Combined with high Performance

➤ **Strip Size:**

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:

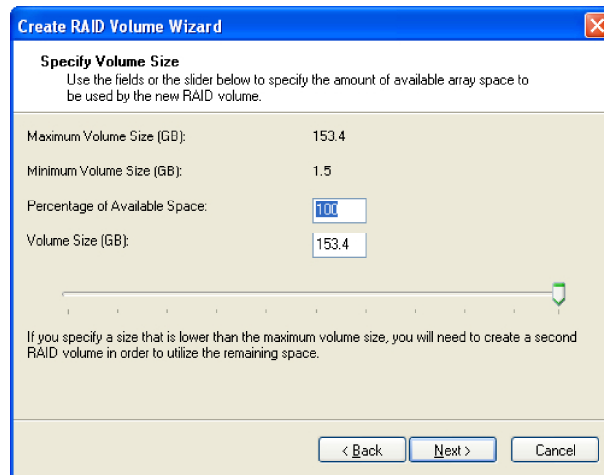
-
- 8KB:** For specialized usage models requiring 8KB strips
 - 16KB:** Best for sequential transfers
 - 32KB:** Good for sequential transfers
 - 64KB:** Good general purpose strip size
 - 128KB:** Best performance for most desktops and workstations

Step 3. Select the hard drives that you wish to use.

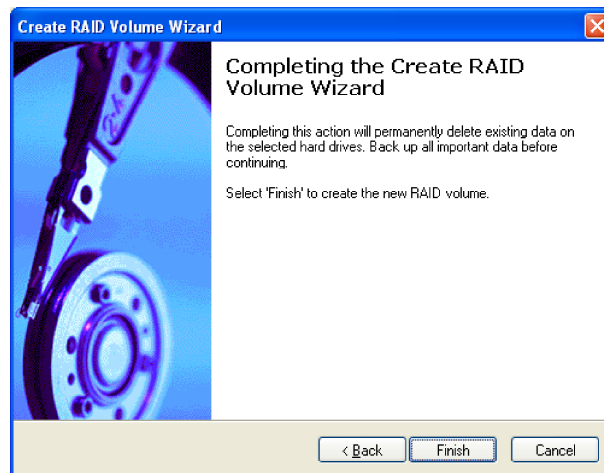


Then click **Next**.

Step 4. Specify the amount of available array space to be used by the new RAID volume. Then click **NEXT**.



The following window appears:



Click **Finish**.

6.2.2 Create RAID volume from Existing Hard Device

Before you click **Create RAID Volume** in Step 1, select **Create RAID volume from Existing Hard Device**. Then build a RAID system with Microsoft Windows installed using 2 SATA devices.

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 2) the single disk is attached to.

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

7.1 Intel Matrix Storage RAID Edition Help System Requirements

In order to use the Intel Matrix Storage RAID Edition. The followingsystem reauirements must be met:

Desktop-based computer system.

Intel Pentium 4 processor.

Intel 945G chipset with an Intel 82801GR I/O Controller Hub.

Minimum 128 MB physical memory.

Four Serial ATA (SATA) Hard drives.

Microsoft Windows XP Home Edition or Windows XP Professional or Windows 2000 Professional.

System BIOS with the Intel RAID Option ROM

8.1 Intel Matrix Storage RAID Edition

Why don't I see extra hard drive after 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:

- 1a. 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-

- 1b. 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 should 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.