Intel® Application Accelerator

User's Manual

Revision 2.0

June 2004

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Revision History

Revision Number	Description	Revision Date
1.0	Initial Release.	March 20, 2003
1.1	Added RAID 1 information	June 6, 2003
2.0	Added Intel® Matrix RAID Technology, AHCI/Native Command Queuing information	June 15, 2004

Document Conventions

Throughout this document, symbols are used to indicate important messages to the reader. These are marked as note, important note, caution or warning.

Note: Note and **Important Note**: Means *reader take note*. Notes can also contain helpful suggestions or references.

Caution: Caution: This symbol means *reader be careful*.

Warning: Warning: Not following these instructions might render the system unusable. Certain functions may also have consequences that you need to be aware of.

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1 *Scope of This Document*

This document discusses how to properly configure your system when using the Intel® Application Accelerator.

The issues discussed in this guide are only relevant on systems implementing a RAID solution and using a supported Intel chipset and supported operating system.

- Supported Intel chipsets
  http://support.intel.com/support/chipsets/imst/sb/CS-012492.htm

- Supported operating system
  http://support.intel.com/support/chipsets/imst/sb/CS-009343.htm

Please note that the Intel Application Accelerator does NOT support Beta or pre-released versions of any Windows* operating systems.

The majority of the issues contained in this document are related to either software configuration or hardware integration. Intel is not responsible for the software written by third party vendors or the implementation of Intel components in the products of third party manufacturers.

Customers should always contact the place of purchase or system/software manufacturer with support questions about their specific hardware or software configuration.

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2 RAID Background

RAID (Redundant Array of Inexpensive Disks) was originally conceived at the University of California at Berkeley in 1987 by David A. Patterson, Garth Gibson, and Randy H. Katz. The focus of their research was to improve storage subsystem performance and reliability. As a result of their findings, they proposed five levels of RAID (RAID 0 – RAID 5) to provide a balance of performance and data protection. Each RAID level is designed for speed, data protection, or a combination of both. Patterson, Gibson, and Katz published their findings in a document titled "A Case for Redundant Arrays of Inexpensive Disks (RAID)." This document is archived at the University of California, Berkeley:

http://sunsite.berkeley.edu/TechRepPages/CSD-87-391

RAID was designed to improve the way computers manage and access mass storage of data by providing an independent and redundant system of disks. Instead of writing to one Single Large Expensive Disk (SLED), RAID writes to multiple independent disks.

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3 RAID 0 (Striping)

RAID 0 leverages the read/write capabilities of two or more hard drives working in unison to maximize the storage performance of a computer system. Data in a RAID 0 array is arranged into blocks that are interleaved among the disks so that reads and writes can be performed in parallel (see below diagram). This technique, known as "striping", is the fastest of all of the RAID levels, especially for reading and writing large sequential files. Real world usage models where RAID 0 can be of particular benefit include loading large files into an image editing application such as Adobe* Photoshop*, saving large movie files in a video editing application such as Adobe* Premiere*, or creating CD or DVD images with a CD/DVD authoring package such as Roxio* Easy CD Creator*.

The hard drives in a RAID 0 array are combined to form one volume which appears as a single virtual drive to the operating system. For example, two 40 GB hard drives in a RAID 0 array will appear as a single 80 GB hard drive to the operating system.

No redundancy information is stored in a RAID 0 array. This means that if one hard drive fails, all data on both drives is lost. This lack of redundancy is also reflected by the RAID level 0, which indicates no redundancy. RAID 0 is not recommended for use in servers or other environments where data redundancy is a primary goal.
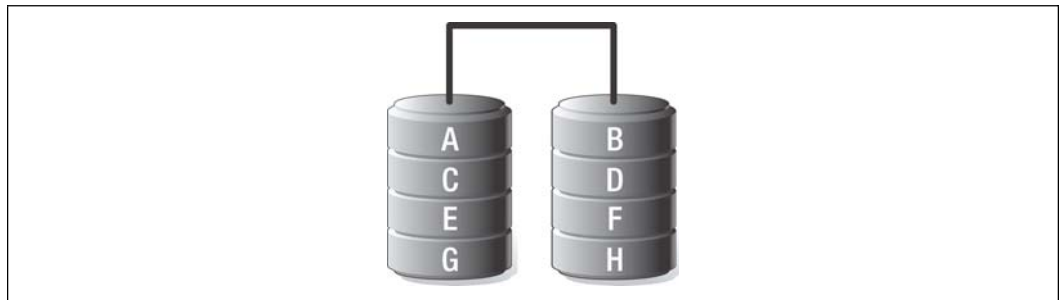
Figure 1. RAID 0

Minimum Disks:	2
Advantage:	Highest transfer rates
Redundancy:	None – if one disk fails all data will be lost
Application:	Typically used in desktops and workstations for maximum performance for temporary data and high I/O rate

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4 RAID 1 (Mirroring)

A RAID 1 array contains two hard drives where the data between the two is mirrored in real time. Since all of the data is duplicated, the operating system treats the usable space of a RAID 1 array as the maximum size of one hard drive in the array. For example, two 40 GB hard drives in a RAID 1 array will appear as a single 40 GB hard drive to the operating system.

The primary benefit of RAID 1 mirroring is that it provides good data reliability in the case of a single disk failure. When one disk drive fails, all data is immediately available on the other without any impact to the data integrity. In the case of a disk failure, the computer system will remain fully operational to ensure maximum productivity.

The performance of a RAID 1 array is greater than that of a single drive since data can be read from multiple disks simultaneously, although disk writes do not realize the same benefit as is the case with RAID 0.
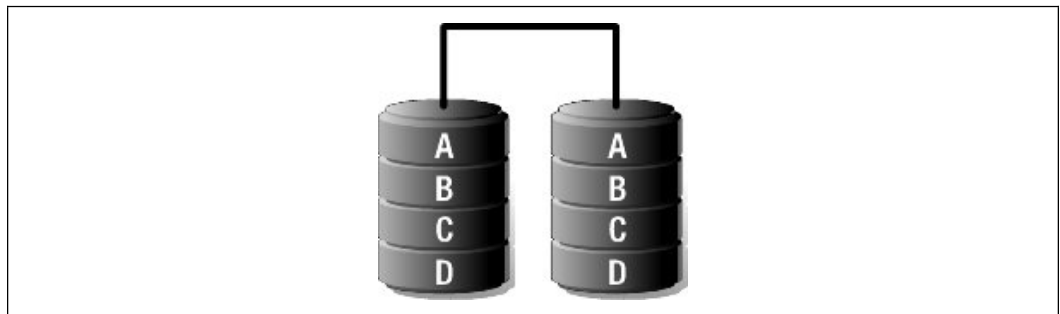
Figure 2. RAID 1

Minimum Disks:	2
Advantage:	100% redundancy of data. One disk may fail, but data will continue to be accessible. A rebuild to a new disk is recommended to maintain data redundancy.
Redundancy:	Excellent – disk mirroring means that all data on one disk is duplicated on another disk.
Application:	Typically used for smaller systems where capacity of one disk is sufficient and for any application(s) requiring very high availability.

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5 Matrix RAID (Two Volumes Per Array)

Intel innovation continues with the introduction of Matrix RAID, which combines the benefits of RAID 0 performance and RAID 1 protection on two hard drives. For example, games and video editing can benefit from improved performance by being stored on a RAID 0 volume; at the same time, valuable personal photos and financial records can be better protected from a drive failure by being stored on the RAID 1 volume.

Matrix RAID provides better data protection than RAID 0 alone. It does this by providing a second volume of RAID 1 storage, where data can be protected from a single hard drive failure. Additionally, Matrix RAID provides greater total storage capacity and improved performance than is provided by RAID 1 alone.
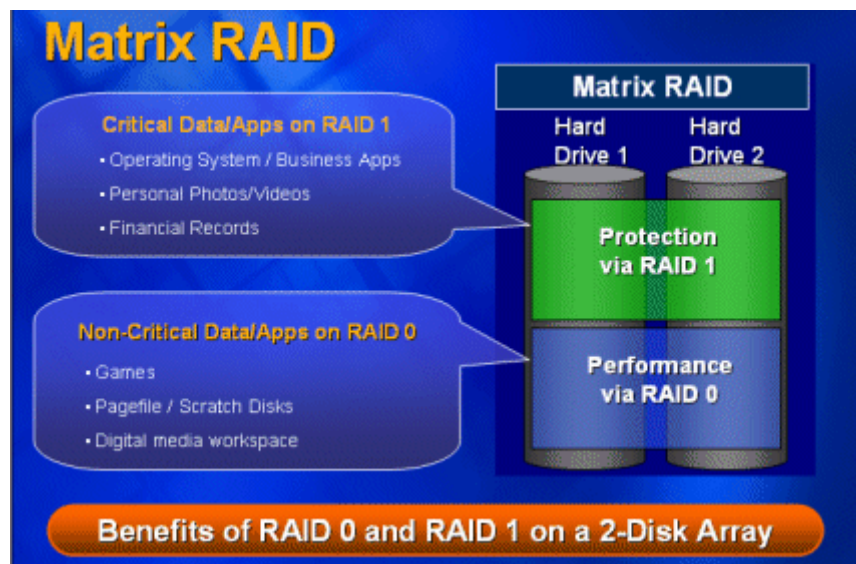
Figure 3. Matrix RAID

Minimum Disks:	2
Advantage:	Combines benefits of RAID 0 and RAID 1 on two hard drives.
Data Protection:	Data stored on the RAID 1 volume is redundant and remains accessible in the event of a single hard drive failure.
Application:	Matrix RAID is an option for advanced users who desire increased capacity and performance while still protecting some data from a single hard drive failure.

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6 RAID Migration Feature

The RAID migration feature in the Intel® Application Accelerator is an advanced software technology that enables a properly configured PC, known as a "RAID Ready" system, to be easily converted into a high-performance RAID 0 or RAID 1configuration by simply adding a Serial ATA hard drive to the system and invoking the RAID migration process from within Windows*.

The migration to a RAID 0 or RAID 1 configuration is performed without the traditional requirements of an operating system re-install. All applications and data remain intact.

The migration process itself can take up to several hours depending on the size of the hard drives being converted, but the system is still fully functional while the migration is being performed – it is possible to conduct other activities such as surf the Web and/or run productivity applications while the system is being migrated. The only limitation is that some disk intensive tasks may experience slower performance during a RAID migration.

The RAID migration feature also features advanced safety algorithms to ensure that an interrupted migration does not result in data loss or corruption. If the migration process is interrupted via a power loss or system reset, the migration will resume from the point of its most recent progress upon the next system reboot.

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7 Advanced Host Controller Interface / Native Command Queuing

Advanced Host Controller Interface

Advanced Host Controller Interface (AHCI) is an interface specification that allows the storage driver to enable advanced Serial ATA features such as Native Command Queuing and Native Hot Plug.

Note: AHCI is built into the Intel® 915 and Intel® 925 Express Chipsets that use the Intel® 82801FR I/O Controller Hub (ICH6R) and requires Intel® Application Accelerator version 4.0 or later.

Native Command Queuing

Native Command Queuing (NCQ) is a feature supported by AHCI, It allows Serial ATA hard drives to accept more than one command at a time. NCQ, when used in conjunction with a hard drive that supports NCQ, increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.

Note: In order to take advantage of NCQ, you need: Intel 915 or Intel 925 Express Chipset with the ICH6R, Intel Application Accelerator version 4.0 or later, and a hard drive which supports NCQ.

Native Hot Plug

Native hot plug is a feature supported by AHCI, allowing Serial ATA hard drive removal or insertion while the system is powered on and running. For example, this may be used when replacing a failed hard drive that is in an externally-accessible drive enclosure.

Note: In order to take advantage of native hot plug, you need the following:

- Intel 915 or Intel 925 Express Chipset using ICH6R

- Intel Application Accelerator version 4.0 or later

- A hard drive which supports hot plug.

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8   Intel Application Accelerator

8.1   Description

The Intel Application Accelerator software package provides high-performance Serial ATA and Serial SATA RAID capabilities in Windows* XP, Windows 2000, and Windows Server 2003. Intel Application Accelerator contains the following key features:

- Serial ATA RAID driver for Windows XP, Windows 2000, and Windows Server 2003, providing RAID 0 for improved performance, RAID 1 for improved protection against hard drive failures, and Matrix RAID for a combination of RAID 0 and RAID 1 benefits.

- Advanced Host Controller Interface support for both RAID and non-RAID Serial ATA drives, providing Native Command Queuing performance benefits, as well as Native Hot Plug capability.

- Intel® Storage Utility, which provides the Windows* user interface for managing Serial ATA drives and RAID arrays

- Migration Feature, allowing migration from a single-drive "RAID Ready" configuration to a RAID 0 or RAID 1 configuration, without the need to reinstall the operating system. Systems can even be migrated from a "RAID Ready" configuration to a Matrix RAID configuration by migrating to RAID 0 as selecting the minimum volume size. Once the migration is complete, a RAID 1 volume can be created in the remaining free array space.

- User Notification provides SMART notification and early warning of potential hard drive failures through the use of balloon messages from a system tray icon.

8.2   Do You Need the Intel Application Accelerator?

The Intel Application Accelerator is required if you have supported hardware and would like to enable RAID performance or data protection features on two hard drives, or enable Native Command Queuing performance on single drive RAID systems. The Intel Application Accelerator is not required for stand-alone Serial ATA hard drive(s) to work properly (e.g. not configured for RAID or AHCI).

To use the Intel Application Accelerator, your system must meet ALL of the following requirements:

- A supported Intel chipset
      http://support.intel.com/support/chipsets/imst/sb/CS-012492.htm

- A supported operating system
      http://support.intel.com/support/chipsets/imst/sb/CS-009343.htm

To take advantage of increased storage subsystem performance and overall system performance, your system must meet the following requirement:

- A Serial ATA device (e.g. hard drive that supports Generation 1 transfers)

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- A hard drive which supports Native Command Queuing (NCQ), a feature supported by Advanced Host Controller Interface (AHCI)

Warning: Serial ATA has specific requirements. Please refer to the Appendix C.3 for more information.

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9 *Serial ATA (SATA)*

9.1 Description

Serial ATA (SATA) is a new storage interface designed to replace parallel ATA (e.g. IDE technology). SATA was designed for a variety of reasons including performance headroom, cabling issues, and voltage tolerance requirements. SATA combines software transparency, low cost, scalability, and design flexibility. SATA has attracted widespread industry support through the Serial ATA Working Group (www.serialata.org).

Note: Please refer to Appendix A for additional information on Serial ATA hard drives.

9.2 Installing Serial ATA Hard Drives

Note: Please refer to Appendix A for additional information on Serial ATA hard drives.

Installing Serial ATA (SATA) hard drives requires the use of a SATA data cable (7-pin, 4-conductor) which supports the Serial ATA protocol and a SATA power cable. Either end of the SATA data cable can be connected to the SATA hard drive or the connector on the motherboard.

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For correct cable installation** (refer to illustration below):

1. Attach either cable end to the connector (A) on the motherboard
2. Attach the other cable end (B) to the SATA hard drive

Note: Both the data and power SATA cables are new designs – you cannot use older 40-pin 80-conductor IDE or regular IDE power cables with SATA hard drives.

** You should always carefully follow any instructions that come from the hard drive manufacturer.
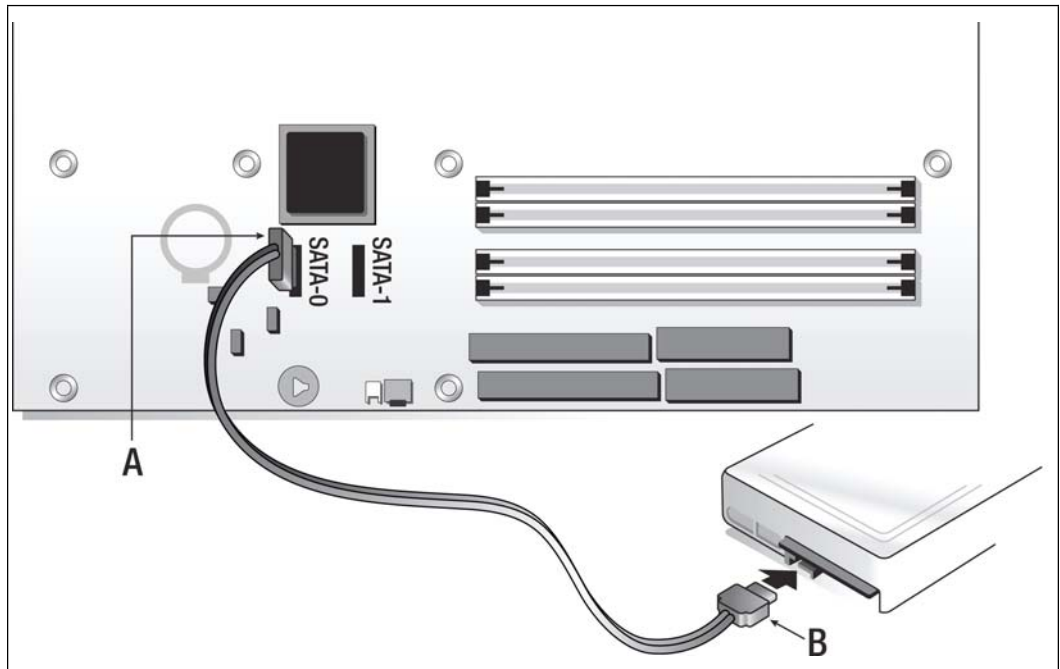
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10   BIOS Importance / Settings

In order to install the Intel Application Accelerator, it is required that the system BIOS includes the Intel® Application Accelerator RAID option ROM.

It is also necessary that the system BIOS is set up correctly for the RAID controller before installing the Intel Application Accelerator. Refer to the motherboard documentation or contact the motherboard manufacturer or your place of purchase for instructions on properly configuring the system BIOS for RAID.

If you are using an Intel motherboard with a supported Intel chipset,
 (*see http://support.intel.com/support/chipsets/imst/sb/CS-012492.htm*) Section 11 identifies how to configure the BIOS for Intel® RAID for Serial ATA.

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11 Configuring BIOS for Intel RAID for Serial ATA on Intel Motherboards

Note: The instructions listed below are specific to motherboards manufactured by Intel with a supported Intel chipset. Always follow the instructions that are provided with your motherboard.

** The specific BIOS settings on non-Intel manufactured motherboards may differ from the instructions listed below. **

The RAID option must be enabled in BIOS before the system can load the Intel Application Accelerator RAID option ROM code for Intel RAID.

1. Enter the BIOS Setup program by pressing the <F2> key after the Power-On-Self-Test (POST) memory test begins.
2. Select the Advanced menu, then the Drive Configuration menu.
3. Switch the Drive Mode option from Legacy to Enhanced.
4. Switch the RAID option to Enabled.
5. Press <F10> to save the BIOS settings and exit the BIOS Setup program.

11.1 Creating, Deleting, and Resetting RAID Sets

Note: Please refer to Section 13 for illustration examples of the Intel Application Accelerator RAID option ROM windows.

The Serial ATA RAID set must be configured in the RAID Configuration utility. During the Power-On Self Test (POST), the following message will appear for a few seconds:

Press <Ctrl-I> to enter Raid Configuration utility

After the above message appears, press the <Ctrl> and <i> keys simultaneously.

11.2 Create RAID 0 or RAID 1 Volume

Note: Please refer to Section 13 for illustration examples of the Intel Application Accelerator RAID option ROM windows.

1. Select option *1 Create RAID Volume* and press the `<Enter>` key.
2. If you selected RAID 0, select the RAID level and press the <Enter> key.
3. Select the strip value for the RAID array by scrolling through the available values by using the <↑> or <↓> keys and pressing the <Enter> key.
4. The available values range from 4 KB to 128 KB in power of 2 increments. The strip value should be chosen based on the planned drive usage. Some suggested selections are listed below. The default selection is 128 KB.

   - 16 KB – low disk usage
   - 64 KB – typical disk usage
   - 128 KB – performance disk usage

5. At the Create Volume prompt, press the <Enter> key to create the array. Confirm this selection by pressing the <Y> key after the prompt.
6. Scroll to option 4 Exit and press the <Enter> key to exit the RAID Configuration utility. Confirm the exit by pressing the <Y> key.

11.3 Delete RAID Volume

Note: Please refer to Section 13 for illustration examples of the Intel Application Accelerator RAID option ROM windows.

Warning: All data on the RAID drives will be lost.

1. Select option 2 Delete RAID Volume and press the <Enter> key to delete the RAID volume.
2. Use the up and down arrow keys to select the volume you would like to delete.
3. Press the <Delete> key to delete the RAID volume. Confirm the volume deletion by pressing the <Y> key.

11.4 Reset RAID Data

Note: Please refer to Section 13 for illustration examples of the Intel Application Accelerator RAID option ROM windows.

Warning: All data on the RAID drives and any internal RAID structures will be lost.

1. Select option 3 Reset Disks to Non-RAID and press the <Enter> key to delete the RAID set and remove any RAID structures from the drives.

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2. In the selections screen, use the <space> bar to select the drives you would like to reset. Press <Enter> when done.

3. Confirm the selection by pressing the <Y> key.

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12 Loading the Intel Application Accelerator Driver During Operating System Install

1. As Windows* Setup begins, press <F6> to specify the RAID driver.
2. When queried by the installation screen, press <S> to specify an additional device.
3. Insert the floppy disk labeled Intel Application Accelerator Driver and press <Enter>. (The following files should be on this disk: IAACHI.CAT, IAAHCI.INF, IASTOR.CAT, IASTOR.INF, IASTOR.SYS, and TXTSETUP.OEM)
4. Press <Enter> to select the Intel RAID Controller.
5. Press <Enter> to continue with Windows Setup.

12.1 Instructions on Creating F6 Floppy Diskette

To create an F6 floppy diskette that contains the files that are needed when installing the driver via an F6 installation method, complete the following steps:

1. Download the Intel Application Accelerator (or use the CD shipped with your motherboard which contains the Intel Application Accelerator). The Intel Application Accelerator can be downloaded from the following website:
   http://downloadfinder.intel.com/scripts-df/Product_Filter.asp?ProductID=1809
2. The following files need to be copied from the compressed .CAB file (which is contained inside the Intel Application Accelerator .EXE package): IAAHCI.CAT, IAACHI.INF, IASTOR.CAT, IASTOR.INF, IASTOR.SYS, and TXTSETUP.OEM.
3. To extract these files, run 'C:\SETUP.EXE -A -P C:\<path>' (as described in the 'Advanced Installation Instructions' section of the README.TXT.)
4. Once these files have been extracted, copy the IAAHCI.CAT, IAACHI.INF, IASTOR.CAT, IASTOR.INF, IASTOR.SYS, and TXTSETUP.OEM. files to a floppy diskette. Note: These files should be in the root directory of the floppy.

Note: Any spaces in the pathname or filename require quotes around the pathname or filename. The switches do not require quotes. For example:

"C:\My Documents\setup.exe" –A –P

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12.2   Installation Using F6 Method

When you start the installation of Windows* XP, you most likely will be presented with a message stating, 'Setup could not determine the type of one or more mass storage devices installed in your system'. If this occurs, the instructions below document how to install the RAID driver. To install the Intel Application Accelerator driver using the F6 installation method, complete the following steps:

Note: After completing these steps and the operating system has been successfully installed, you will still need to install the Intel Application Accelerator by running the typical Setup.exe process.

1. Press F6 when prompted in the status line with the 'Press F6 if you need to install a third party SCSI or RAID driver' message at the beginning of Windows XP setup (during text-mode phase). Note: After pressing F6, setup will temporarily continue loading drivers and then you will be prompted with a screen to load support for mass storage device(s).

2. Press the 'S' key to 'Specify Additional Device'

3. You will be prompted to 'Please insert the disk labeled Manufacturer-supplied hardware support disk into Drive A:' Once prompted, insert the floppy disk containing the following files: IAAHCI.CAT, IAACHI.INF, IASTOR.CAT, IASTOR.INF, IASTOR.SYS, and TXTSETUP.OEM. and press ENTER.

Note: See Section 12.1 titled 'Instructions on Creating F6 Floppy Diskette' for instructions on how to extract these four files from the Intel Application Accelerator Setup.exe file.

4. After pressing ENTER, you should be presented with a list of available SCSI Adapters; it should list 'Intel(R) 82801FR Serial RAID Controller'. Select this entry and press ENTER.

5. The next screen should confirm that you have selected the Intel(R) RAID controller. Press ENTER again to continue.

6. At this point, you have successfully F6'ed in the Intel Application Accelerator driver and Windows XP setup should continue. Leave the floppy disk in the floppy drive until the system reboots itself. Windows* setup will need to copy the files from the floppy again to the Windows installation folders. Once Windows setup has copied these four files again, you should then remove the floppy diskette so that Windows setup can reboot as needed.

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13 Intel Application Accelerator RAID option ROM

13.1 Description

The Intel Application Accelerator RAID option ROM should be integrated with the system BIOS on all motherboards with a supported Intel chipset (*see http://support.intel.com/support/chipsets/imst/sb/CS-012492.htm*). The Intel Application Accelerator RAID option ROM is a PnP option ROM that provides a pre-operating system user interface for the Intel RAID implementation and provides BIOS and DOS disk services (Int13h).

13.2 Confirming Version of Intel Application Accelerator RAID option ROM Installed

There is only one way to determine which version of the Intel Application Accelerator option ROM has been integrated into the system BIOS:

- Press the CTRL + i keys when you see the 'Intel(R) Application Accelerator RAID option ROM' status screen appear (should appear early in system boot-up, during the Power-On Self Test (POST))

- Located in the top right corner you should see a version number in the following format: V4.1.0.xxxx

13.3 Using the Intel Application Accelerator RAID option ROM

13.3.1 Creating, Deleting, and Resetting RAID Volumes

The Serial ATA RAID volume may be configured using the user interface within the RAID option ROM.

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

Note: The 'Drive Model', 'Serial #', and 'Size' listed in your system can differ from the following example.

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```
   Intel(R) RAID for Serial ATA - RAID BIOS v3.0.0.2307

   Copyright(C) 2003 Intel Corporation.  All Rights Reserved.


   RAID Volumes:
   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
 Press <CTRL-I> to enter Configuration Utility…
```

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

13.3.2   Create RAID 0 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. v3.0.0.2307
 ==============================[ MAIN MENU ]==============================

                      1.   Create RAID Volume
                      2.   Delete RAID Volume
                      3.   Reset Disks to Non-RAID
                      4.   Exit


 ======================[ DISK/VOLUME INFORMATION ]======================

     RAID Volumes:
     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



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

1. Select option 1 'Create RAID Volume' and press the <Enter> key and the following window will appear:

```
        Intel(R) RAID for Serial ATA - RAID Configuration Utility
   Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
                            =[ CREATE ARRAY MENU ]=

                     Name:  RAID Volume1
               Strip Size:  128KB
               RAID Level:  RAID0(Striping)
                 Capacity:  223.5GB

                         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
```

2. Specify a RAID Volume name and then press the <TAB> or <ENTER> key to advance to the next field:

```
        Intel(R) RAID for Serial ATA - RAID Configuration Utility
   Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
                            =[ CREATE ARRAY MENU ]=

                     Name:  RAID Volume1
               Strip Size:  128KB
               RAID Level:  RAID0(Striping)
                 Capacity:  223.5GB

                         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 purpose strip size
          128KB - Best performance for most desktops and workstations


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

3. Select the strip value for the RAID 0 array by scrolling through the available values by using the <á> or <â> 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. Some suggested selections are listed below. The default selection is 128KB.
— 16 KB – Best for sequential transfers
— 64 KB – Good general purpose strip size
— 128 KB – Best performance for most desktops and workstations

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

```
        Intel(R) RAID for Serial ATA - RAID Configuration Utility
   Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
═══════════════════════[ CREATE ARRAY MENU ]═══════════════════════

                  Name:   RAID_Volume1
            Strip Size:   128KB
            RAID Level:   RAID0(Striping)
              Capacity:   223.5GB

                          Create Volume


═══════════════════════════[ HELP ]═══════════════════════════




              Press "ENTER" to Create the specified volume




     [↑↓]Change      [TAB]-Next     [ESC]-Previous Menu    [ENTER]-Select
```
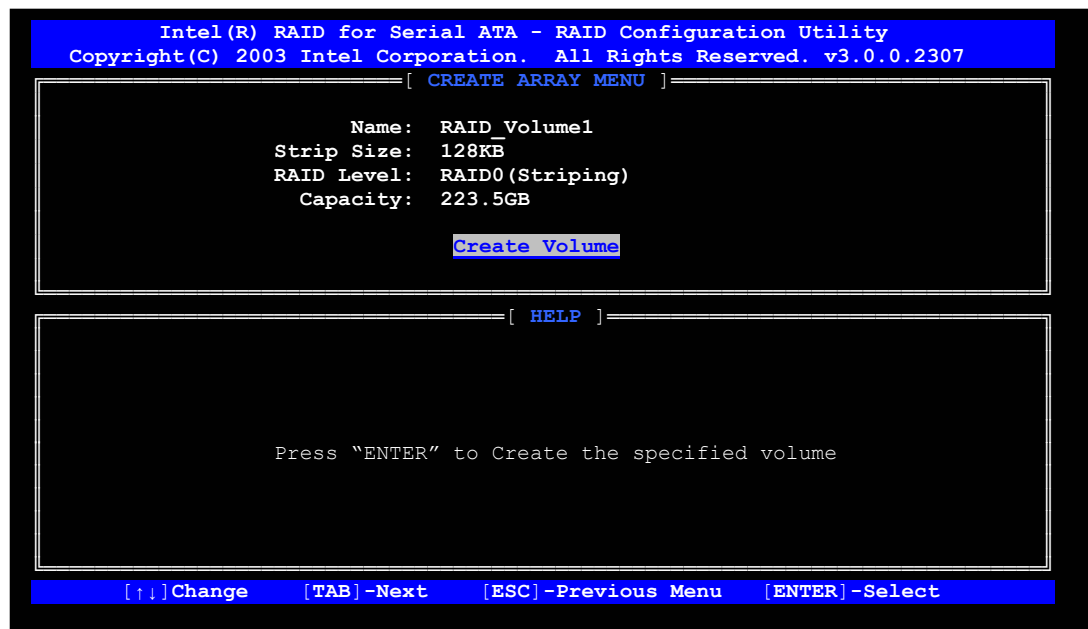
5. Press the <Enter> key to create the specified volume and the following prompt will appear:

```
        Intel(R) RAID for Serial ATA - RAID Configuration Utility
    Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
==================================[ CREATE ARRAY MENU ]==========================

                        Name:   RAID_Volume1
                  Strip Size:   128KB
                  RAID Level:   RAID0(Striping)
                    Capacity:   223.5GB

                          Create Volume


           Are you sure you want to create this RAID volume (Y/N)



              Press "ENTER" to Create the specified volume




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

6. Confirm this selection by pressing the <Y> key after the prompt. The window will be returned to the main menu with an updated status similar to the following:

```
          Intel(R) RAID for Serial ATA - RAID Configuration Utility
      Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
=======================================[ 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_Volume1     RAID0(Stripe) 128KB    223.5GB   Normal        Yes
          ├ ST3120023AS    3KA0J1ZJ      Port0    111.7GB   Normal
          └ ST3120023AS    3KA0H0M0      Port1    111.7GB   Normal

       Non-RAID Disks:
       None defined.


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

Note: The disk/volume information listed for your system can differ from the following example.

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7. Scroll to option 4 'Exit' and press the <Enter> key to exit the RAID Configuration utility and the following prompt will appear:

```
       Intel(R) RAID for Serial ATA - RAID Configuration Utility
    Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
                                [ MAIN MENU ]
                        1.   Create RAID Volume
                        2.   Delete RAID Volume
                        3.   Reset Disks to Non-RAID
                        4.   Exit

                           [ CONFIRM EXIT ]
                    Are you sure you want to exit? (Y/N):



    RAID Volumes:
    ID Name              Level          Strip    Size      Status       Bootable
     0 RAID_Volume1      RAID0(Stripe)  128KB    223.5GB   Normal        Yes
       ├ ST3120023AS     3KA0J1ZJ       Port0    111.7GB   Normal
       └ ST3120023AS     3KA0H0M0       Port1    111.7GB   Normal

    Non-RAID Disks:
    None defined.


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

8. Confirm the exit by pressing <Y> key.

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13.3.3   Delete RAID Volume

⚠️ *Warning:*   By performing this operation, all data on the RAID drives will be lost.

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:

⚠️ *Warning:*   If your system currently boots to RAID and you delete the RAID volume in the Intel Application Accelerator RAID option ROM, your system will become unbootable.

```
           Intel(R) RAID for Serial ATA - RAID Configuration Utility
        Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
    ============================[ DELETE ARRAY MENU ]============================

     Name            Level              Drives        Capacity       Status      Bootable
     RAID_Volume1    RAID0(Stripe)      2             223.5GB        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 VOULME WILL BE LOST AND NON-RECOVERABLE




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

2. Select the volume and press the <Delete> key to delete the RAID volume and the following prompt will appear:

```
           Intel(R) RAID for Serial ATA - RAID Configuration Utility
         Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
                           =[ DELETE ARRAY MENU ]=
                       =[ VOLUME DELETE VERIFICATION ]=
  Na                  Are you sure you want to delete this volume?              e
  RA                      ALL DATA IN THE VOLUME WILL BE LOST!!                  s

                  Are you sure you want to delete volume "RAID_Volume1"? (Y/N)



                              =[ 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 VOULME WILL BE LOST AND NON-RECOVERABLE



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

3. Confirm the volume deletion by pressing the <Y> key.

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13.3.4   Reset Disks to Non-RAID

⚠ *Warning:* By performing this operation, all data on the RAID drives and any internal RAID structures will be lost.

4. Select option 3 'Reset Disks to Non-RAID' and press the <Enter> key to delete the RAID volume and remove any RAID structures from the drives and the following window will appear:

```
        Intel(R) RAID for Serial ATA - RAID Configuration Utility
    Copyright(C) 2003 Intel Corporation.  All Rights Reserved. v3.0.0.2307
                            [ MAIN MENU ]
                    [ RESET ALL RAID DATA ]

     Resetting all RAID data will remove any internal RAID structures
     from all RAID disks, including disks with working volumes. These
     structures are used to maintain the RAID volumes. By removing
     these structures, the drive will revert back to a Non-RAID disk
     that can then be used or reallocated to a new RAID volume.

     WARNING: Selecting "Yes" will cause all data on any RAID disk
             (RAID Volume or Other RAID Disk) to be lost.

       Are you sure you want to reset all RAID data (Y/N):
                                                                      le
       └ ST3120023AS   3KA0H0M0      Port1    111.7GB   Normal

     Non-RAID Disks:
     None defined.


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

✏ *Note:* Possible reasons to 'Reset Disks to Non-RAID' could include issues such as incompatible RAID configurations or a failed volume or failed disk.

2. Confirm the selection by pressing the <Y> key.

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14   Installing the Intel Application Accelerator

14.1   Installation Caution

⚠ *Caution:* The Intel Application Accelerator driver may be used to operate the hard drive from which the system is booting or a hard drive that contains important data. For this reason, you cannot remove or un-install this driver from the system after installation; however, you will have the ability to un-install all other non-driver components.

The following non-driver components can be un-installed:

- Intel Storage Utility
- Help Documentation
- Start Menu Shortcuts
- System Tray Icon Service
- RAID Monitor Service

14.2   Steps to Take Before Installing the Intel Application Accelerator

14.2.1   Resolve Conflicts in Device Manager

Before installing the Intel Application Accelerator, there should be NO conflicts (e.g. yellow exclamation points or red X's) in Device Manager under Hard Disk Controllers. Device Manager can be accessed by going to: Start Button / Settings / Control Panel / System / Device Manager. Often, installing the Intel® Chipset Software Installation Utility will resolve conflicts where the operating system does not properly recognize the Intel device.

Please refer to Appendix A for additional information on the Intel Chipset Software Installation Utility.

14.3   Obtaining and Installing the Intel Application Accelerator

The Intel Application Accelerator is most likely supplied on a CD-ROM that was included with your motherboard or system.

If needed, the Intel Application Accelerator can also be downloaded from the following Intel website: http://support.intel.com/support/go/iaa/tti_r.htm

The Intel Application Accelerator is available for supported operating systems (*see http://support.intel.com/support/chipsets/imst/sb/CS-009343.htm*) in both English (iaarxx_enu.exe) and multi-language (iaarxx_multi.exe) versions. An included README.TXT file covers topics such as system requirements, basic installation instructions, and advanced installation instructions.

A Release Notes document is located at the following website:
http://downloadfinder.intel.com/scripts-df/Product_Filter.asp?ProductID=1809

A Known Compatibility Issues document is located at the following website:
http://support.intel.com/support/chipsets/imst/sb/CS-012524.htm

After the Intel Application Accelerator has been downloaded from the Intel website to a known location on your hard drive, you need to run the file iaarxx_enu.exe (English version) or iaarxx_multi.exe (multi-language). Running the file can be done by double-clicking on the file name. The installation program should launch after you double-click on the file name. Click on the "Next" button at the Welcome screen. Read the license agreement and click on the "Yes" button to accept the license terms and continue. Click on the "Next" button to install the driver in the default folder location. Click on the "Next" button to create the default Program Folder. The driver files will now be installed. When finished installing, select the "Yes" button for the reboot option and click on the "Finish" button to restart your computer. The Intel Application Accelerator should now be installed.

Note: The instructions above assume that the Intel Application Accelerator RAID option ROM and BIOS have been configured correctly and the RAID driver has been installed using the F6 installation method (see Section 12.2 titled 'Installation Using F6 Method' for additional information).

14.3.1 Installation Steps

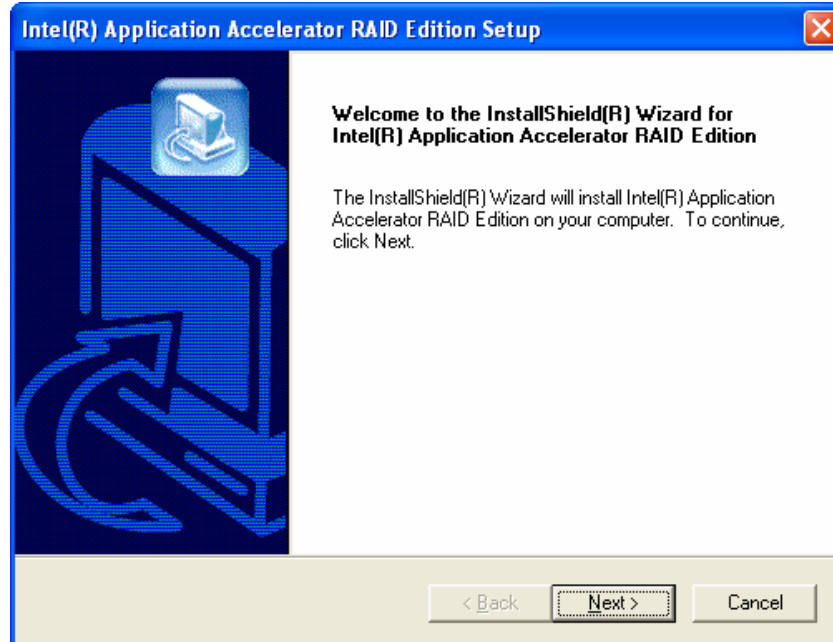After clicking on the .EXE file, installation will begin and the following screen will temporarily appear:
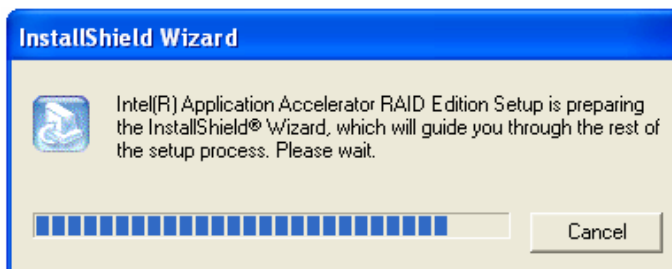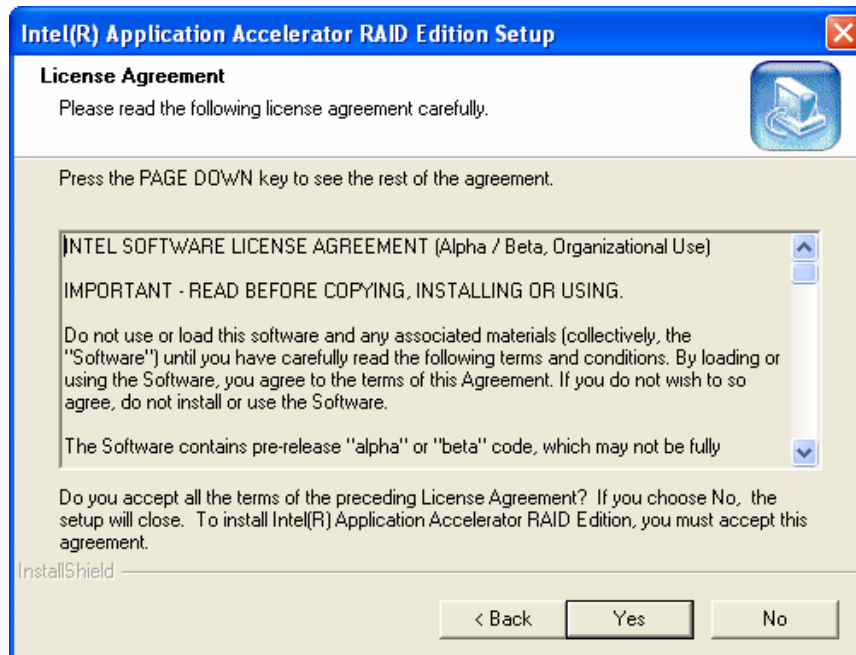
14.3.2   Installation: Welcome Screen

Click on the 'Next' button after the following welcome window appears:

14.3.3   Installation: License Agreement

Carefully read through the license agreement in the following window and if you accept all the terms, click on the 'Yes' button:

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14.3.4 Installation: Choose Destination Location

Select the folder in the following window where you would like Setup to install the files and then click on the 'Next' button:
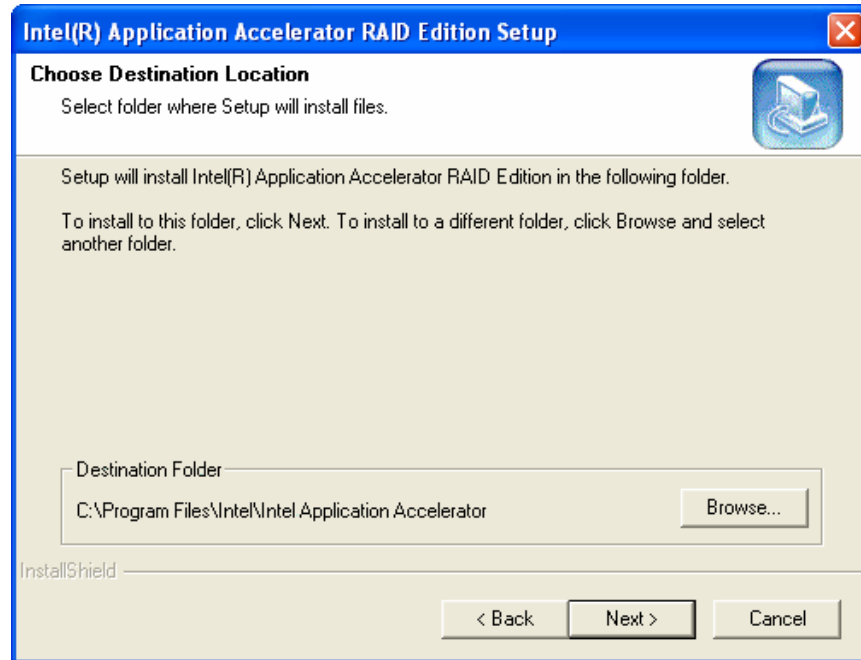
14.3.5 Installation: Select Program Folder

Select a program folder in the following window where you would like Setup to add the program icons:
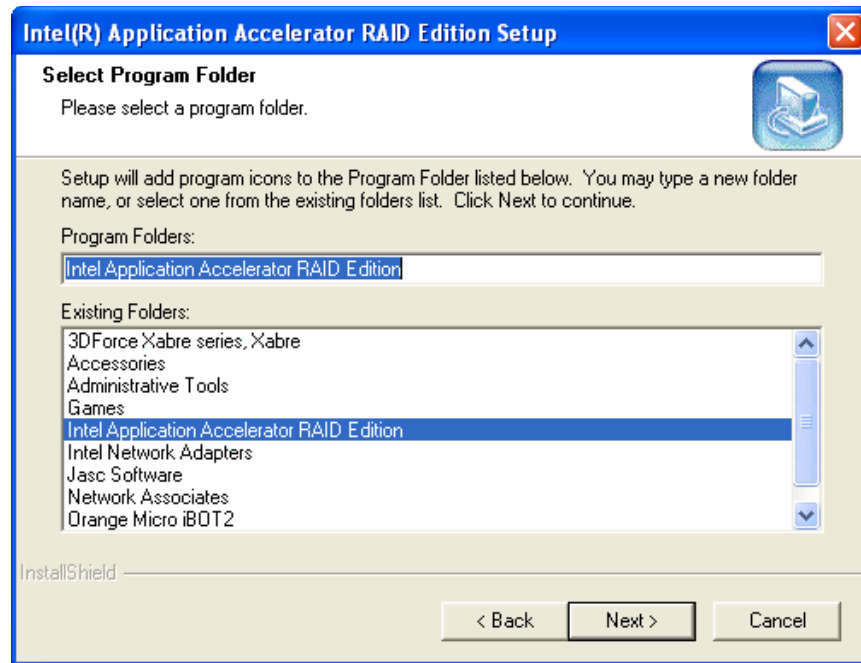
14.3.6   Installation: Setup Status

The status of the Intel Application Accelerator Setup will then appear in the following window:

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14.3.7   Installation: InstallShield* Wizard Complete

Once installation is complete, the following window will appear:

15 Confirming the Intel Application Accelerator is Installed

To confirm that the Intel Application Accelerator has been installed, complete the following steps:

- Click on Start Button / All Programs
- Find the 'Intel Application Accelerator' program group
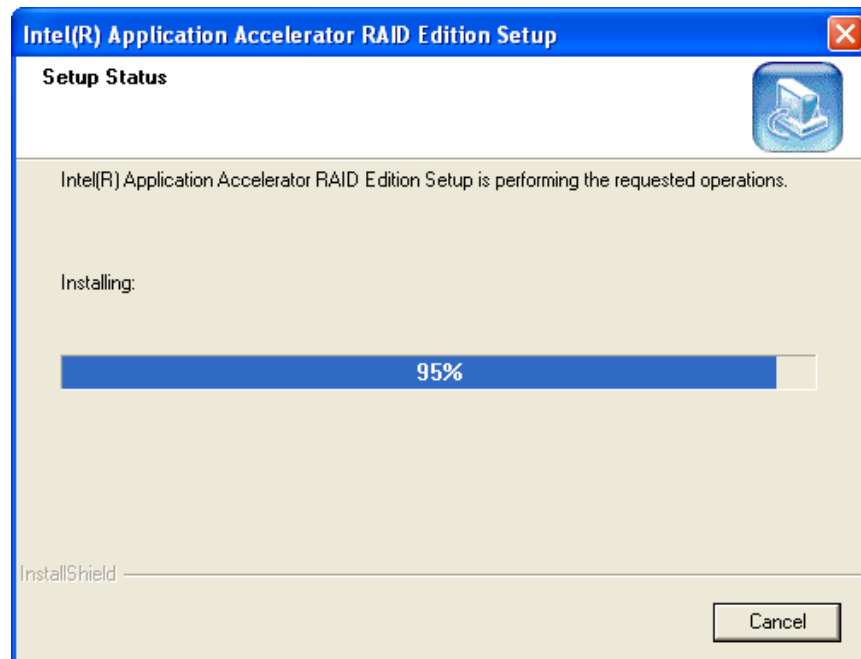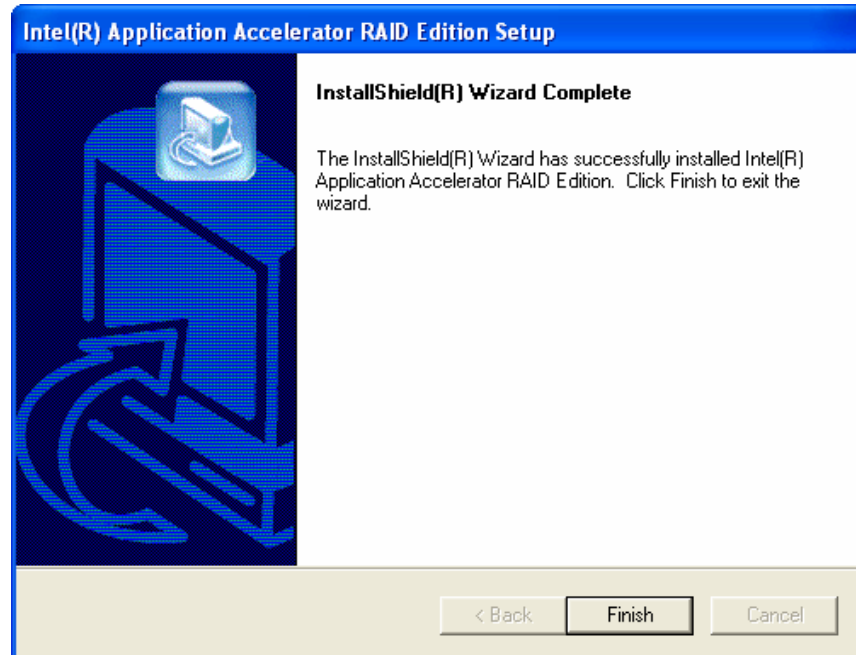- Select the 'Intel Application Accelerator' shortcut
- The Intel Storage Utility should be shown

If installation was done via have-disk, F6, or unattended installation methods, you can confirm that the Intel Application Accelerator has been loaded by completing the following steps:

For Windows* XP

Note: The following instructions assume classic mode:

- Click on Start Button / Control Panel
- Double-click on the 'System' icon
- Select the 'Hardware' tab
- Select 'Device Manager' button
- Expand the 'SCSI and RAID Controllers' entry
- Right-click on the 'Intel(R) 82801FR SATA RAID Controller'
- Select the 'Driver' tab
- Select the 'Driver Details' button
- 'iaStor.sys' should be displayed in the window as the following image illustrates:
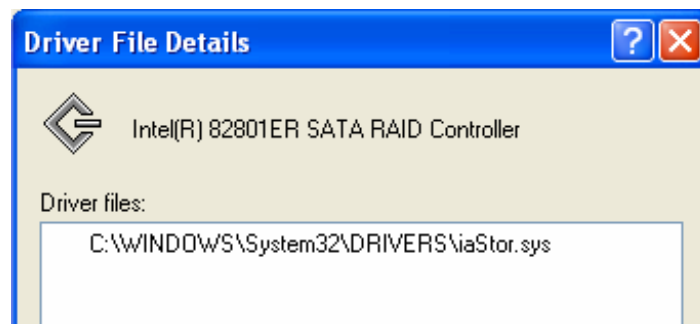
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16   Confirming Version of Intel Application Accelerator Installed

There are two different ways to determine which version of the Intel Application Accelerator is installed:

- Use the Intel Storage Utility
- Locate the RAID driver (iaStor.sys) itself and view the file properties.

16.1   Using the Intel Storage Utility:

- Run the Intel Storage Utility from the following Start Menu path:
  — Start → All Programs → Intel Application Accelerator → Intel Application Accelerator
- Click the 'Device Information' Tab
- ·Single left click the 'Intel(R) 82801FR SATA RAID Controller' item in the Devices tree
- Then look for a parameter in the Parameters list box titled 'Driver Version'. This should have a version number in the following format:
  — 4.1.0.xxxx

16.2   RAID Driver File Properties:

- Locate the file "iaStor.sys" within the following path:
  — <System Root>\Windows\System32\Drivers
- Right click on "iaStor.sys" and select 'Properties'
- Select the 'Version' tab
- Located at the top of this tab's view should be a parameter call "File version". Next to it is the RAID Driver version. It should have a version number in the following format:
  — 4.1.0.xxxx

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17 Issues During Installation

17.1 Symptom: Incompatible Hardware

The following error message occurs during installation:
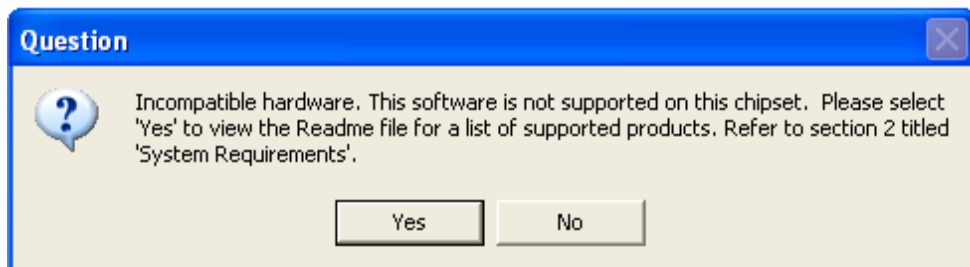
Resolution: This issue is resolved by installing the Intel Application Accelerator on a system with a supported Intel chipset.
(*see http://support.intel.com/support/chipsets/imst/sb/CS-012492.htm*).

17.2 Symptom: Operating System Not Supported

The following error message occurs during installation:
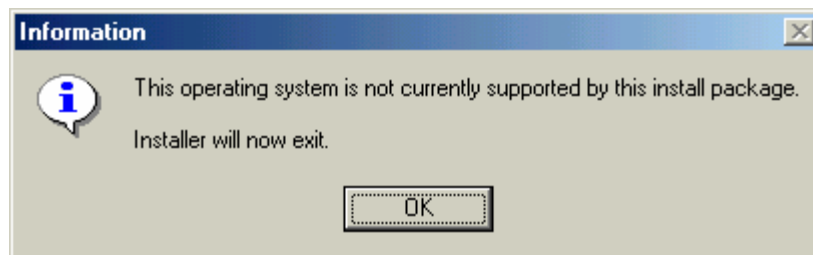
Resolution: This issue is resolved by installing the Intel Application Accelerator on a system with a supported operating system.
(*see http://support.intel.com/support/chipsets/imst/sb/CS-009343.htm*)

Note:	Note For Windows* XP Users: In order to successfully complete installation of the Intel Application Accelerator with Windows* XP, the user must be logged on with Administrator rights.

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18   "RAID Ready"

18.1   "RAID Ready" Definition

A "RAID Ready" system is a specific system configuration that enables a seamless migration from a single non-RAID disk drive to a dual disk drive RAID 0 or RAID 1array.

18.2   "RAID Ready" System Requirements

In order for a system to be considered "RAID Ready", it must meet all of the following requirements:

1. System with a supported Intel chipset and one Serial ATA (SATA) hard drive
2. Motherboard BIOS that includes the Intel Application Accelerator RAID option ROM
3. Intel Application Accelerator
4. RAID Controller enabled in the BIOS

18.3   Steps on Setting Up a "RAID Ready" System

In order to set up a "RAID Ready" system, complete the following steps:

Note: The system must meet all the "RAID Ready" system requirements specified in Section 18.2.

1. Intel Application Accelerator driver is F6'd (during operating system installation, you will be prompted to 'Press F6 if you need to install a third party SCSI or RAID driver') or pre-installed on SATA Hard Drive (configured as Non-RAID Disk – also known as RAID Ready Mode)
2. Intel Application Accelerator driver is installed from within operating system to add Start Menu links and Intel Storage Utility

18.4   Converting a "RAID Ready" System into RAID 0 or RAID 1 System with Migration Feature

Note: The steps listed in this section assume that the operating system has been installed on an existing Serial ATA hard drive and the required driver was installed during the operating system setup.

To turn a RAID Ready system into a RAID System, complete the following steps:

1. Physically add one Serial ATA hard drive in the system
2. Boot to Windows*, install the Intel Application Accelerator
3. Open the Intel Storage Utility (Start/All Programs/Intel Application Accelerator/Intel Application Accelerator)

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4. Create a RAID 0 or RAID 1 volume via the Intel Storage Utility and perform a 'Create from Existing Disk' migration (right-mouse click on 'RAID Volumes' or select option under 'RAID' file menu)

5. When migration is complete, Reboot

6. Optional: Use 3rd party application or Windows* to create and format a new data partition on unused space, if any (see Note below)

Note: To ensure that non-Windows* partitions are kept intact, the migration to RAID 0 or RAID 1 does not utilize the extra space made available by adding the 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 Section 18.4.1 for instructions)

or

5. 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*.

18.4.1 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 window 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 is the 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 gray area labeled 'Free Space'. This area will have to be partitioned and formatted before it may be used.

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19   RAID Migration Instructions

The Intel Application Accelerator offers the flexibility to upgrade from a single Serial ATA (SATA) hard drive to a two drive RAID 0 or RAID 1 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. Refer to Section 10 and 11 to properly configure the BIOS.

2. Install the Intel Application Accelerator during Windows Setup. Refer to Section 12 for instructions on installing the driver during Windows Setup.

3. Install the Intel Application Accelerator after the operating system is installed. See Section 14.3 for where the Intel Application Accelerator can be downloaded.

To create a volume from an existing disk, complete the following steps:

Warning: 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.

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After the Intel Application Accelerator has been successfully installed and the system has rebooted, click on the Intel Application Accelerator shortcut link and the following window will appear:

Note: The 'Physical Disks' listed in your system can differ from the following illustration.

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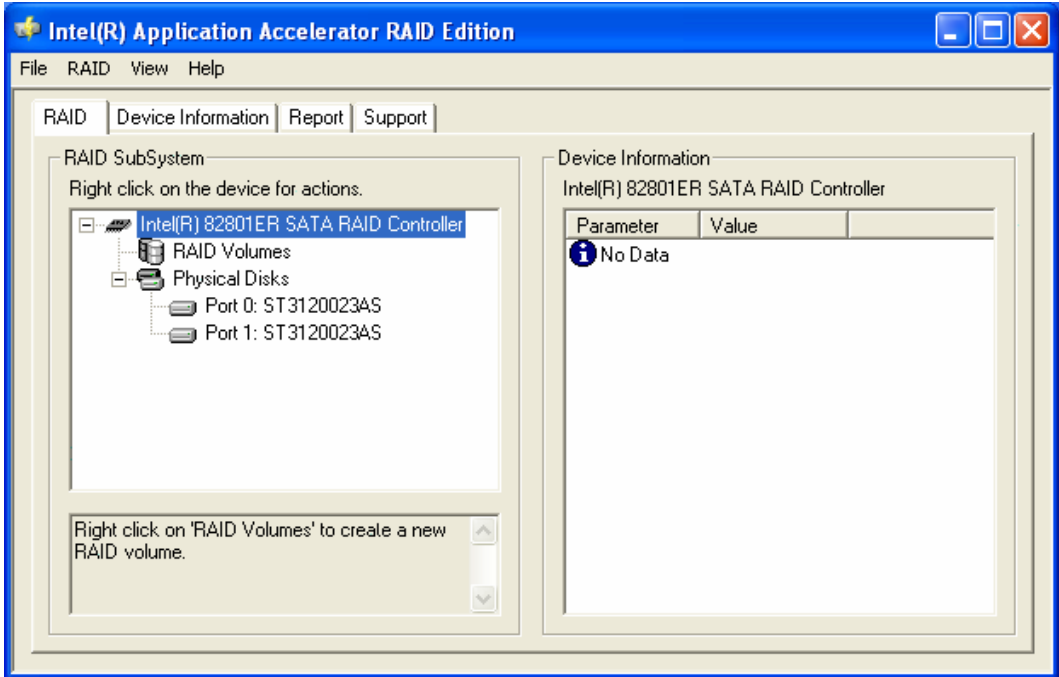
19.1　Create RAID Volume from Existing Disk

To create a RAID volume from an existing disk, right-mouse click on 'RAID Volumes' and select 'Create From Existing Disk' to create a new RAID volume as illustrated below:
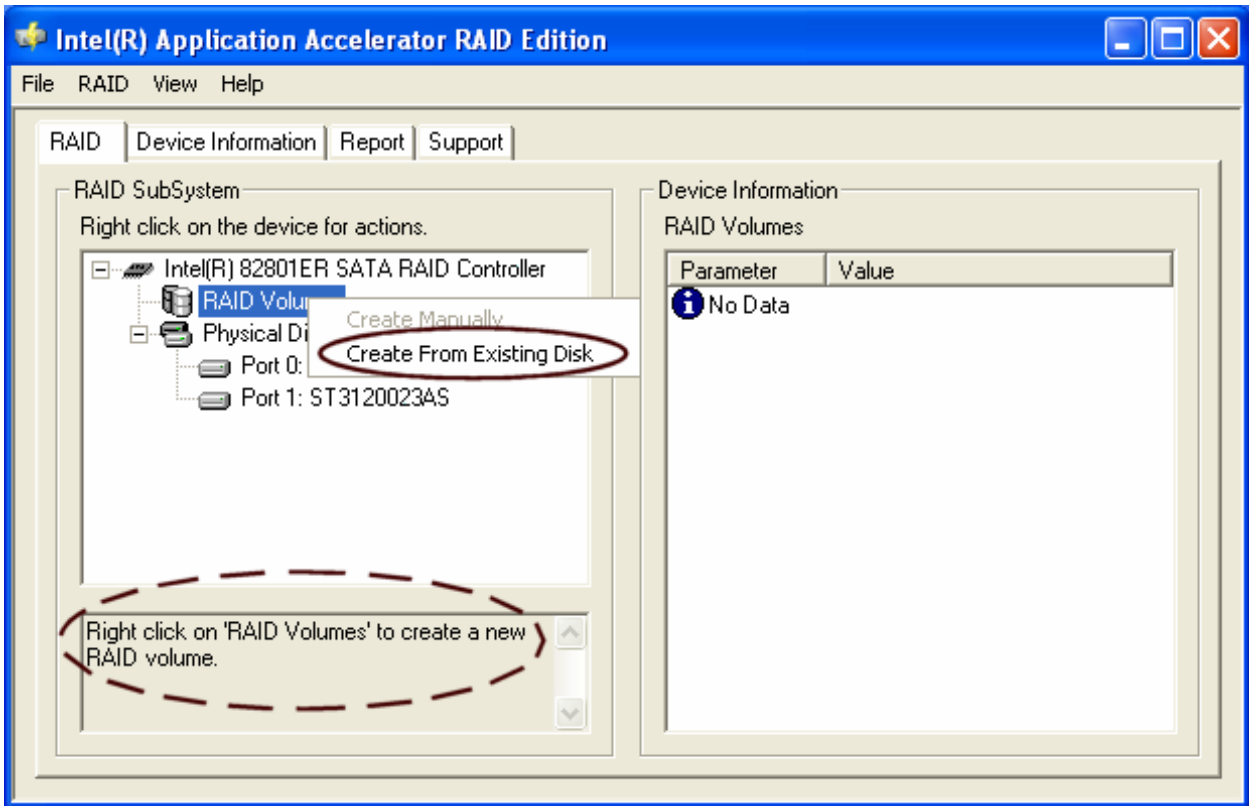
Note:　Note: Creating a RAID volume from an existing disk can also be accomplished by clicking on the 'RAID' file menu, and then arrow down and click on 'Create Volume from Existing Disk'.

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19.1.1   Step 1 of 3: Select Source Disk

For Step 1, select the source disk that you wish to use and then click 'Next':
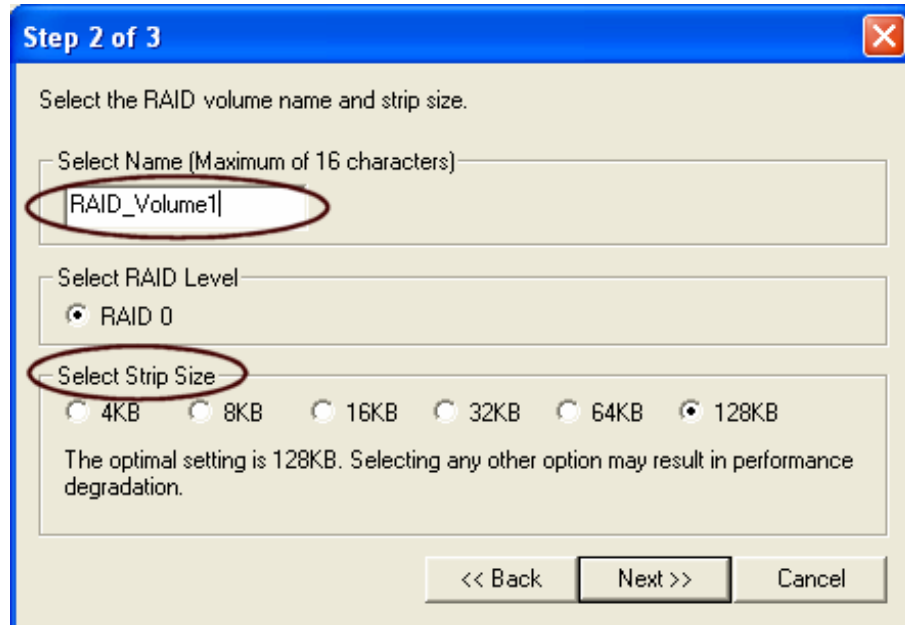
⚠️ *Warning:*   It is very important to note which disk is the source disk (the one containing all of the information to be migrated) and which one is the target disk. On a RAID Ready system, this can be determined by making a note during POST of which port (e.g. Port 0 or Port 1) the single disk is attached to. You can also use the Intel Storage Utility before the second disk is installed to verify the Port and serial number of the drive that contains all the data.
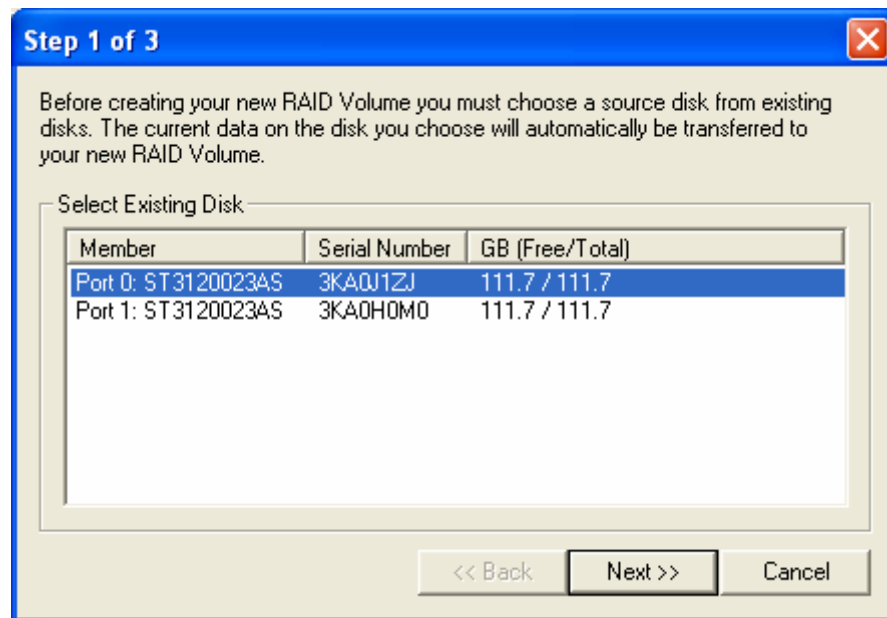
19.1.2 Step 2 of 3: Select the RAID Volume Name and Strip Size

For Step 2, select the RAID volume name and strip size and then click 'Next':

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. Additional details on the three most typical strip size settings are listed in Section 19.1.3 titled 'Strip Size Descriptions'.

19.1.3 Strip Size Descriptions

Strip Size Settings	Descriptions
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

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19.1.4   WARNINGS

Carefully read the next two dialog boxes that appear and decide if you wish to continue. Please note that once you have selected 'Migrate' on Step 3 of 3, the Intel Application Accelerator 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: ST3120023AS

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]

19.1.5 Step 3 of 3: Confirm Creation of New RAID Volume

For step 3, confirm the creation of the new RAID volume and then click 'Migrate':
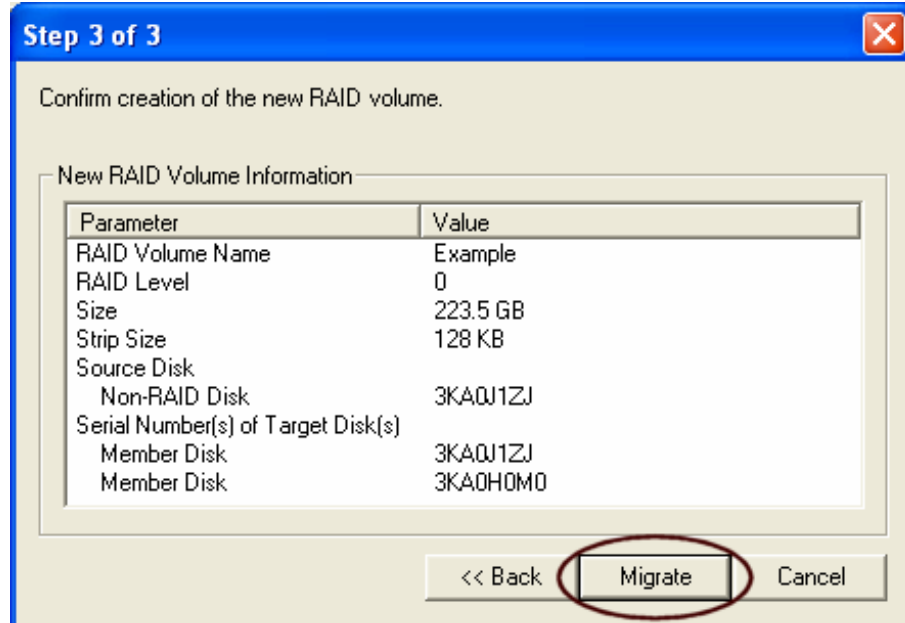
19.2 Migration Process May Take Considerable Time to Complete

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 once the migration process starts as illustrated in the following example:

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![pencil note icon] *Note:* The time remaining for your system can differ from the following example.
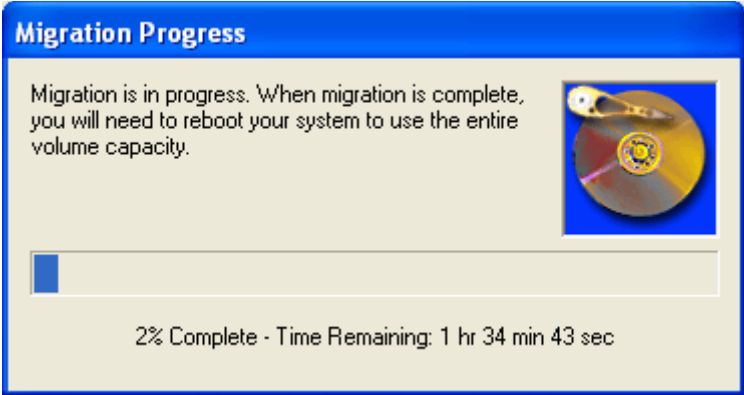
19.3   Successful Migration

If the migration process was completed successfully, the following dialog window will appear:

![pencil note icon] *Note:* You must reboot your system in order to use the full capacity of the new volume.

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20   Uninstalling the Intel Application Accelerator

20.1   Uninstall Warning

Warning: **CRITICAL WARNING**: Removing the Intel Application Accelerator from a system that has been configured as RAID will DELETE ALL EXISTING DATA from the RAID-controlled hard drive(s) and the data cannot be recovered. It is critical that you backup all important data before proceeding.
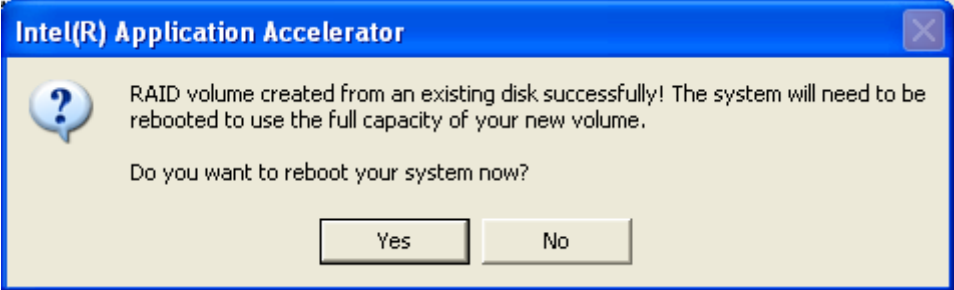
Uninstalling the Intel Application Accelerator would render all data on any existing RAID Volumes inaccessible and therefore it cannot be automatically uninstalled. It is recommended that any RAID volume be deleted before disabling the Intel 82801FR SATA RAID Controller. Disabling the Intel 82801FR SATA RAID Controller would re-enable the SATA controller and the operating system would no longer use the Intel Application Accelerator driver.

For instructions on how to manually uninstall the Intel Application Accelerator, please refer to Section 20.2 titled 'Windows* XP'.

20.2   Windows* XP

To manually uninstall the Intel Application from your system, complete the following steps:

Note: **Important Note**: All the data on the RAID-controlled hard drive(s) will be DELETED and will not be accessible after completing these steps. Backup all important data before proceeding.

1.   Reboot the system

2.   Depending on your system configuration, complete one of the following set of tasks:

If System has Intel Application Accelerator RAID option ROM Installed:

   a.   Enter the Intel Application Accelerator RAID option ROM Setup by pressing the 'Ctrl' and 'i' (CTRL + i) keys   at the appropriate time during boot-up. (Note: If your system does not appear to have Intel Application Accelerator RAID option ROM installed, skip to step '2d' below)

   b.   Once you have entered the Intel Application Accelerator RAID option ROM Setup, select menu option #3 to 'Reset disks to non-RAID'.

   c.   Exit the Intel option ROM Setup

   or

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If System Does Not Have Intel RAID Application Accelerator option ROM Installed:

    d.   Enter the system BIOS Setup (usually done by pressing a key such as 'F2' or 'Delete' during boot-up)

    e.   Change the IDE configuration for the RAID-controlled hard drive(s) from 'RAID' to 'IDE'.

3.   Delete any partitions on the hard drives that were previously connected to the RAID controller

4.   Reinstall the operating system

Note: If you experience any difficulties making these changes to the system BIOS, please contact the motherboard manufacturer or your place of purchase for assistance.

21   Unattended Installation Under Windows XP*

To install the Intel Application Accelerator as outlined in the Microsoft* document "Deployment Guide Automating Windows NT Setup," use the supplied TXTSETUP.OEM file included in the application package and insert the lines below into the UNATTEND.TXT file. This method is available for Windows* XP. For Windows XP, the IAAHCI.CAT, IAACHI.INF, IASTOR.CAT, IASTOR.INF, IASTOR.SYS, and TXTSETUP.OEM files need to first be extracted from the compressed .CAB file. To extract these files, run 'C:\SETUP.EXE -A -P C:\<path>' as described in the 'Advanced Installation Instructions' section of the README.TXT.)

Windows* XP:

```
// Insert the lines below into the UNATTEND.TXT file
[MassStorageDrivers]
"Intel(R) 82801FR SATA RAID Controller" = OEM

[OEMBootFiles]
iaAhci.cat
iaAhci.inf
iaStor.cat
iaStor.inf
iaStor.sys
Txtsetup.oem
```

Place iaAhci.cat, iaAhci.inf, iaStor.cat, iaStor.inf, iaStor.sys, and Txtsetup.oem in the following folder:

   <SystemRoot>:\i386\OEM\Textmode

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22   Intel Storage Utility

22.1   Description

The Intel Storage Utility is a Windows*-based application that provides management capabilities and detailed status information for storage devices and RAID arrays.

22.2   Create Volume Manually

The Intel Application Accelerator offers the ability to create a RAID volume manually. This option should be used if you are using a third bootable device such as an IDE or SCSI hard drive – in addition to using two Serial ATA hard drives. One benefit of using a third bootable device and creating a RAID volume manually is that the operating system is not located on the RAID volume. Should something happen to the RAID volume, the operating system should not be impacted.

Note: The 'Create Volume Manually' option is not selectable unless a third bootable device (such as an IDE or SCSI hard drive) is installed in the system – in addition to using two Serial ATA hard drives.

To manually create a RAID volume, right-mouse click on 'RAID Volumes' and select 'Create Manually' to create a new RAID volume as illustrated below:

![Intel logo]
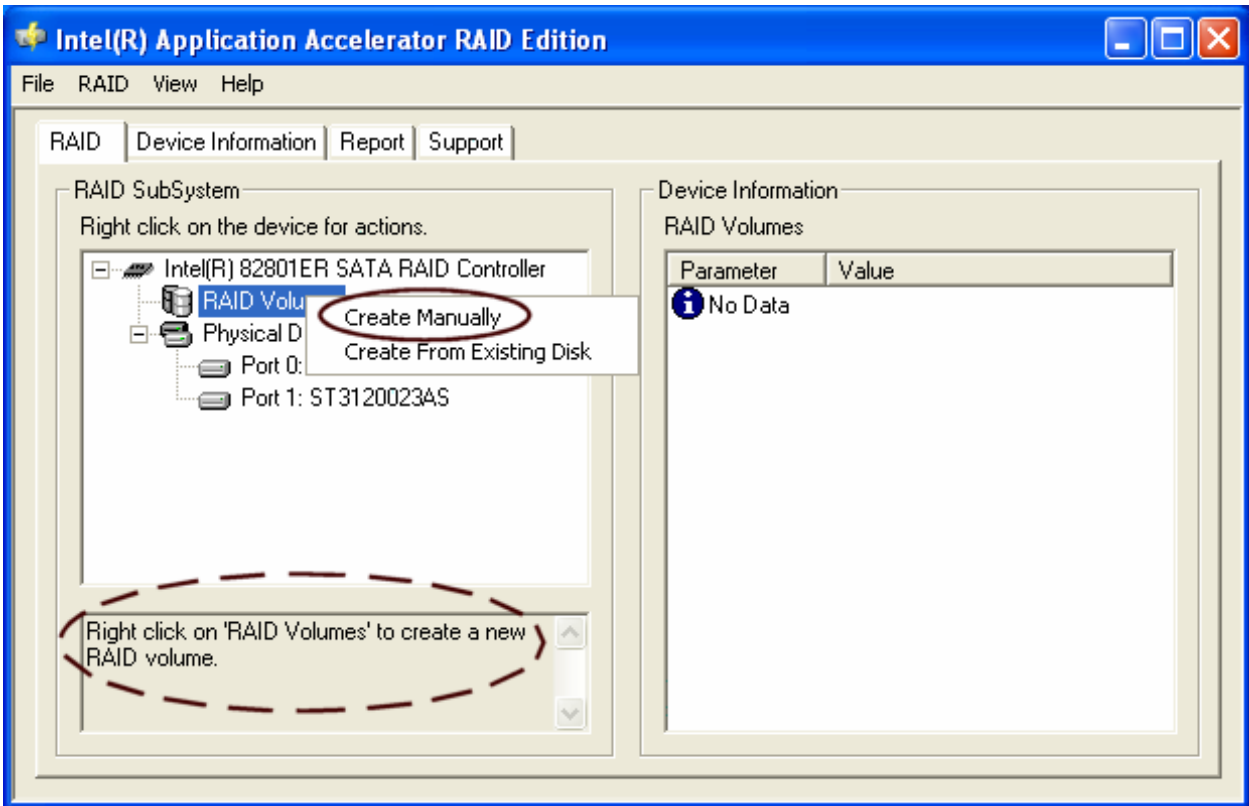
Note: Manually creating a RAID volume can also be accomplished by clicking on the 'RAID' file menu, and then arrow down and click on 'Create Volume Manually'.

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22.2.1 Step 1 of 2: Select the RAID Volume Name and Strip Size

For Step 1, select the RAID volume name and strip size and then click 'Next':

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.
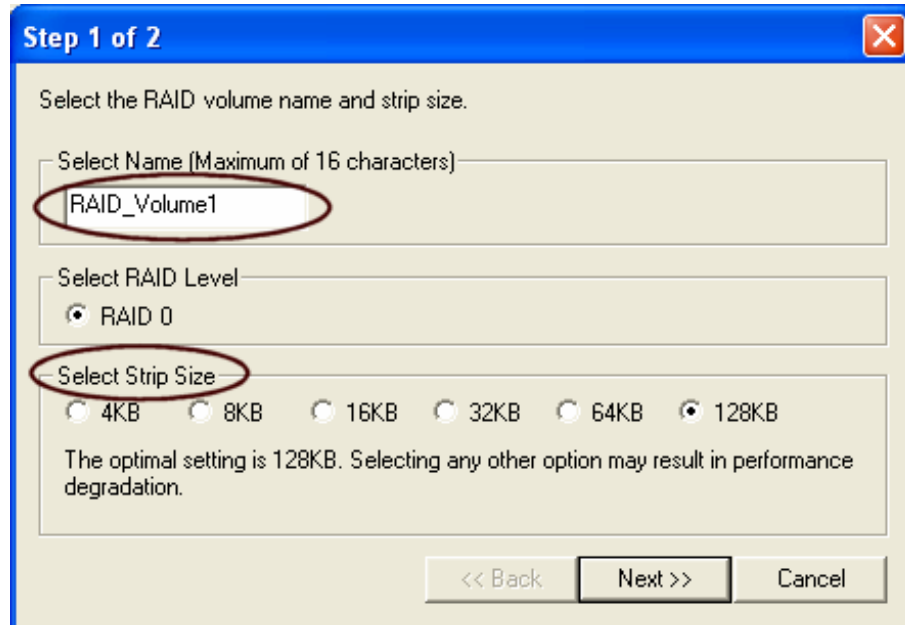
Strip Sizes:

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. Additional details on the three most typical strip size settings are listed in Section 22.2.2 titled 'Strip Size Descriptions'.

22.2.2 Strip Size Descriptions

Strip Size Settings	Descriptions
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

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22.2.3   WARNINGS

⚠️ *Warning:*   Carefully read the next two dialog boxes that appear and decide if you wish to continue. Please note that once you have selected 'Yes' on the following two dialog boxes, the Intel Application Accelerator 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 0: ST3120023AS
          Port 1: ST3120023AS

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]

Intel Storage Utility

22.2.4 Step 2 of 2: Confirm Creation of New RAID Volume

For Step 2, confirm the creation of the new RAID volume and then click 'Create':

Step 2 of 2

Confirm creation of the new RAID volume.

New RAID Volume Information

Parameter	Value
RAID Volume Name	Example
RAID Level	0
Size	223.5 GB
Strip Size	128 KB
Serial Number(s) of Target Disk(s)	
Member Disk	3KA0J1ZJ
Member Disk	3KA0H0M0

<< Back   Create   Cancel
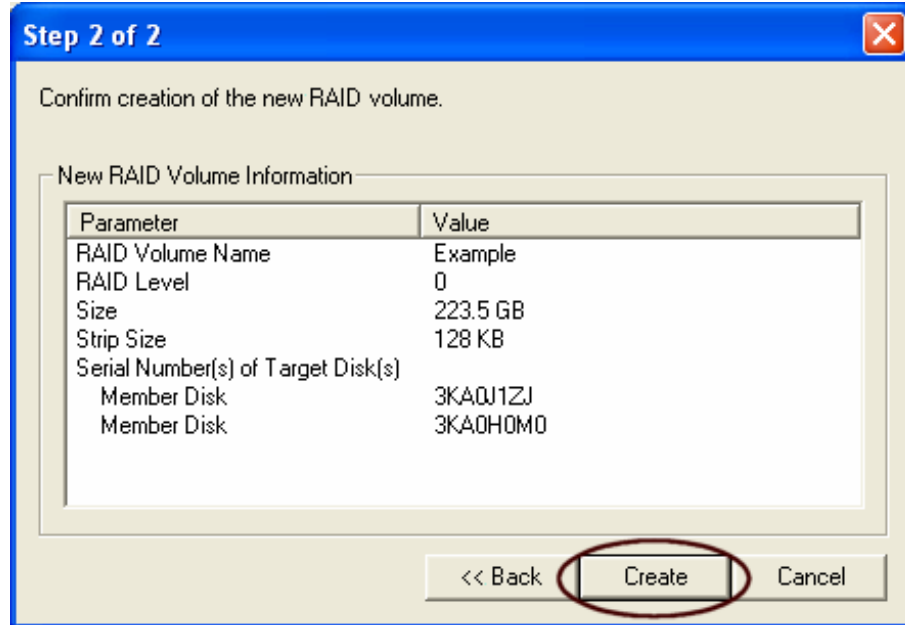
22.3 Successful Creation

If the manual volume creation process was completed successfully, the following dialog window will appear:

Intel(R) Application Accelerator

RAID volume created successfully.

OK

22.4 Disk and Volume Status Parameter Descriptions

The Intel Storage Utility displays a wide variety of information including the status of the physical disk parameters and the volume parameters. The status of the physical disk parameters indicates the health of the disk while the status of the volume parameters indicates the health of the RAID volume. Listed below are descriptions on the different disk and volume parameters that could appear:

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22.4.1 Status Entries for Physical Disk Parameters:

| **Status**	Indicates the health of the disk	
	Normal	Disk is present and functioning as expected
	Error Occurred	Disk has exceeded its unrecoverable threshold. Disk will continue to be accessed if it's a member of a RAID 0 volume.
	SMART Event	Disk has exceeded its recoverable error threshold and is at risk of failure.
	Missing	Disk is not present.
	Incompatible Version	Disk has RAID meta-data on it but its version is incompatible with the current version of RAID software. Updated version might be needed in order to resolve

22.4.2 Status Entries for Volume Parameters:

Status	Indicates the health of the RAID volume	
	Normal	Volume data is fully accessible to host
	Failed	One or more disks are missing or have failed, and the volume will complete all I/O requests with a failing status.
	Migrating	A RAID volume topology (RAID level, strip size, capacity, etc.) is changing

22.5 Generate and View a Report using the Intel Storage Utility

The Intel Storage Utility allows you to generate and view a report. Everything that appears for each device in your system (except for the Serial #'s), can be generated into a report. This information can be very helpful if you need assistance from Intel Customer Support.

To generate and view a report, simply arrow up and click on 'File' (located at the top left of the window), arrow down to 'Report' and then over to the right and click on 'View' as illustrated in the following example:
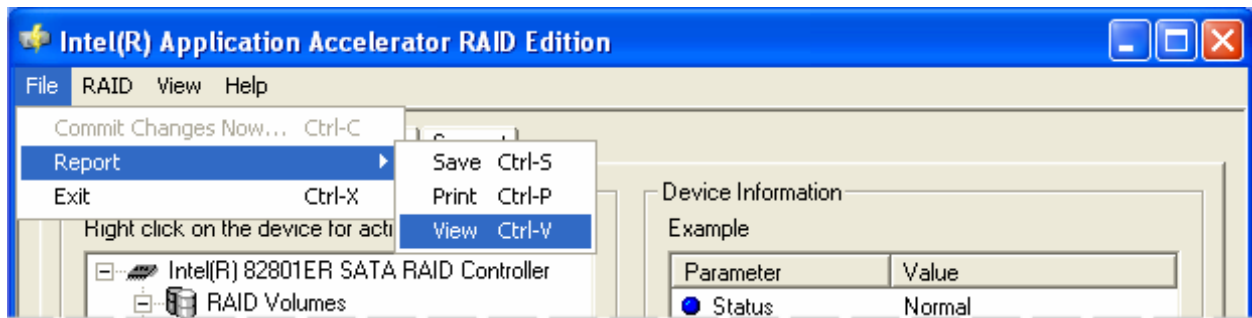
Selecting 'View' option:

The report will be generated and you will automatically be taken to the 'Report' tab where you can view all the system information.

Selecting 'Save' option:

The report can be saved to a location on your hard drive and then viewed with a text viewer such as Notepad* or WordPad*.

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22.6 Support Tab Information

The 'Support' tab contains links to different Intel Customer Support websites if you would like to obtain information on any of the following topics related to the Intel Application Accelerator:

- Top Technical Issues

- Knowledge Base

- Intel Application Accelerator Downloads

The following illustration shows an example of the 'Support' tab:
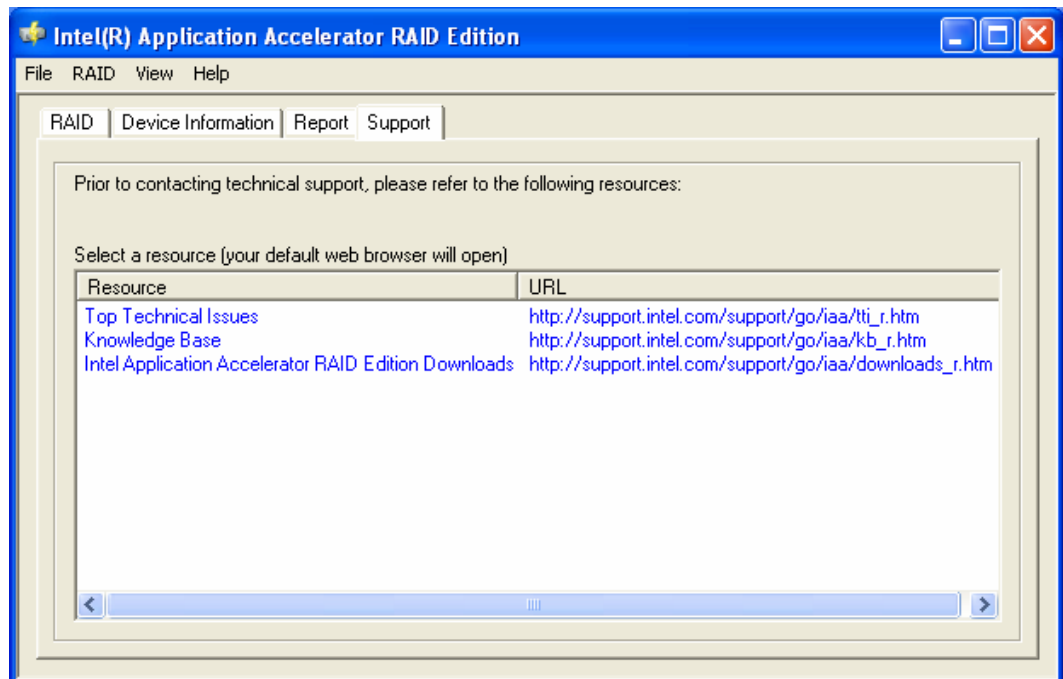
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23   *Troubleshooting*

Please refer to the following Intel Application Accelerator website for troubleshooting information:

http://support.intel.com/support/chipsets/imst/index.htm

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24   Frequently Asked Questions (FAQs)

Please refer to the following Intel Application Accelerator website for Frequently Asked Questions (FAQs):

http://support.intel.com/support/chipsets/imst/index.htm

Appendix A How to Identify the Intel Chipset

If you are unsure which Intel chipset is located in your computer, first check the documentation that came with the computer for this information. If this is not successful, the Intel® Chipset Identification Utility provides an easy way to identify the specific Intel chipset that is located on your motherboard. The Intel Chipset Identification Utility can be downloaded from the following Intel website:

http://support.intel.com/support/chipsets/inf/chipsetid.htm

If Windows* has properly identified your Intel chipset, you should be able to look at Device Manager in Windows to identify your Intel chipset:

http://support.intel.com/support/chipsets/deviceman.htm

Note: If the above options do not provide the necessary information, a qualified professional may be able to assist you in determining the chipset included in your system. A qualified professional should be able to properly identify the chipset while taking all necessary precautions to safeguard your system. (If you choose to take your system to a qualified professional, you will be responsible for all associated costs).

Note: **Important Note**
The section below is for qualified and trained professionals only. Please do not follow the instructions listed below unless you are a qualified and trained professional. Only qualified and trained professionals should open a computer system.

Note: Some system manufacturers may void your warranty if you open the case. Check with the manufacturer if you have any concerns about this before proceeding.

Note: **Important Note**: Please do not follow the instructions listed below or attempt to open a computer system unless you are a qualified and trained professional.

Qualified and trained professionals shall take all necessary precautions to avoid damage to all computer systems, such as but not limited to disconnecting the power before opening the case, using proper electrostatic discharge (ESD) precautions (including ground straps, gloves, ESD mats), having suitable facilities and proper tools and training.

Identifying the Intel chipset components located in your computer can usually be done by looking at the motherboard for the chipset markings. Chipsets are comprised of multiple components and the website listed below shows the combinations that make up the various Intel® 800 series of chipsets.

Note: Intel strongly recommends that you do not try removing any heatsink attached to your chipset (if present) in order to view the chipset markings.

Chipset Photo Examples (*see http://support.intel.com/support/chipsets/inf/identify.htm*)

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Appendix B Intel Chipset Software Installation Utility for Intel Chipsets

B.1 Description

The Intel Chipset Software Installation Utility (formerly referred to as Intel INF Installation Utility) for Intel chipsets was developed for updating certain versions of Windows. This utility allows the operating system to correctly identify the Intel chipset components and properly configure the system. The Intel Chipset Software Installation Utility installs specific Windows INF files. The INF files inform the operating system about how to properly configure the chipset for specific functionality, such as AGP, USB, Core PCI, and ISA PnP services.

For more details about the specific INF files that are updated, please refer to the README.TXT file that is included with the Intel Chipset Software Installation Utility for Intel chipsets.

Note: It is important that your Intel chipset is properly configured prior to installing the Intel Application Accelerator. If the Intel Chipset Software Installation Utility is needed, it should always be installed prior to installing the Intel Application Accelerator.

F6 Installation Note: If you plan on installing the Intel Application Accelerator using the F6 installation method (Section 12.2), you will not be able to install the Intel Chipset Software Installation Utility first.

B.2 Obtaining the Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility for Intel chipsets can be downloaded from the following Intel web site:

http://downloadfinder2.intel.com/scripts-df/Product_Filter.asp?ProductID=816

B.3 Confirming Installation of the Intel Chipset Software Installation Utility

To confirm that the Intel Chipset Software Installation Utility in installed, please refer to the instructions listed on the following Intel website:

http://support.intel.com/support/chipsets/inf/confirm.htm

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B.4   Troubleshooting

After installing the Intel Chipset Software Installation Utility for Intel chipsets, certain symptoms may be seen depending on the system configuration. Please refer to the following Intel Chipset Software Installation Utility website for troubleshooting information:

http://support.intel.com/support/chipsets/inf/

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Appendix C Serial ATA

C.1   Description

Serial ATA (SATA) is defined as the primary inside-the-box storage connection only, with no outside-the-box implementation. It is a storage device-centric technology and does not support other peripherals, such as cameras, scanners, or printers.

The Serial ATA 1.0 specification outlines the following benefits:

- *Performance Headroom*: SATA provides higher performance than equivalent ATA with performance scaling from 150MB/sec at introduction to 300MB/sec for the second generation, and ultimately forecasted to reach 600MB/sec during its anticipated 10-year roadmap.

- *Software Transparency with Legacy Parallel ATA*: This enables a relatively easy transition to the new technology.

- *Low Cost*: SATA is cost-competitive with equivalent Parallel ATA solutions, including hosts, devices, and cabling in volume quantities.

C.2   Comparing Serial ATA versus Parallel ATA (IDE)

The table below compares Serial ATA (SATA) versus Parallel ATA (IDE):

Serial ATA (SATA)		Parallel ATA (IDE)	
Theoretical Transfer Rate (over life of SATA)	150/300/600 MB/sec (forecast only)	**Theoretical Transfer Rate**	133MB/sec
Transfer Mode	Generation 1	**Transfer Modes**	PIO – UDMA-6
Data Cable	7-pin SATA	**Data Cable**	40-pin, 80-conductor IDE
Max Data Cable Length	1 meter (39 inches)	**Max Data Cable Length**	
Power Cable	SATA Power Cable	**Power Cable**	IDE Power Cable
Power Consumed	250 mV	**Power Consumed**	5 V

The following illustrations show examples of SATA and IDE data cables:

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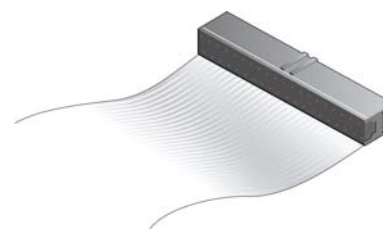
C.3   System Requirements

To use Serial ATA (SATA), your system must meet ALL of the following requirements:

- SATA compatible logic either on the motherboard or on a Serial ATA adapter card
- SATA compatible BIOS
- SATA-aware device driver for the operating system
- Generation 1-compatible SATA device such as a hard drive
- A SATA data cable
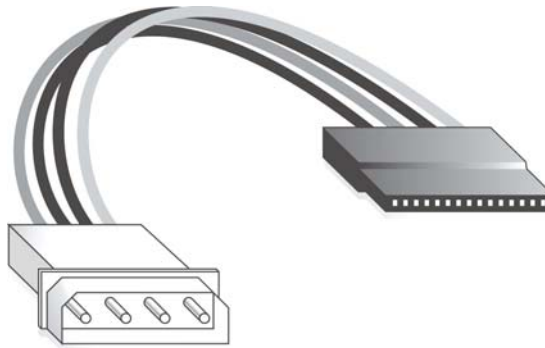- A SATA power cable

C.4   Serial ATA Data Cable

Serial ATA (SATA) data cables are 7-pin cables. Either end of the SATA data cable can be connected to the SATA hard drive or the connector on the motherboard. SATA data cables can be up to 1 meter (39 inches) in length. The following illustration shows an example of a SATA data cable:

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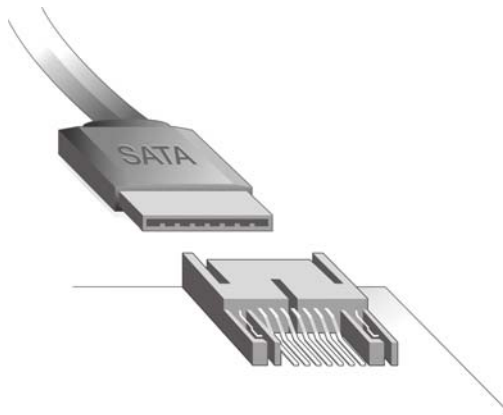
C.5   Serial ATA Power Cable

Serial ATA power cables are usually 4 or 5-pin cables with 15-pin connectors. SATA power cables currently use an IDE/ATAPI to SATA power adaptor. One end of the SATA power cable is a typical 4-pin IDE/ATAPI power connector (which gets connected to an unused power cable from the power supply) and the other end (15-pin connector) gets connected to the SATA hard drive. The following illustration shows an example of a SATA power cable:

C.6   Are a Serial ATA Data and Power Cable Needed for Serial ATA?

In order to take advantage of Serial ATA (SATA), SATA data and power cables are required. These SATA cables have a new design configuration; you cannot use older 40-pin, 80-conductor IDE or regular IDE power cables with SATA hard drives as they physically do not fit the SATA devices.

C.7   Mixing/Matching Serial ATA Hard Drives with IDE Hard Drives

If your motherboard has a supported Intel chipset and provides both IDE and Serial ATA connections, you can use both Serial ATA and IDE hard drives in the system. Note that Serial ATA hard drives use different data and power cables than IDE devices. In order to use both IDE and Serial ATA hard drives in a RAID configuration, please refer to Section 22.2 titled 'Create Volume Manually' for additional information.

C.8   Using IDE to Serial ATA Adaptors

Using IDE to Serial ATA adaptors (also referred to as "Serial ATA converter" or "device side dongle") to connect IDE hard drives to Serial ATA ports is not recommended. Intel recommends that you only connect Serial ATA hard drives to Serial ATA ports. IDE to Serial ATA Adapters are not recommended for use with Intel RAID Technology as these devices have not been validated for use in Intel platforms. Intel does not provide support for configurations using IDE to Serial ATA Adapters.

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C.9 Theoretical Transfer Rates Associated with Transfer Modes

The table below lists different transfer modes Serial ATA (SATA) devices support along with the theoretical transfer rate. Please refer to the documentation that was bundled with your device or contact the hardware manufacturer for more information about your specific device.

Note: This table contains theoretical transfer rates of SATA transfer modes supported by the Intel 82801ER I/O Controller Hub. Your actual transfer rates can vary from the information contained in this table. In order to take advantage of Serial ATA, your system must meet specific requirements. Please refer to Appendix C.3 for more information.

Table 1. Serial ATA Transfer Rates Associated With Transfer Modes

Mode	Theoretical Transfer Rate (MB/s)
Generation 1	150MB/s

Note: Refer to the Glossary (Appendix D) for a definition of the terms 'theoretical transfer rate', 'sustained transfer rate', and 'burst transfer rate'.

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Appendix D Glossary

48-bit LBA	Technology used with hard drives larger than 137GB
AHCI	Advanced Host Controller Interface (AHCI) is an interface specification that allows the storage driver to enable advanced Serial ATA features such as Native Command Queuing and hot plug.
Array Roaming	Ability to move a complete RAID array from one computer system to another computer system and preserve the RAID configuration information and data on that RAID array.
BIOS	Basic Input/Output System
Block size	Same term as 'Strip size': Grouping of data on a single physical disk within a RAID Volume
Burst transfer rate	Maximum burst rate of the drive. These short transfers usually account for a small percentage of total transfer requests, mostly from the integrated controller cache or buffer.
Create From Existing Disk	Feature in the Intel Application Accelerator which allows flexibility to upgrade from a single Serial ATA (SATA) hard drive to a two drive RAID 0 or RAID 1 configuration when an additional SATA hard drive is added to the system without loss of data.
Disks	Physical disks attached to a RAID controller
IDE	Integrated Drive Electronics
IDE to Serial ATA Adaptor	Also referred to as "Serial ATA converter" or "device side dongle." Connects IDE hard drive to Serial ATA port
ICH5R	Intel 82801ER I/O Controller Hub
ICH6R	Intle 82801FR I/O Controller Hub
Intel Application Accelerator RAID option ROM	Standard PnP option ROM that provides a pre-operating system user interface for the Intel RAID implementation. Also allows boot order to be selected from within the BIOSes setup utility.
Matrix RAID	Combines the benefits of RAID 0 performance and RAID 1 protection on two hard drives
Native Hot Plug	Feature supported by AHCI, allowing Serial ATA hard drive removal or insertion while the system is powered on and running. For example, this may be used when replacing a failed hard drive that is in an externally-accessible drive enclosure.
NCQ	Native Command Queuing (NCQ) is a feature supported by AHCI and it allows for ATA drives to accept more than one command at a time. NCQ, when used in conjunction with a hard drive that supports NCQ, increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
Port0	Serial ATA port (connector) on a motherboard identified as Port0
Port1	Serial ATA port (connector) on a motherboard identified as Port1
POST	Power-On Self Test

RAID	Redundant Array of Independent Disks
RAID 0	Data striping Array. RAID 0 stripes the data across all the drives but doesn't utilize parity. This RAID level is designed for speed and is the fastest of the RAID levels but provides the least protection.
RAID 1	Mirrored Disk Array. RAID 1 requires that each primary data disk have a mirrored disk. The contents of the primary disk and the mirror disk are identical. RAID 1 provides the best data protection but is slower than RAID level 0. Note: Intel Application Accelerator version 3.0 does not support RAID 1.
RAID Array	A group of physical disk drives managed by either hardware, software, or a combination of both
RAID Ready	Term used to describe a system that an end-user can turn into a RAID system by simply adding a second Serial ATA hard drive and invoking the migration feature
RAID Volume	A block of capacity, allocated from a RAID Array and arranged into a RAID topology. The operating system sees a RAID Volume as a physical disk.
SCSI	Small Computer System Interface
Serial ATA (SATA)	New storage interface designed to replace parallel ATA (e.g. IDE technology). SATA was designed for a variety reasons, including performance headroom, cabling issues, and voltage tolerance requirements.
Strip	Grouping of data on a single physical disk within a RAID Volume
Stripe	The sum of all strips in a horizontal axis across physical disks within a RAID Volume
Sustained transfer rate	Rate at which the drive can transfer data sequentially from multiple tracks and cylinders on the disk (closer to real-world file transfers)
Theoretical transfer rate	Actual speed that the drive can read bits from the surface of the platter or write bits to the surface of the platter (can be used to compare drives against one another)