M5287

Serial ATA Host Controller

RAID BIOS/Driver/Utility Manual

Rev. 1.10

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Revision History

Revision	Date	Description
1.10	7/5/2005	• Modified the screen message of RAID BIOS version and drive information, added a note (Chapter 3), and modified the BIOS Reference Message description (Section 7.1). • Added “Create RAID 0 Stripe x4 for Performance” menu item and description (Chapter 3). • Added a note for the “Create Option” in RAID Utility (Section 5.1). • Added a note for RAID Utility information page (Section 5.3).
1.00	6/15/2005	Added RAID Utility information page description.
0.91	12/14/2004	Revised RAID Utility screen example.
0.90	11/04/2004	Initial release.

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1. Introduction

1.1 What is ULi M5287

ULi M5287 is a SATA host controller. It supports up-to 4 SATA ports; each supports SATA 1.0, 1.5 Gbps data rate, SATA II features and AHCI. It can be found in ULi M1573, the highest integration south bridge solution between PCI-Express Link bus, PCI bus, and peripheral buses for personal computer systems.

ULi M5287 also provides a cost-effective solution of RAID functions for performance and reliability.

1.2 Features and Specifications

Disk Interface	Serial ATA
Number of channels	4
Maximum number of drives	4
Supported RAID levels	0, 1, 0+1, JBOD
Supported OS	• Windows XP SP2/2000/Server 2003 SP1 • Linux
RAID Management Tool	RAID Configuration and Management
RAID BIOS	Support bootable array
Additional Features	• Automatic e-mail notification when error occurs • Hot plug

2. Getting Started

Before using the SATA drive, read the following instructions carefully:

2.1 Cable

Use 80-conductor cable with parallel drives.

2.2 RAID Configuration

- For best performance, use two identical drives for RAID 0.
- There is no guarantee that it will work for transferring existing RAID 0/JBOD drives from other adapter to ULi M5287. It is recommended to use new drives to create RAID 0/JBOD with M5287.
- There is no guarantee that it will work for transferring existing RAID 1 drives from other adapter to ULi M5287. If existing drive with valid data is to be used, backup all content of this drive before creating RAID 1 and do 'Create RAID 1 Mirroring for Reliability' at BIOS setup with other new drive. It is recommended to use new drive to create RAID 1 with M5287.
- There is no guarantee that it will work for transferring existing RAID 0+1 drives from other adapter to ULi M5287. If existing drive with valid data is to be used, backup all content of this drive before creating RAID 0+1 and do 'Create RAID 0+1 for Striping, Mirroring' at BIOS setup with other new drives. It is recommended to use new drives to create RAID 0+1 with M5287.

3. ULi RAID BIOS

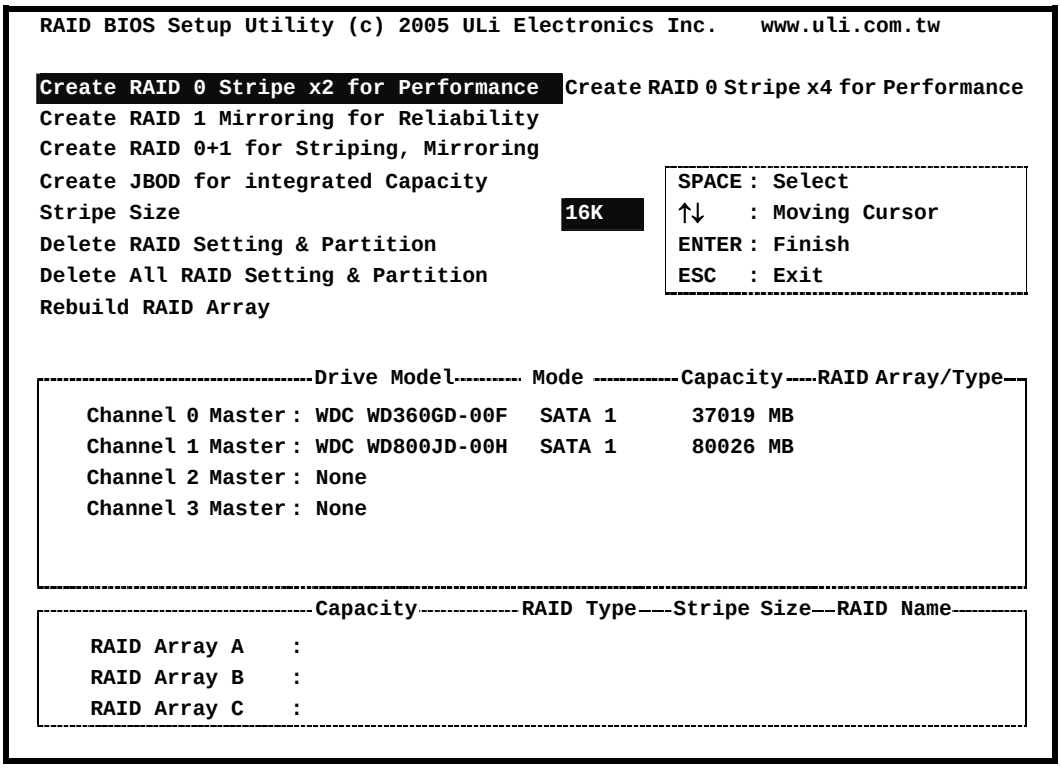
After the system BIOS detects ULi RAID BIOS, the RAID BIOS version and drive information shows up on the screen. The following is an example of BIOS version and drives information:

```
ULi RAID BIOS V1.13 (M5287)
(c) ULi Electronics Inc. 2004, All Rights Reserved.
Identifying IDE drive . . . .
Channel 0 Master: WDC WD360GD-00F    SATA 1   37019 MB
Channel 1 Master: WDC WD800JD-00H    SATA 1   80026 MB
Channel 2 Master: None
Channel 3 Master: None


Press Ctrl-A to enter ULi RAID BIOS setup utility
```

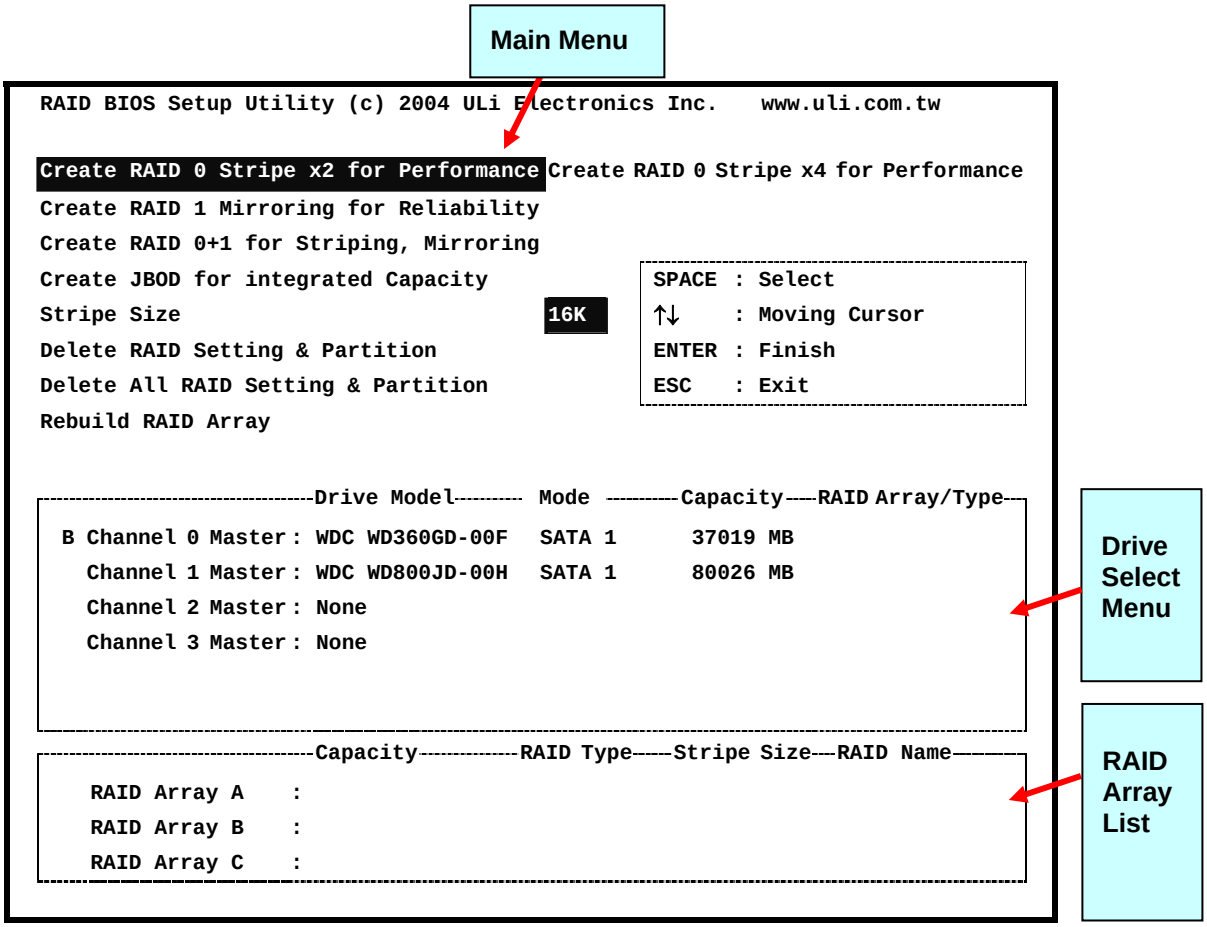
When RAID BIOS is waiting after identifying drives, press 'Ctrl' and 'A' simultaneously to enter the setup menu.

Note: For ULi RAID BIOS V1.13 and later versions, only "**`Identifying IDE drive . . . .`**" will be shown instead of "**`Identifying IDE drive .O.X.O.X`**" which may confuse users.

3.1 RAID BIOS Setup Menu



There are three major areas in the RAID BIOS setup screen: Main Menu, Drive Select Menu and RAID Array List. The following uses setup screen for illustration:



Note: ULi RAID BIOS V1.13 and later versions support the "RAID 0 x4 for Performance" function. If you are using RAID BIOS older than V1.13, there is no "RAID 0 x4 for Performance" item and the screen is a little different from the one shown above.

3.2 Main Menu

In **Main Menu**, the user has several options to operate RAID:

3.2.1 Create RAID 0 Stripe x2 for Performance

1. Press 'Enter' key to activate this item. An '**S**' flash cursor appears at the **Drive Select Menu** for the user to choose the first drive for RAID 0.
2. Use 'Space' key to choose the desired drive for RAID 0. Then the flash cursor changes to an '**s**' flash cursor for the user to choose the second drive for RAID 0.
3. The prompt 'Data on RAID Drives will be deleted (Y/N)' appears after two drives are properly assigned.
4. Press 'Y', and then some necessary information will be written to the drives, which will destroy the original data in the drives.

Warning: Make sure the data in drives is no longer in use before creating RAID 0.

5. Next, the Array Name input line appears for the user to key in a name for the newly created array. The effective characters for an array name is '0'-'9', 'A'-'Z', 'a'-'z', space and underscore.
6. After the RAID array has been created successfully, its information shows up at **RAID Array List**.

3.2.2 Create RAID 1 Mirroring for Reliability

1. Press 'Enter' key to activate this item. An '**M**' flash cursor appears at the '**Drive Select Menu**' for the user to choose the first (source) drive for RAID 1.
2. Use 'Space' key to choose the desired drive for RAID 1. Then flash cursor changes to an '**m**' flash cursor for the user to choose the second (target) drive for RAID 1.
3. The prompt 'Create RAID 1(Y/N)' appears after two drives are properly assigned.

> ***Warning:*** It is recommended to use new drives to create RAID 1. If existing drive is to be used, backup all necessary data before creating RAID 1.

4. Press 'Y', and then some necessary information will be written to drives, which may destroy the original data in the drives.
5. Next, the Array Name input line appears for the user to key in a name for the newly created array. The effective characters for an array name is '0'-'9', 'A'-'Z', 'a'-'z', space and underscore.
6. Lastly a prompt message 'Duplicate Data from M to m (Y/N)?' asks whether to do drive copy. The source and target drives are indicated by '**M**' and '**m**' in '**Drive Select Menu'** respectively. Pressing 'Y' will duplicate the data in source drive to the target drive. Make sure the source drive is the correct one. If you press 'N', then the data is inconsistent in two drives.

> ***Warning:*** Make sure the data in target drive is no longer in use before duplicating RAID 1 Array.

7. After the RAID array has been created successfully, its information shows up at **RAID Array List**.
8. The process status bar shows up during the duplication process.

3.2.3 Create RAID 0+1 for Striping, Mirroring

1. Press 'Enter' key to activate this item. An '**+**' flash cursor appears at the '**Drive Select Menu**' for the user to choose the first drive for RAID 0+1.
2. Use 'Space' key to choose the desired drive for RAID 0+1. Then flash cursor changes to an '**+**' flash cursor for the user to choose the second, third and fourth drives for RAID 0+1.
3. The prompt 'Create RAID 1(Y/N)' appears after two drives are properly assigned.

> ***Warning:*** It is recommended to use new drives to create RAID 0+1. If existing drive is to be used, backup all necessary data before creating RAID 0+1.

4. Press 'Y', and then some necessary information will be written to drives, which may destroy the original data in the drives.
5. Next, the Array Name input line appears for the user to key in a name for the newly created array. The effective characters for an array name is '0'-'9', 'A'-'Z', 'a'-'z', space and underscore.
6. After the RAID array has been created successfully, its information shows up at **RAID Array List**.
7. The process status bar shows up during the duplication process.

3.2.4 Create JBOD for Integrated Capacity

1. Press 'Enter' key to activate this item. A '**J**' flash cursor appears at the '**Drive Select Menu'** for the user to choose the first drive for JBOD.
2. Use 'Space' key to choose the desired drive for JBOD array. Use 'Enter' key to finish JBOD drive selection. The maximum number of drives for JBOD array is four and the minimum is two.
3. The prompt 'Create JBOD (Y/N)' appears.
4. Press 'Y' key and then some necessary information will be written to drives, which may destroy the original data in the drives.

> ***Warning:*** Make sure the data in drives is no longer in use before creating RAID Array.

5. Next the Array Name input line appears for the user to key in a name for the newly created array. The effective characters for an array name is '0'-'9', 'A'-'Z', 'a'-'z', space and underscore.

3.2.5 Stripe Size

This option is effective for RAID 0/0+1. The user can choose a stripe size from 64KByte, 32KByte, 16KByte(default), 8KByte and 4KByte. If the user uses RAID 0 for most A/V editing application or files, 64KByte is recommended.

1. Press 'Enter' key to activate this item. Then 64K, 32K, 16K, 8K, 4K items appears at bottom of **Main Menu**.
2. Use ' ↑ ' ' ↓ ' to choose the stripe size.

3.2.6 Delete RAID Setting & Partition

When RAID BIOS detects a broken RAID, the user can use **Delete RAID Setting & Partition** to delete the broken RAID.

1. Press 'Enter' key to activate this item. An '**E**' flash cursor appears at the '**Drive Select Menu'** for the user to choose defined array drive to be deleted.
2. 'Data on RAID drives will be deleted (Y/N)?' prompt message shows up to confirm the user's selection.
3. Press 'Y' key, and then the data in drives is destroyed.

Warning: Make sure the data in drives is no longer in use before deleting RAID Array.

4. "**RAID Array List**" automatically updates itself.

3.2.7 Delete All RAID Setting & Partition

1. Press 'Enter' key to activate this item.
2. 'Data on RAID drives will be deleted (Y/N)?' prompt message shows up to confirm the user's selection.
3. Press 'Y' key, and then the data in drives is destroyed.

Warning: Make sure the data in drives is no longer in use before deleting RAID Array.

4. '**RAID array List**" automatically updates itself.

3.2.8 Rebuild RAID Array

When a drive is replaced or BIOS detects a broken RAID, the user can use **Rebuild RAID Array** to keep data coherency for RAID 1 and 0+1.

1. Press 'Enter' key to activate this item. An 'R' flash cursor appears at the 'Drive Select Menu' for the user to choose the valid drive of previously defined RAID 1 or 0+1 to rebuild.
2. BIOS shows the source (marked with 'M') and target (marked with 'm') drives.

Warning: Make sure the data in target drive is no longer in use before rebuilding RAID Array.

3. Lastly a prompt message 'Duplicate Data from M to m (Y/N)?' asks whether to do drive copy. The source and target drives are indicated by '**M**' and '**m**' in '**Drive Select Menu'** respectively. Press 'Y' to start the rebuild process and data duplication.
4. The process status bar shows up during the duplication process.

3.2.9 Create RAID 0 Stripe x4 for Performance

1. Press 'Enter' key to activate this item.
2. The prompt 'Data on first 4 drives will be deleted (Y/N)' appears.
3. Press 'Y', and then some necessary information will be written to the drives, which will destroy the original data in the drives.

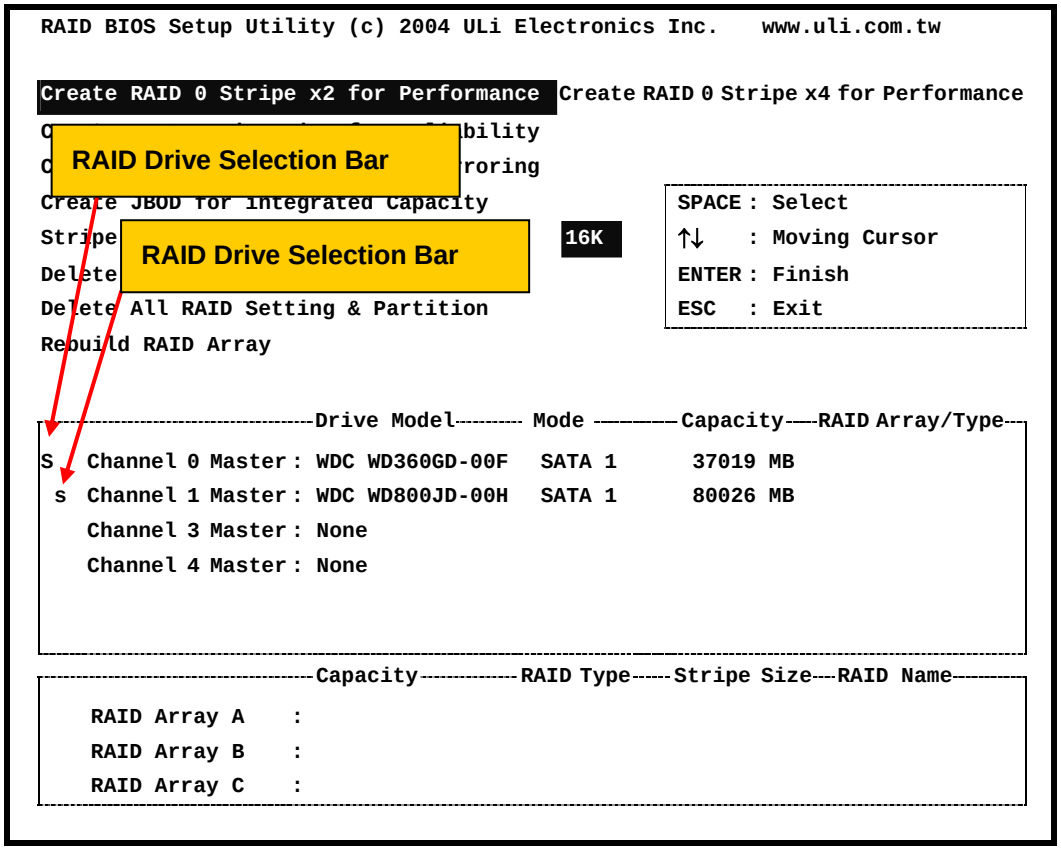
> ***Warning:*** Make sure the data in drives is no longer in use before creating RAID 0.

4. Next, the Array Name input line appears for the user to key in a name for the newly created array. The effective characters for an array name is '0'-'9', 'A'-'Z', 'a'-'z', space and underscore.
5. After the RAID array has been created successfully, its information shows up at **RAID Array List**.

> ***Note:*** This item is supported ONLY by the RAID BIOS V1.13 and later

3.3 Drive Select Menu

This menu lists the available drives and their information. There are three indicator bars in this menu: two RAID Drive Selection Bar and one Boot Drive Selection Bar.



3.4 RAID Array List

This list shows the existing and newly created RAID arrays.

4. ULi Windows Driver and RAID Utility Installations

4.1 Use SETUP.EXE

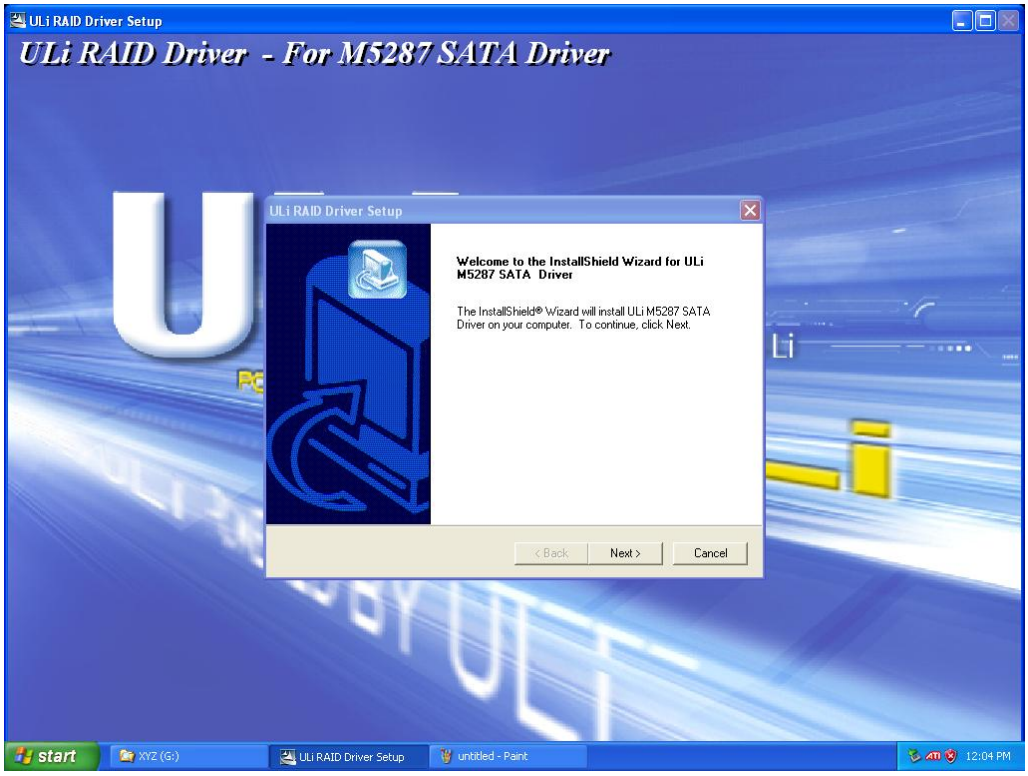
4.1.1 When Windows XP/2000 is Already Installed

When the operation system is installed in a drive not connected at M5287, using the *SETUP* program is the BEST way to install the driver and utility since the *SETUP* program will automatically install driver and utility under Windows.

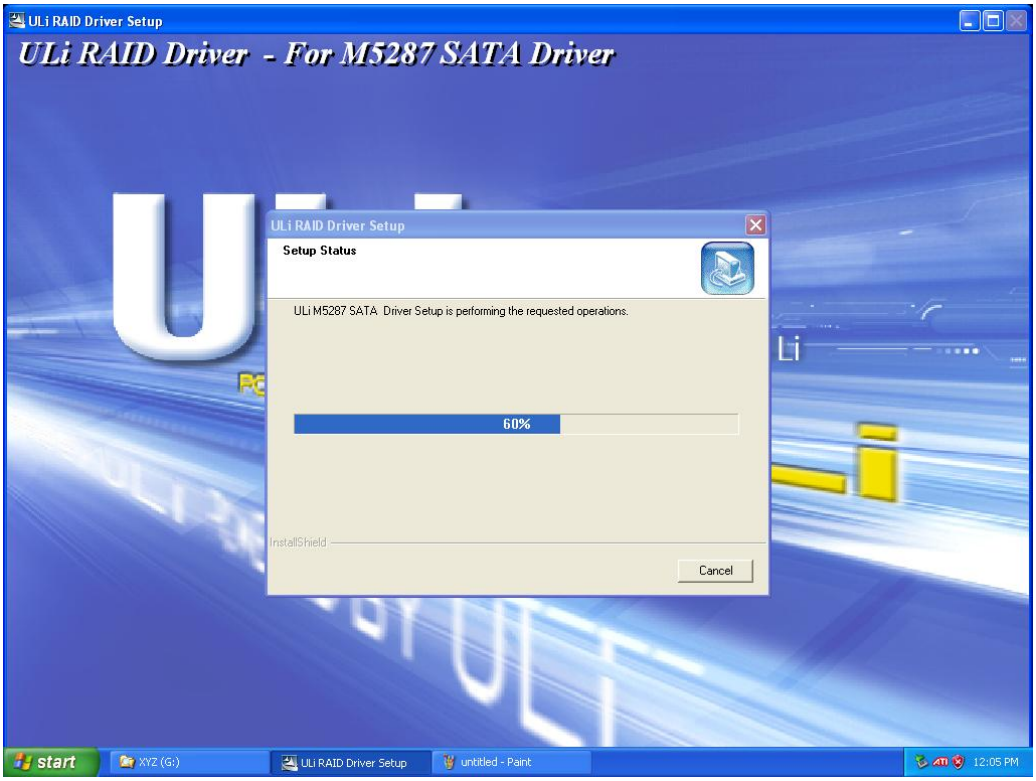
Note: If you follow the **Windows Hardware Wizard** to install the driver, the *ULi RAID Utility* will not be installed. You need to run *SETUP* again.

1. Click '**Cancel'** button when the "**Found New Hardware Wizard**" dialog box shows up.
   The following is an example of Windows XP Wizard.

2. Run ULi RAID driver *SETUP.EXE*. The following screen shows up. Click '**Next'** to continue the setup process.

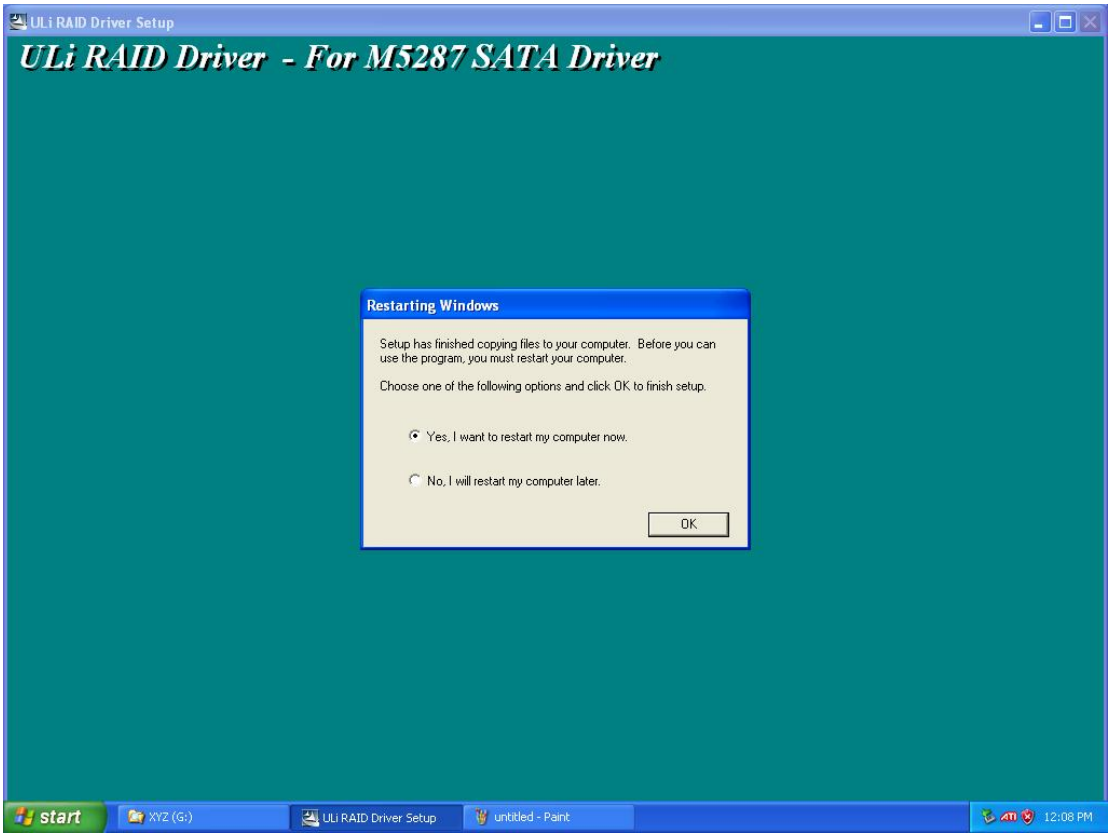


3. Wait for a while. The setup percentage bar will reach 100% after several seconds.

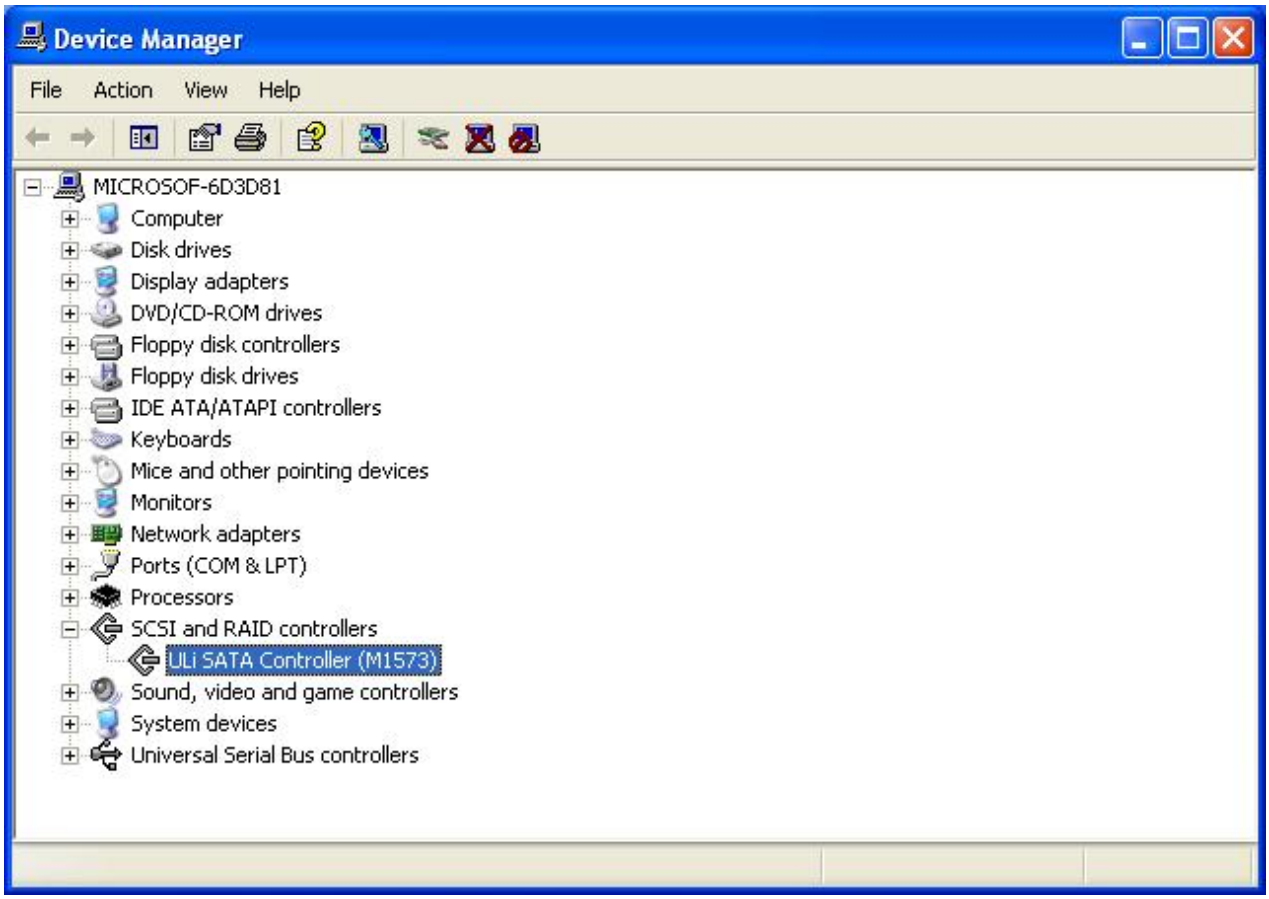


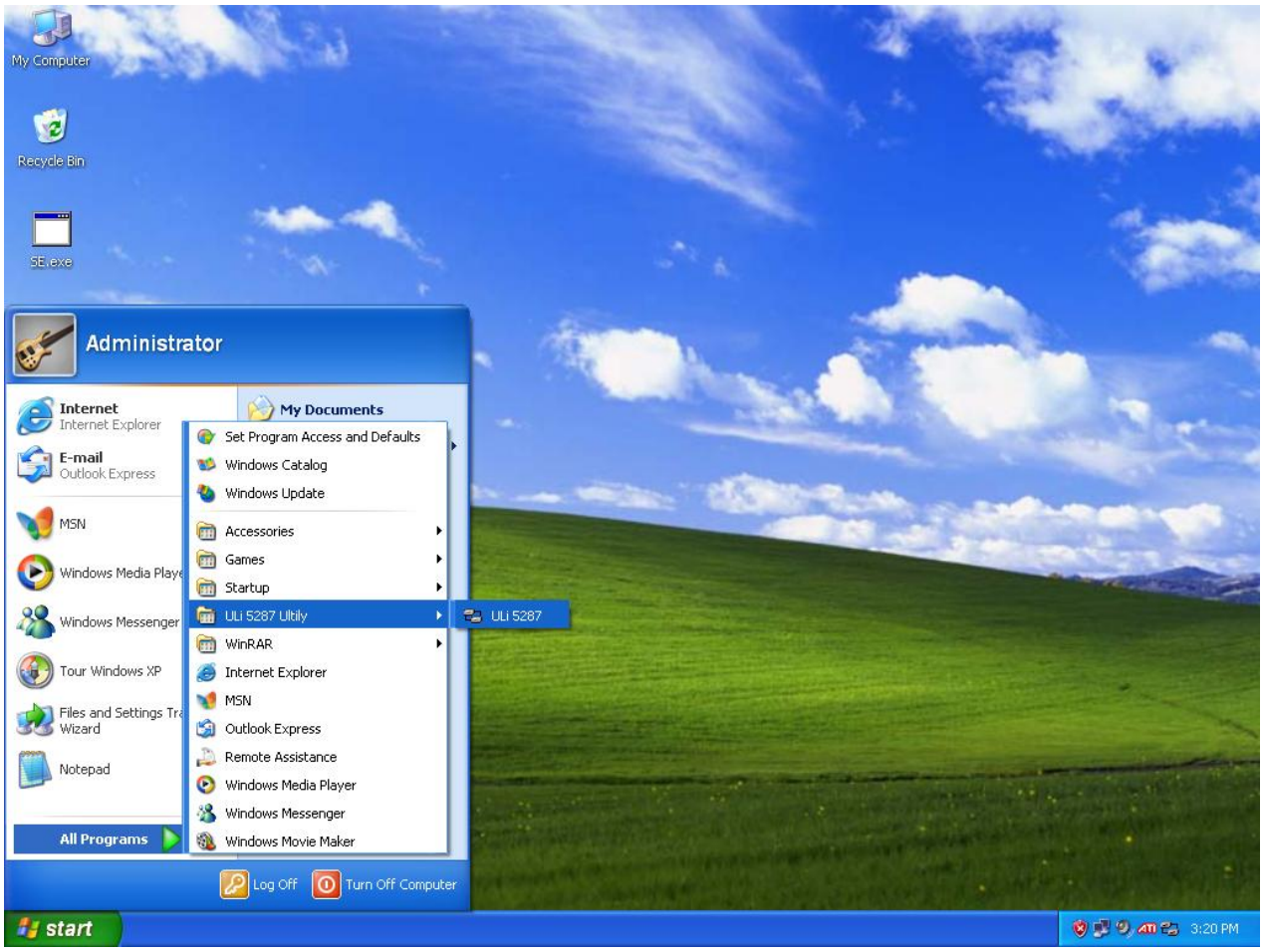
4. If a warning dialog box appears to indicate the driver has not passed Windows Logo testing, it means you are installing a non-logo driver version. Please make sure the version is right for your adapter or system. Click '**Continue Anyway**' after you confirm the unsigned driver is ready to be used. If the driver is signed, this warning dialog will not show up.

5. The last step is to restart Windows. Click '**Finish'** to restart Windows.



6. After Windows restart, the driver is installed as 'SCSI and RAID controllers' and you can check it in the **Device Manager**. You can also find the ULi RAID utility at **Programs**.




My Computer
Recycle Bin
SE.exe
Administrator
Internet
Internet Explorer
E-mail
Outlook Express
MSN
Windows Media Player
Windows Messenger
Tour Windows XP
Files and Settings Transfer Wizard
Notepad
All Programs
My Documents
Set Program Access and Defaults
Windows Catalog
Windows Update
Accessories
Games
Startup
ULi 5287 Ultily
ULi 5287
WinRAR
Internet Explorer
MSN
Outlook Express
Remote Assistance
Windows Media Player
Windows Messenger
Windows Movie Maker
Log Off
Turn Off Computer
start
3:20 PM

4.2 Install Driver during Windows XP Installation

4.2.1 Preparation

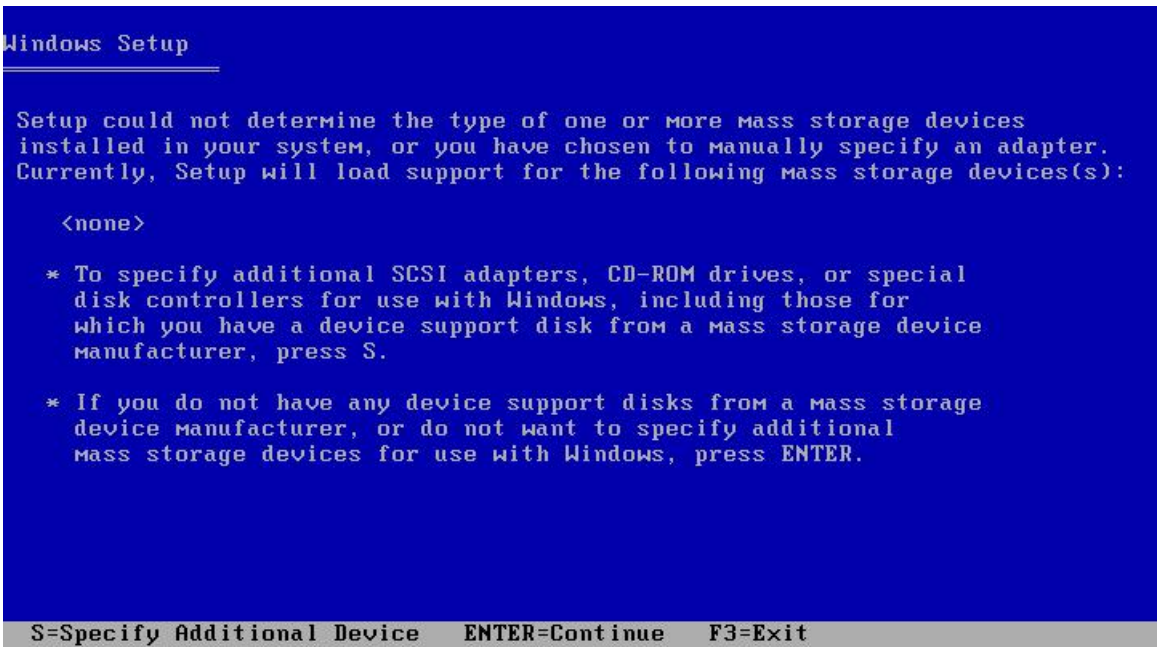
To use boot drive connected at M5287, set the boot drive in the RAID BIOS. You may need to adjust system BIOS to use Adapter boot (e.g. SCSI selection item in some BIOS).

Also prepare a diskette containing the ULi RAID driver. The driver binary for Windows XP/2000/NT can be found under win_xp, win_2000, and win_nt subdirectory respectively. There should be two files, *TXTSETUP.OEM* and *DISK1*, included at the root directory of the diskette.

4.2.2 Start installation

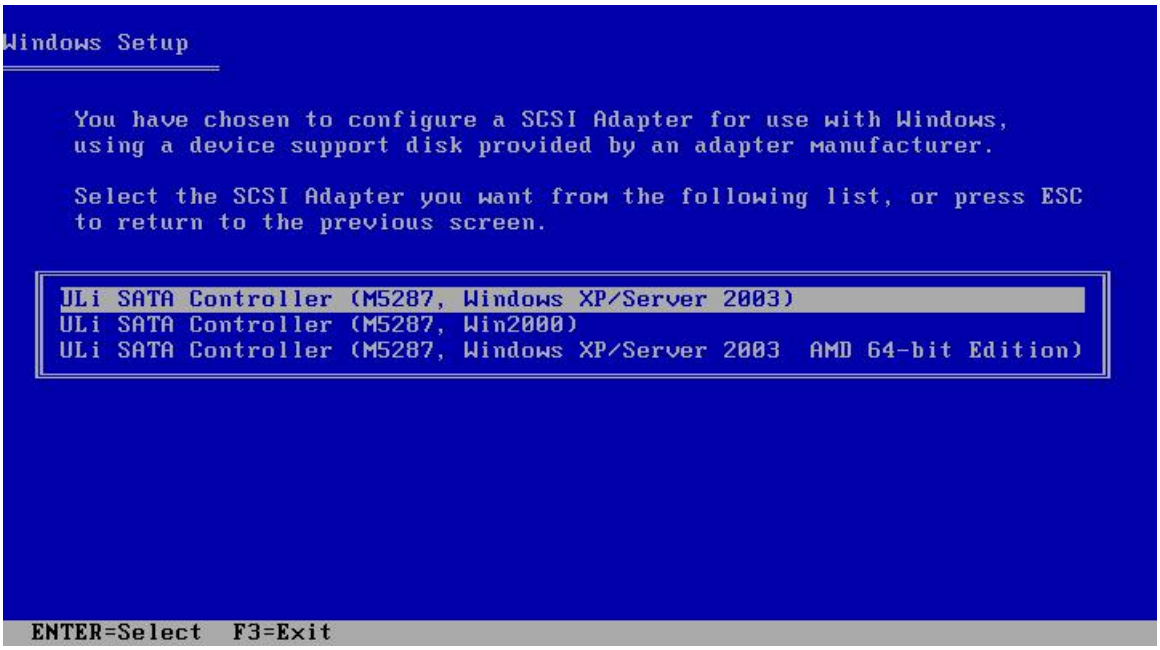
1. Boot from Windows XP installation CD-ROM. When Windows Setup screen prompts "**Press F6 if you need to install a third party SCSI or RAID driver…**', press **F6** to run the driver installation.

2. Wait for a while when Setup is loading files. When *Setup* shows a message indicating it could not determine the type of device, press '**S**' and Windows Setup will prompt for driver.

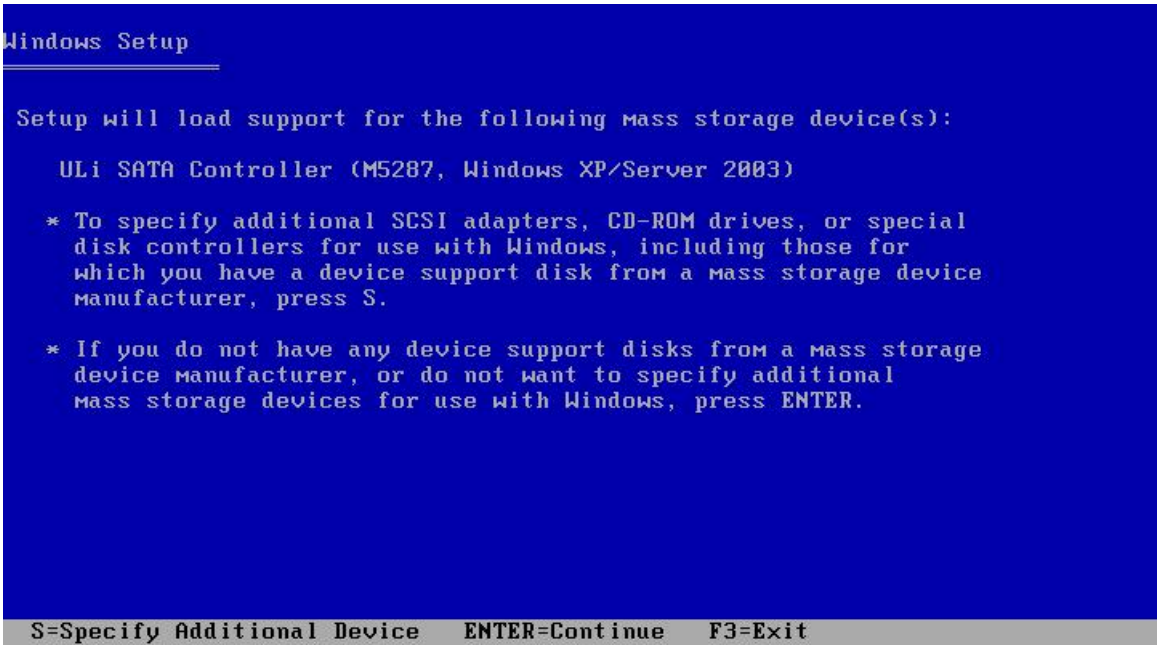


3. When *Setup* asks for driver diskette, insert the prepared driver diskette and press '**Enter'**.

4. When the controller menu shows up, use ↑↓ keys to select "**ULi STAT Controller (M5287, Windows XP/Server 2003)**" and press '**Enter'**.



5. Wait for while when *Setup* is loading driver files. After *Setup* recognizes the driver for ULi SATA RAID Controller and shows the following prompt, press '**ENTER'** to continue the rest of Windows Setup..



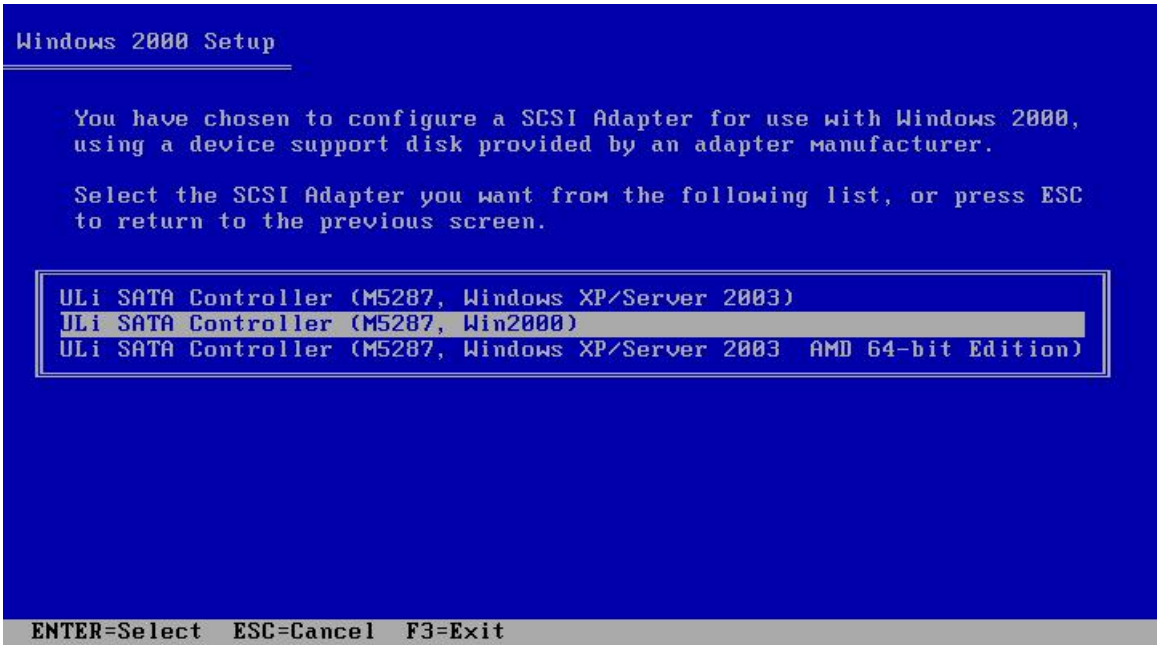
6. After several minutes of normal Windows XP installation, if a warning dialog box shows up to indicate that the driver has not passed Windows Logo testing, it means you are installing a non-logo driver version. Make sure the version is right for your adapter or system. Click '**YES'** after you confirm the unsigned driver is ready to be used. If the driver is signed, this warning dialog will not show up.

7. After Windows XP finishes installation and is ready at working mode, run *SETUP.EXE* in the ULi driver package to install ULi RAID utility. Refer to instructions at Section 4.1 Step 2 to Step 6.

4.3 Install Driver during Windows 2000 Installation

The installation is similar to that for Windows XP. Only the driver selection at Step 4 and Step 6 are different. Use the following for Step 4, refer to Section 4.2 for others steps.

Step 4. When the controller menu shows up, use ↑↓ keys to select "**ULi STAT Controller (M5287, Win2000)" and press Enter**'.

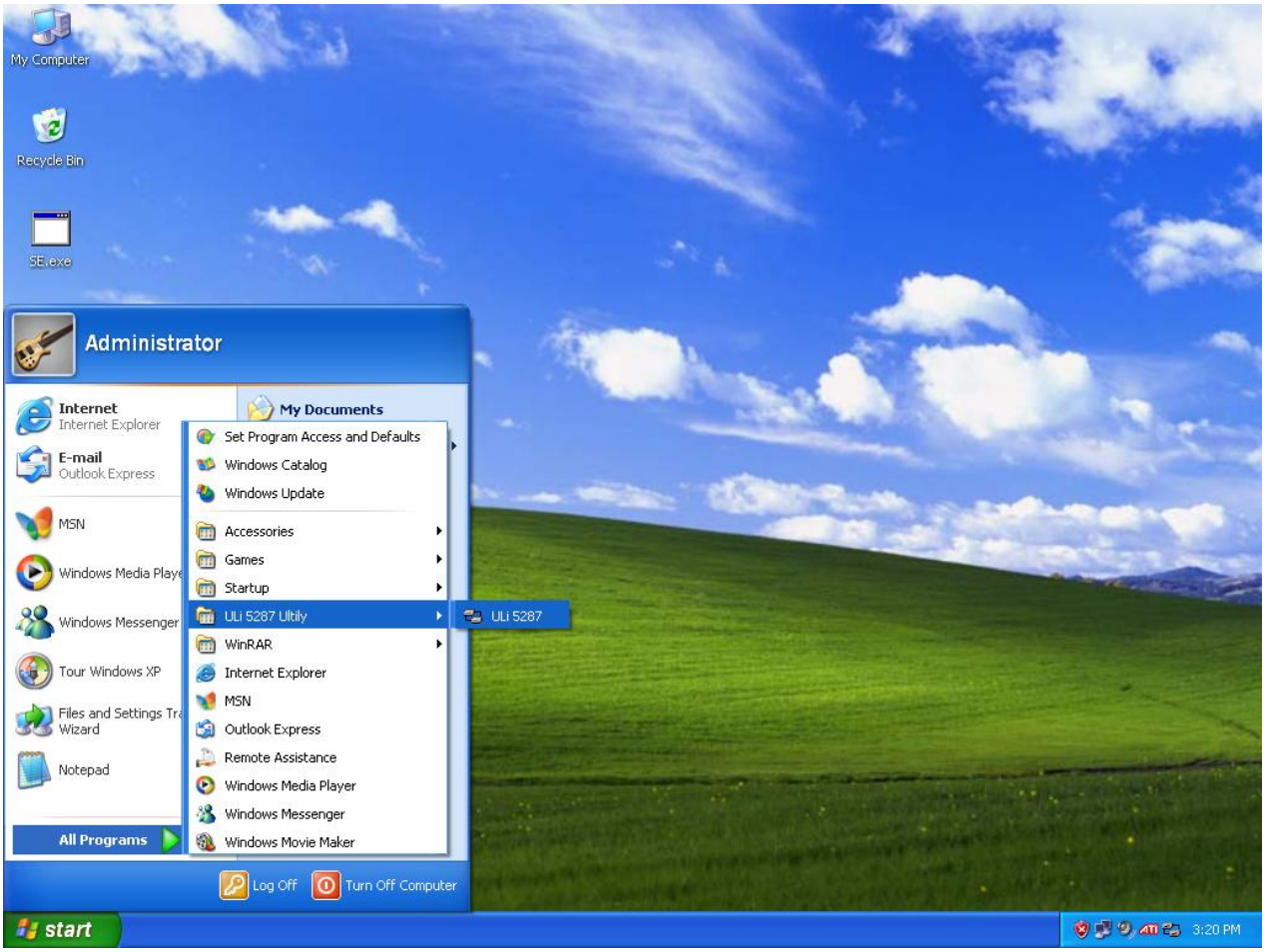


5. Using ULi Windows RAID Utility

5.1 How to create M5287 RAID under Windows

The user can create RAID arrays in either the RAID BIOS setup menu as previously described or under Windows Utility by following the steps below:

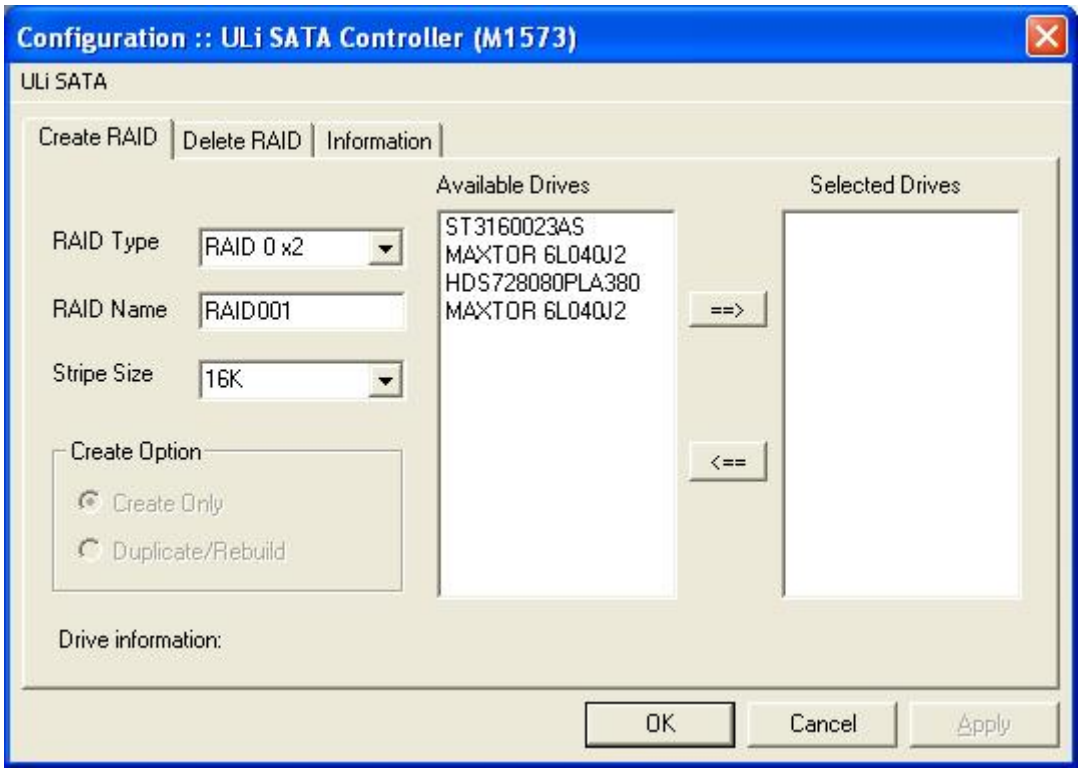
1. After the driver and utility are installed correctly, the user can find ULi RAID utility from Windows **Programs** as shown below:



Or the user can find ULi RAID Utility at task bar:

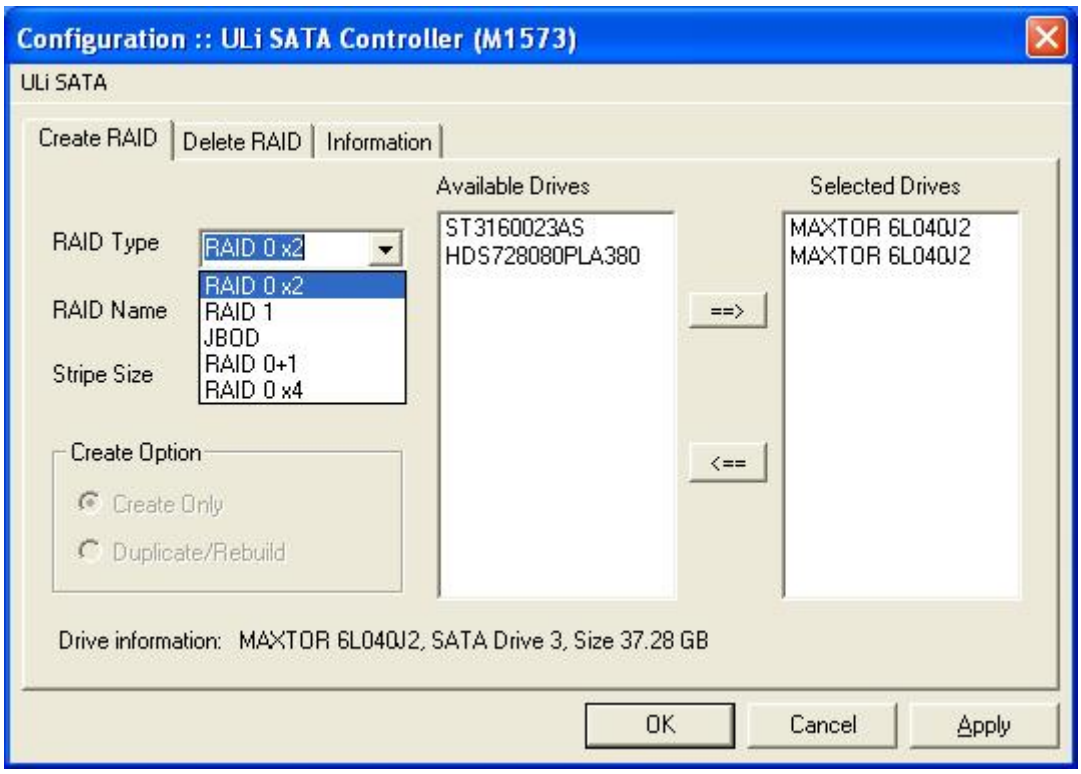
2. Run ULi RAID utility from Windows **Program** or click on '**Configuration**' at task bar. The **Configuration** dialog box appears.

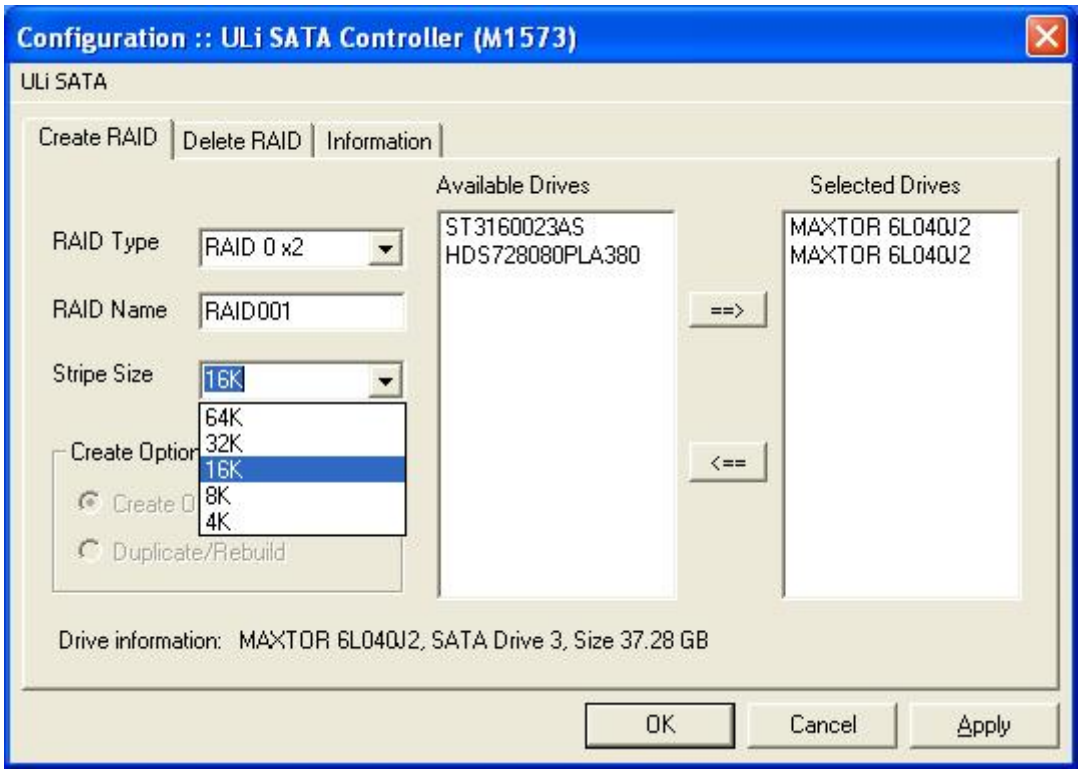
3. The information of the connected drives is displayed.

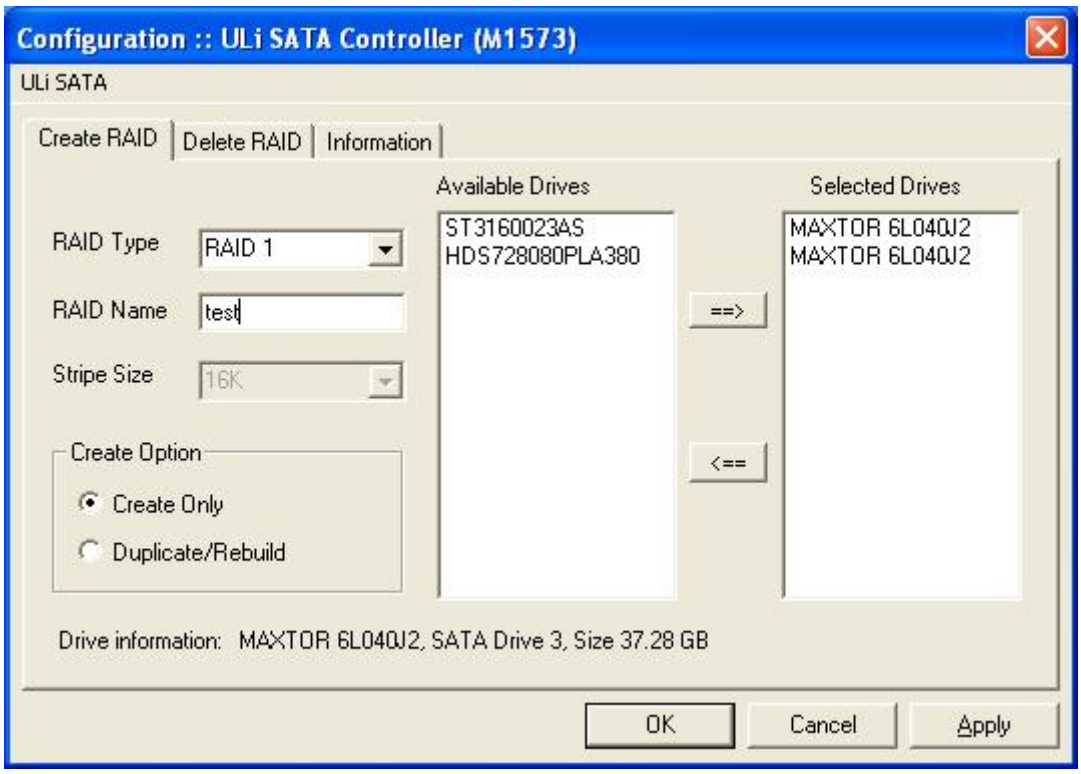


4. Click the desired drive from the '**Available Drives'** list. The selected drive will be moved to '**Selected Drives'** list by clicking **->**. The user can select array type from the '**RAID Type'** pull-down menu and select stripe size for RAID 0 from '**Stripe Size'** pull-down menu. The user keys in array name in '**RAID Name'**. The following are examples of creating RAID 0 and RAID 1.

Note: The **Create Option** is active for RAID 1 and RAID 0+1 only. The '**Create Only**' option will destroy data in both of the selected drives. The '**Duplicate'** option will keep the source drive data and copy source drive data into the target drive.

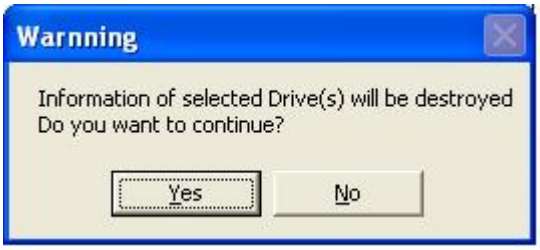

Configuration :: ULi SATA Controller (M1573)
ULi SATA
Create RAID
Delete RAID
Information
Available Drives
Selected Drives
RAID Type
RAID 0 x2
RAID Name
Stripe Size
RAID 0 x2
RAID 1
JBOD
RAID 0+1
RAID 0 x4
ST3160023AS
HDS728080PLA380
MAXTOR 6L040J2
MAXTOR 6L040J2
==>
<==
Create Option
Create Only
Duplicate/Rebuild
Drive information: MAXTOR 6L040J2, SATA Drive 3, Size 37.28 GB
OK
Cancel
Apply


Configuration :: ULi SATA Controller (M1573)
ULi SATA
Create RAID
Delete RAID
Information
Available Drives
Selected Drives
RAID Type
RAID 0 x2
RAID Name
RAID001
Stripe Size
16K
64K
32K
16K
8K
4K
ST3160023AS
HDS728080PLA380
MAXTOR 6L040J2
MAXTOR 6L040J2
==>
<==
Create Option
Duplicate/Rebuild
Drive information: MAXTOR 6L040J2, SATA Drive 3, Size 37.28 GB
OK
Cancel
Apply

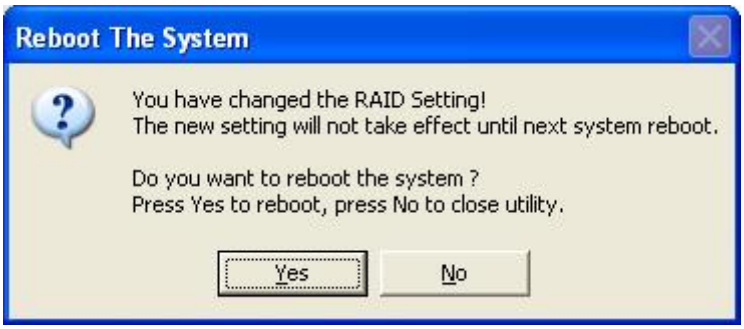


Note: The **RAID 0x4** is available for Driver V6205 and RAID BIOS v1.13 and later.

5. After the drives and type are configured, a dialog box appears to warn the user that the next action will destroy information in the drives. Make sure the information in selected drivers is no longer in use before clicking on 'Yes'.

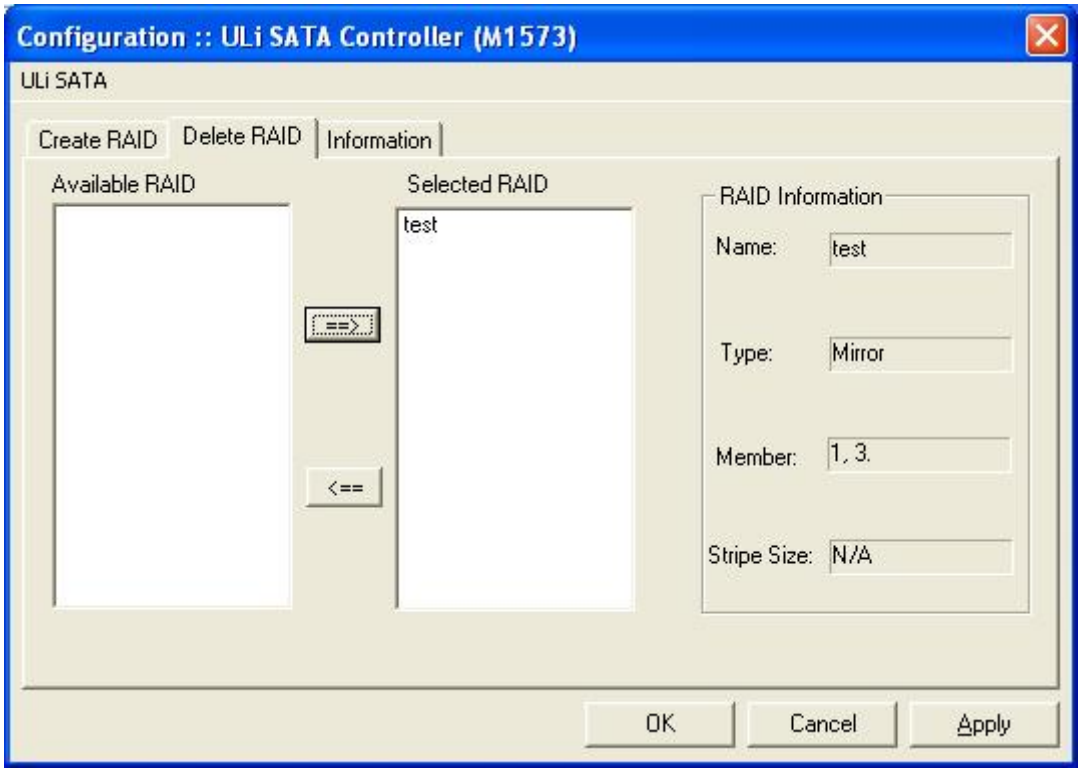


6. Click '**Yes'** to restart the system.

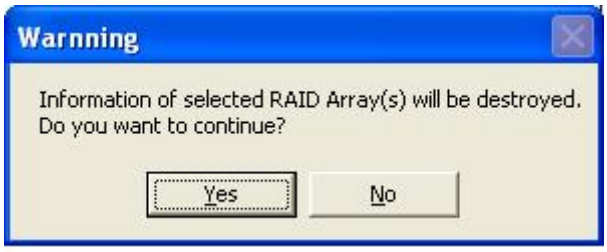


5.2 How to delete M5287 RAID under Windows

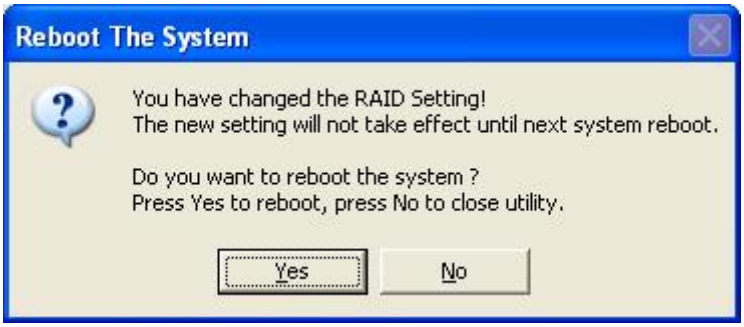
1. If the user wants to delete existing or newly created RAID, click on '**Delete RAID'** tab on the main **Configuration** menu. Click on the RAID from '**Available RAID'** list, then move the selected RAID to '**Selected RAID'** list by clicking **->**.



2. Click 'OK' after the array is selected. A dialog box appears to warn the user that the next action will destroy information in the drives. Make sure the information in selected drivers is no longer in use before clicking on '**Yes'**.

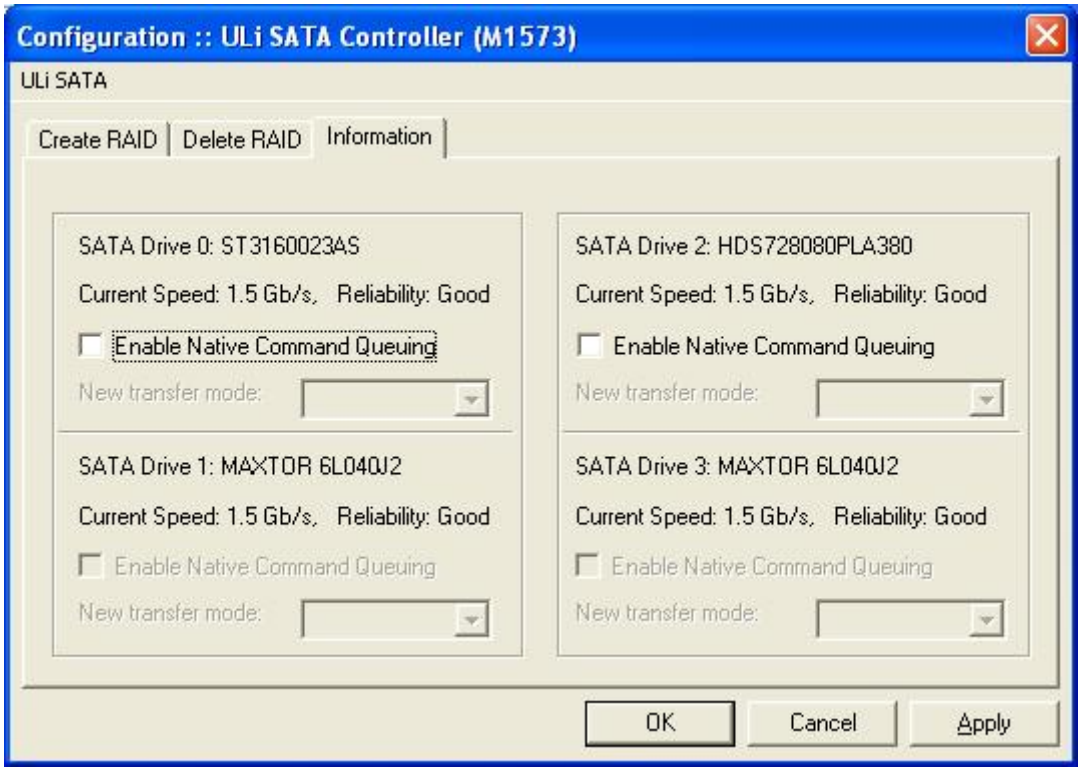


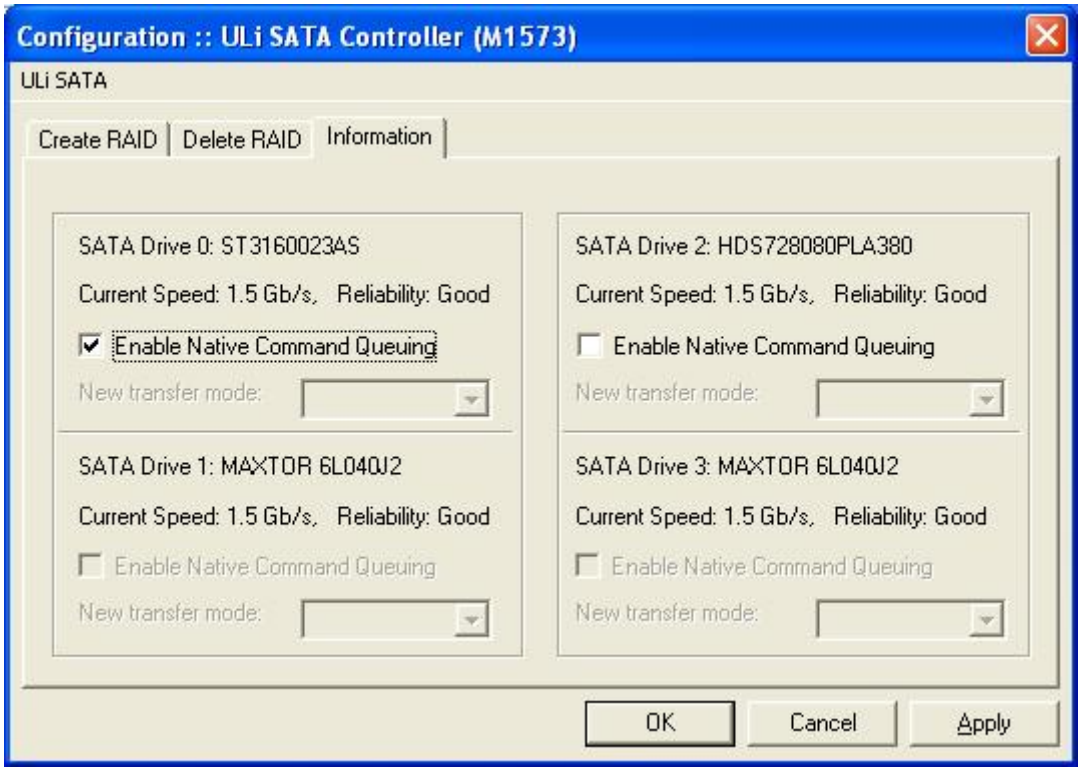
3. Click '**Yes'** to restart the system.

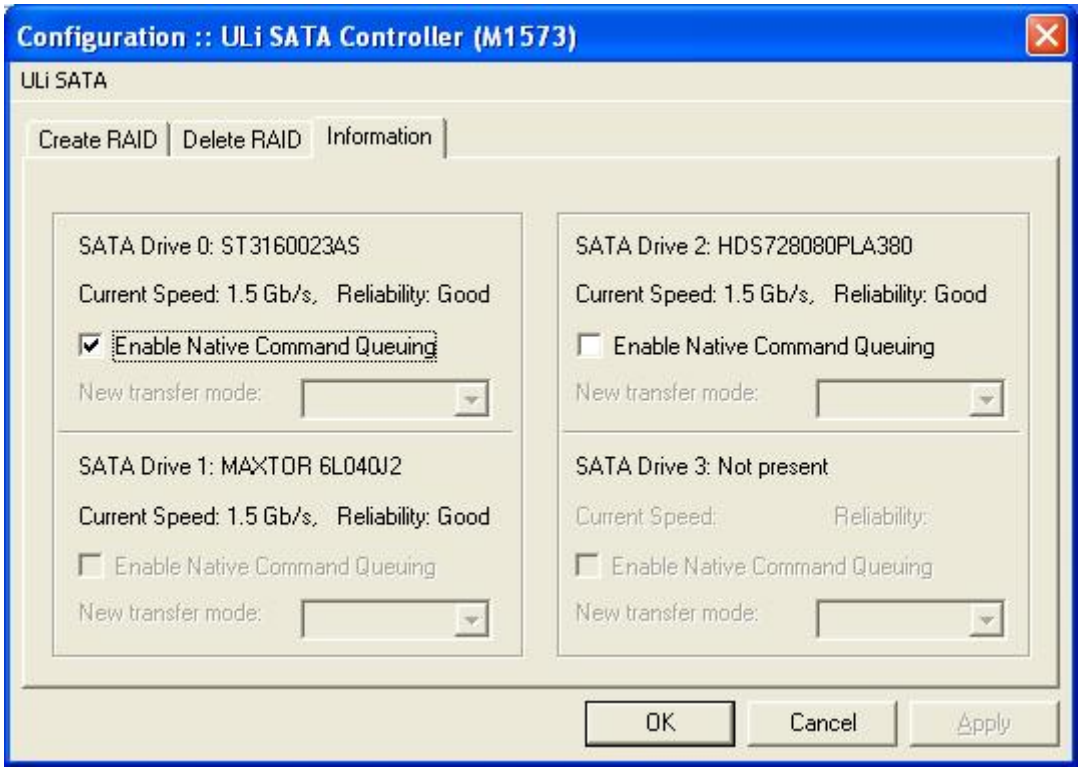


5.3 How to Obtain Drive Information under Windows

The **Information** page shows the name of the drive (if connected) and its current running speed. Below are three examples:







The "**Enable Native Command Queuing**" becomes selectable when the drive supports Native Command Queue. After changing "**Enable Native Command Queuing**" from check to uncheck or vice versa, the system needs to reboot before the new setting takes effect.

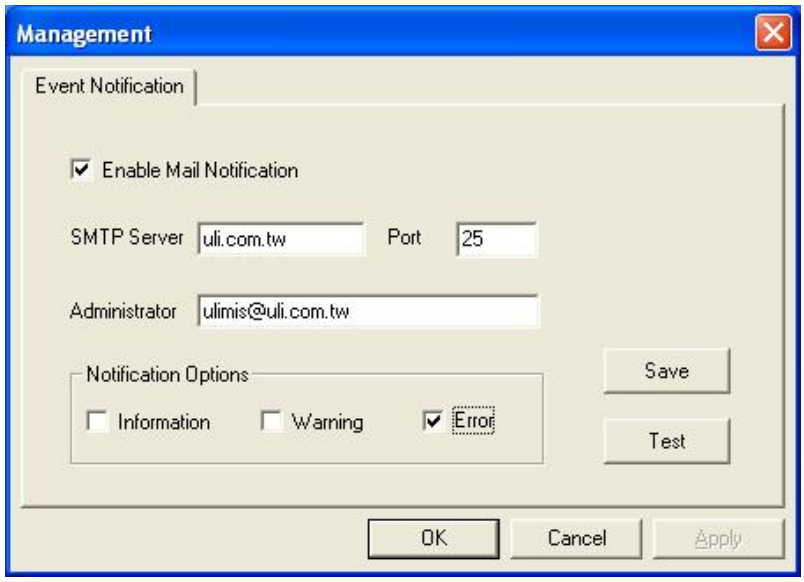
The **Reliability** is an information item that tells the user about the drive degradation and/or faults. It is a technology to predict and therefore protect data from the possibility of degradation or fault.

Note: The **Current speed** and **Reliability** display, and the "**Enable Native Command Queuing**" features are supported on driver version 6205 and later.

5.4 How to setup automatic e-mail notification when error occurs

1. Find ULi RAID utility from Windows desktop or taskbar and click on '**Management**.

2. The **Management** dialog box appears. Input the SMTP server information and administrator e-mail address. Check on the '**Enable Mail Notification'** checkbox. Then click '**OK'**.



6. Terminology

- **RAID:** Redundant Array of Independents Disks.

- **RAID 0:** Striped Disk Array without Fault Tolerance.
  The data is broken down into stripes and each stripe is written to a separate disk drive. This improves the I/O performance through different drive at different channel. However, it is not fault tolerant. The failure of one disk will result in data loss in disk array.
  The maximum capacity is the number of drives multiplies by the minimum size of the drives.
  For example, when using 10GB and 14GB drivers to form RAID 0, the RAID 0 capacity is 20GB.

- **RAID 1:** Mirroring Disk Array with Fault Tolerance.
  The data is written to all drives and read parallel from different drives. This enhances the data protection, but cost some overhead at performance. Once one drive fails, data can be recovered from other drive.
  The maximum capacity is the minimum size of the drives.
  For example, when using 10GB and 14GB drivers to form RAID 1, the RAID 1 capacity is 10GB.

- **RAID 0+1:** Striping and Mirroring
  RAID 0+1 is implemented as a mirrored array whose segments are RAID 0 arrays. RAID 0+1 has same fault tolerance as mirroring and reduces overhead by striping. It needs at least four drives to form a RAID 0+1.

- **JBOD:** Just a Bunch of Drives
  JBOD is to expand the capacity of drive through creating a virtual drive which combines more than one disk. The total capacity is the sum of all drives. The failure of one drive will result in data lost in array.

- **NCQ:** Native Command Queuing
  A New performance feature for Serial ATA. It reduces the mechanical overhead of the drive by queuing commands from the host and re-order them.

7. Reference Messages

7.1 BIOS Reference Messages

- **'?' shown at the RAID BIOS identifying IDE drive.**

```
ULi RAID BIOS V1.13
(c) ULi Electronics Inc. 2005. All Rights Reserved.
Identifying IDE driver. . . . .
Channel 1 Master: Maxtor 4A160J0
Channel 2 Master: None
Channel 3 Master: WDC WD360GD-00F
Channel 4 Master: Maxtor 6Y200M0


Press Ctrl-A to enter ULi RAID BIOS setup utility
```

If the drive is not a workable drive, "?" will show up in the screen:

-

```
RAID 1 may still function, but mirroring mechanism is disabled !
After broken HDD (e.g., marked with ?) is swapped with new one, you may
enter RAID BIOS to "Rebuild RAID Array" for RAID 1 and RAID 0+1.

RAID 0+1 may still function, but mirroring mechanism is disabled !
After broken HDD (e.g., marked with ?) is swapped with new one, you may
enter RAID BIOS to "Rebuild RAID Array" for RAID 1 and RAID 0+1.
```

When this message appears, the existing RAID 1 or RAID 0+1 is broken. It may due to drive failure at RAID or one drive is replaced/changed. User should enter setup to rebuild RAID or delete RAID relation.

-

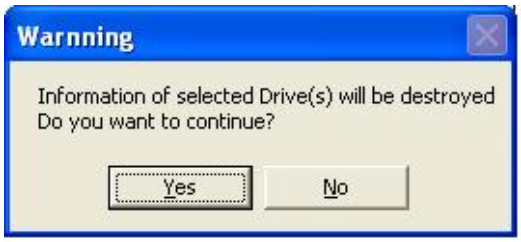
```
RAID 0 configuration is broken and may not function !

JBOD configuration is broken and may not function !
```

When this message appears, the existing RAID 0 or JBOD is broken. It may due to drive failure at RAID or one or more drives are replaced/changed. User should enter setup to rebuild RAID or to delete RAID relation.

7.2 RAID Utility Reference Messages

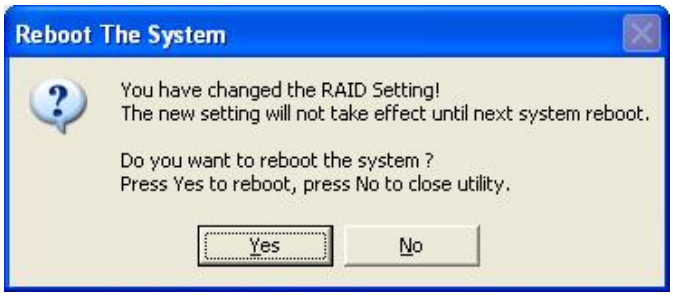
- **Warning Message:**

When creating or deleting RAID, the utility will show this warning message. User must make sure the data at selected drivers is no longer in use. After pressing 'Yes', the data at selected drivers will be destroyed.



- **Reboot system prompt:**

After using the utility to create or delete RAID, the RAID setting will only take effect after system reboot. If system can be reboot right now, press 'Yes' button. Otherwise, press 'No' to close utility. However, remember to reboot system before accessing new changed RAID.

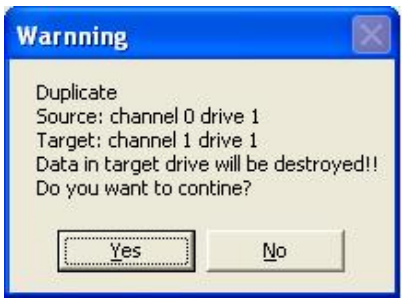


- **Error Messages:**

From the theory, RAID 0 and RAID 1 need two drives, JBOD need 2 or more drivers and RAID 0+1 needs 4 drivers. If you do not select the right number of drivers, this type of error message will show up. Press 'OK' to go back to utility and correct selection.

- **Warning Message:**

There are two options for creating RAID 1/RAID 0+1: one is to duplicate with creating RAID 1/RAID 0+1, and the other is to create RAID 1/RAID 0+1 only. If the former option is selected, the warning dialog box shows up to indicate the source drive and target drive. Make sure the data in target drive is no longer in use. Data in target drive will be lost after you press 'Yes' button.



8. Troubleshooting

1. **Q**: I have a PATA drive with operation system already installed (Windows XP, Windows 2000 or Windows NT). I moved it to M5287 SATA connector. Why is the previous installed operation system not working?

   A: Windows XP/2000/NT cannot recognize M5287 if you have not installed driver before switching the drive from motherboard IDE connector to M5287 PATA IDE connector. It is a limitation of Windows. Please remember to install ULi RAID driver before you do such change.

2. **Q**: I use boot drive at my motherboard. When I connect my used drive to M5287, it cannot work. Why?

   A: First, check your cable used with this drive. If it is a 40-conductor cable, please change it to 80-conductor cable. If this drive cannot be recognized at RAID BIOS, check the drive power connector. If it can be recognized at RAID BIOS but does not work under Windows, please check if RAID driver is installed properly.

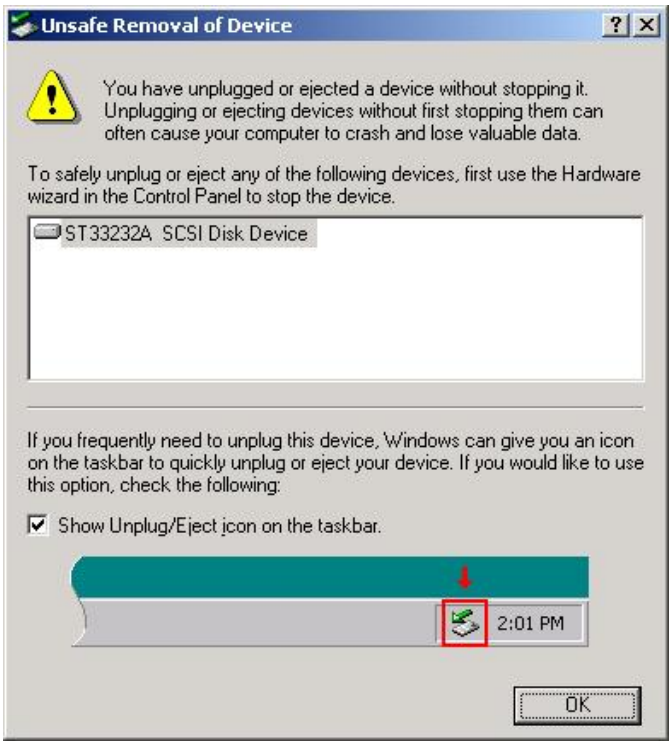
3. **Q**: I used unattended installation Windows XP CD and follow the “Install driver during Windows XP installation” to install bootable XP at M5287. I found there is an unknown mass storage device with ‘?’ in device manager. Why?

   A: Use unattended installation CD to install bootable drive will cause incomplete driver installation. You need to install ULi RAID driver again after booting into Windows XP.

4. **Q**: I want to follow 4.2 to install bootable Windows XP at SATA drive connected at M5287. However, system always boot at my motherboard PATA drive. How do I solve this problem?

   A: The system BIOS controls the boot sequence. Some system BIOS treats ULi M5287 as a ‘SCSI’ type adapter. You need to adjust system BIOS setup to prioritize the ‘SCSI’ as the first priority to boot. If problem still can not be solved, please consult motherboard/system maker.

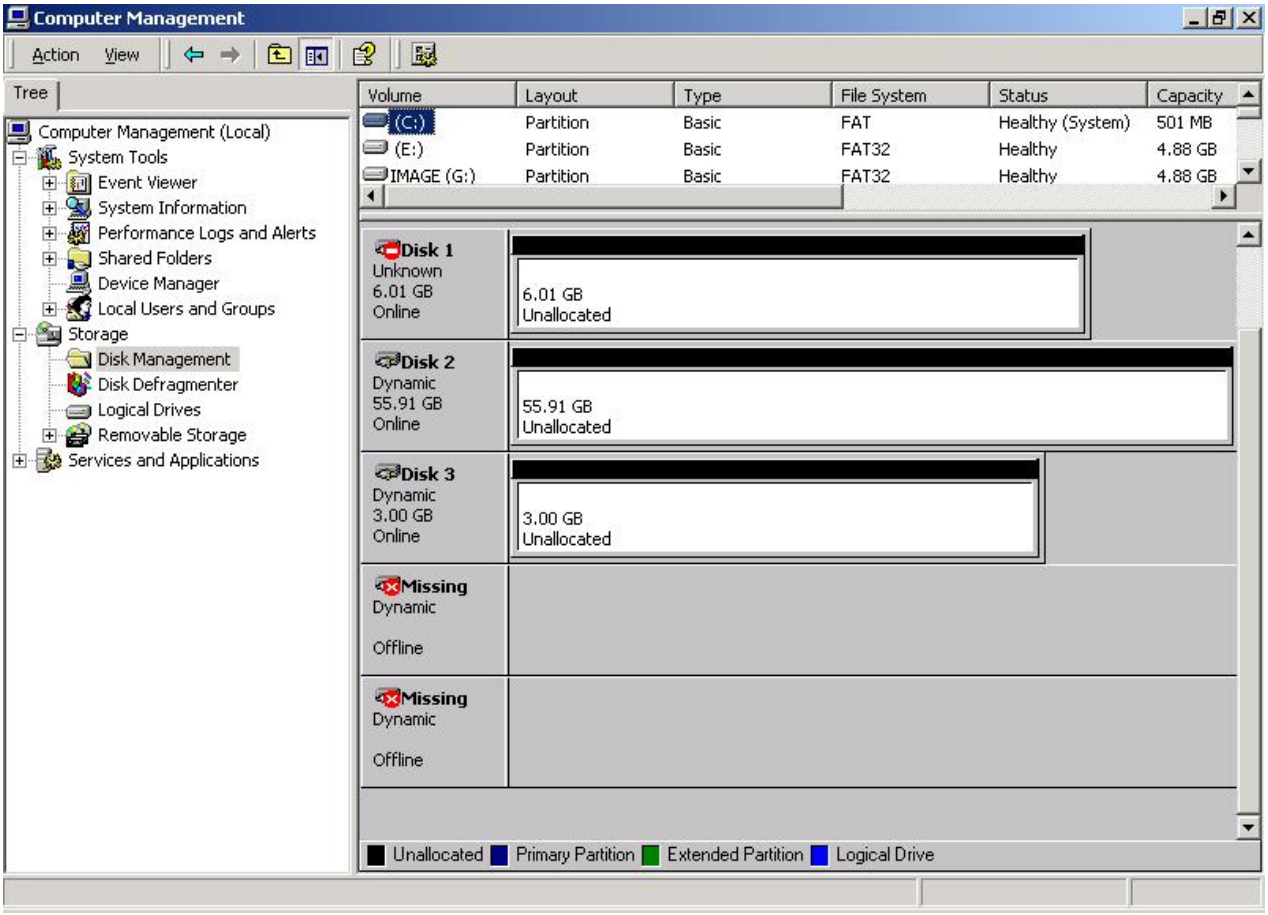
5. **Q:** When I use utility to create or delete RAID under Windows 2000, sometimes an exclamation mark message box (as the following picture) pops up. How do I proceed?



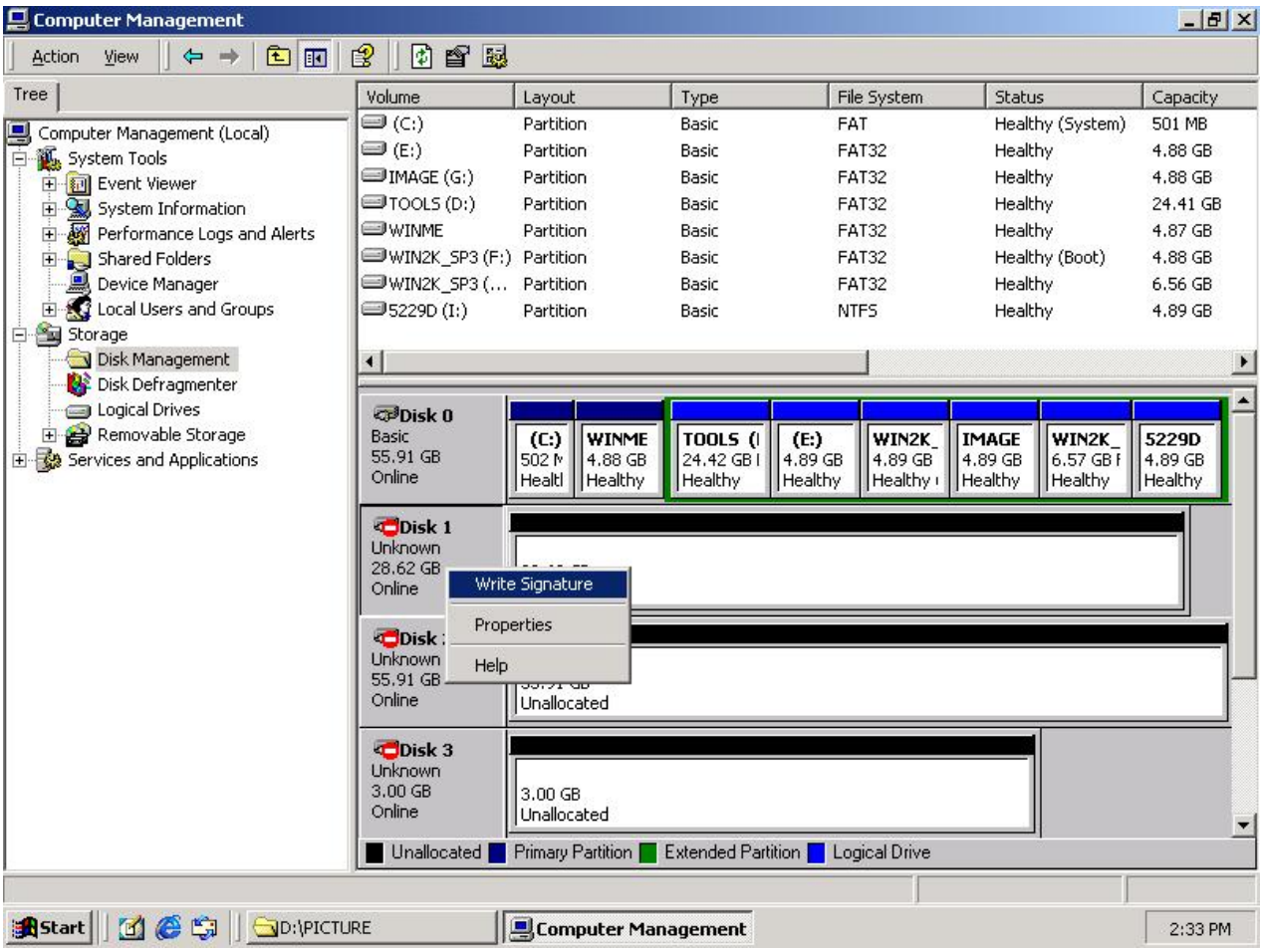
A: This problem happens only under Windows 2000 (even with SP3) as it detects the drive configuration change. This message box may show up more than one time, depending on how many drives have been created or deleted. Simply press 'OK' button to continue. Then reboot system as the last step since RAID configuration has been changed.

6. **Q:** When I want to partition my newly created RAID drive, why are there red mark at disk management?

   A: This problem only happens under Windows 2000 (even with SP3). When you change drive configuration and do not do any partition action before entering Windows 2000, if you check the disk management, there sometime is a red cross mark showing a missing disk or a red minus mark showing an unknown disk. The following picture shows an example:



Under this situation, you need to right click mouse at the disk that has red cross mark or red minus mark. Apply the 'Write Signature' to notify Windows 2000 to adjust the disk signature as shown in the following picture. The disk will be at normal status and ready for partition.



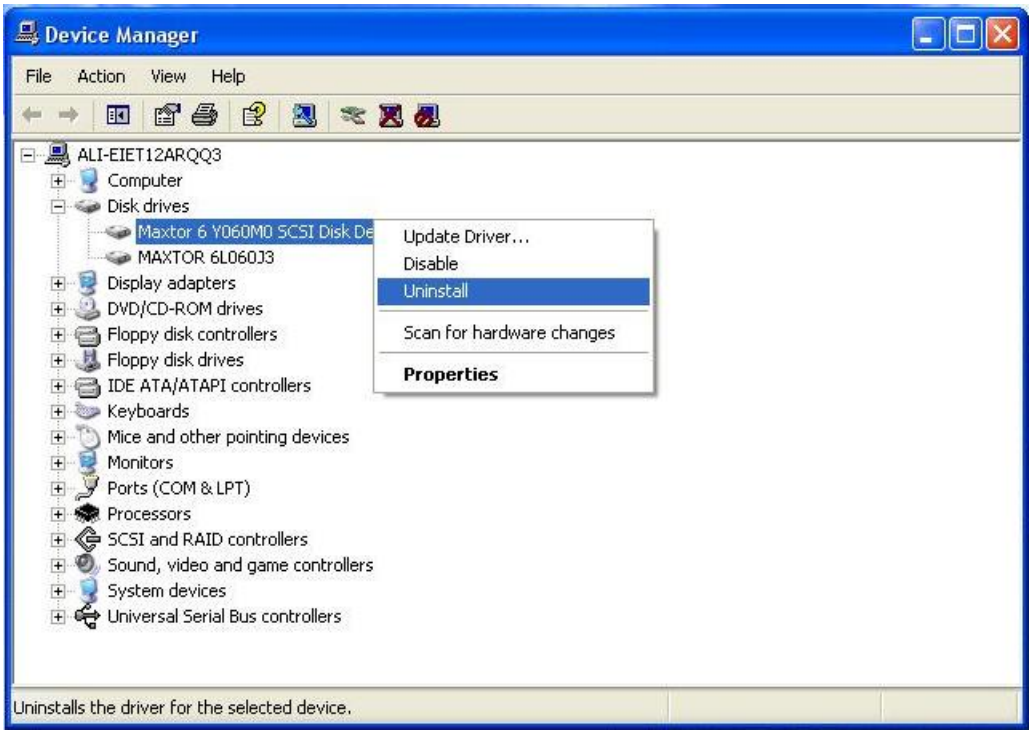
7. **Q:** Can I hot plug my SATA drive into working Windows?

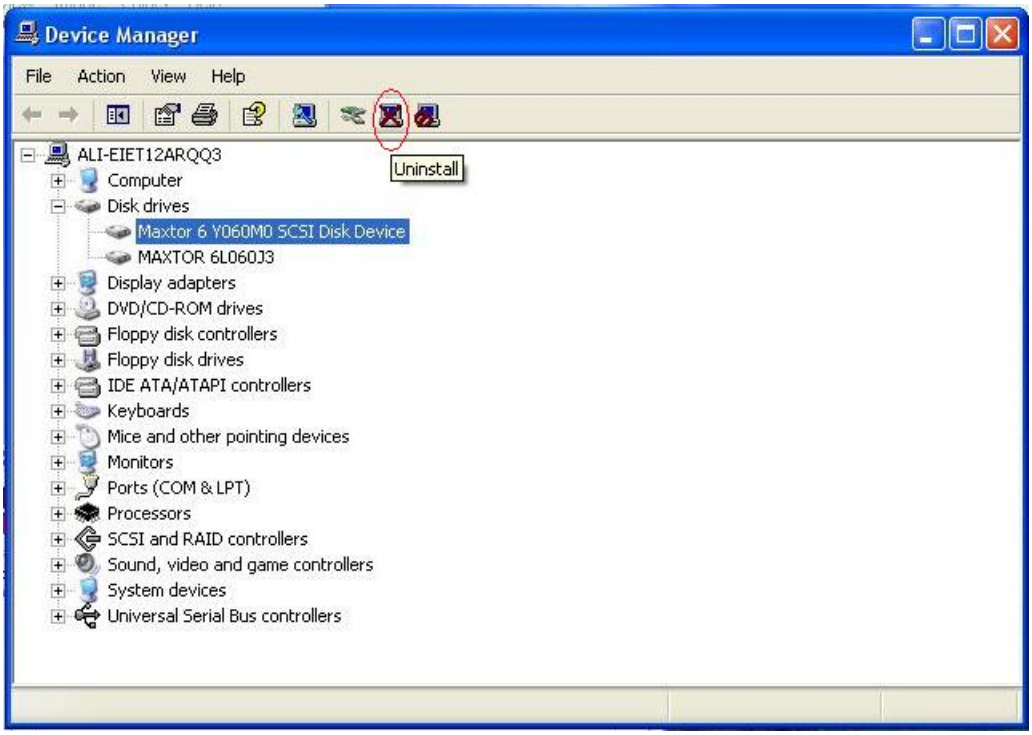
   A: The hot plug feature is supported by ULi RAID driver under Windows 2000/XP. Before you hot plug in a SATA drive, please make sure its power is on. Before you hot unplug a SATA drive, please do the following steps to protect data and Windows:

   a. Open **Device manger**.

   b. Open **Disk Drives.**

   c. Choose the disk/RAID you want to unplug, and click **Uninstall** as in the following pictures:





Note:

- ONLY SATA controller and drive can support hot plug/unplug.
- Due to operation system limitation, ULi RAID driver does not support hot plug under Windows 98/ME/NT. There is no safety guarantee if you do hot plug/unplug under Windows 98/ME/NT.