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Configuring SATA Hard Drive(s) (Controller: nVIDIA nForce4 SLI)

To configure SATA hard drive(s), follow the steps below:

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(2) Configure SATA controller mode and boot sequence in BIOS Setup.

(3)* Configure RAID set in RAID BIOS.

(4) Make a floppy disk containing the SATA controller driver.

(5) Install the SATA controller driver during OS installation.

Before you begin

Please prepare:

(a) At least two SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). If you do not want to create RAID, you may prepare only one hard drive.

(b) An empty formatted floppy disk.

(c) Windows XP/2000 setup disk.

(d) Driver CD for your motherboard.

(1) Installing SATA hard drive(s) in your computer

Attach one end of the SATA signal cable to the rear of the SATA hard drive and the other end to available SATA port(s) on the motherboard. If there are more than one SATA controller on your motherboard, you may refer to the motherboard user's manual to identify the SATA controller for the connector. Then connect the power connector from your power supply to the hard drive.

(2) Configuring SATA controller mode and boot sequence in BIOS Setup

You have to make sure whether the SATA controller is configured correctly in system BIOS Setup and set BIOS boot sequence for the SATA hard drive(s)/RAID array.

Step 1:

Turn on your computer and press Del to enter BIOS Setup during POST (Power-On Self Test). In the example in Figure 1, make sure that **Serial-ATAII 1** or **Serial-ATAII 2** under the **Integrated Peripherals** menu is enabled (**Serial-ATAII1** controls the SATAII0/1 connectors and **Serial-ATAII2** controls the SATAII2/3 connectors). If you wish to create RAID array, press ENTER on the **IDE/SATAII RAID Config** item to enter the submenu .

"*" Skip this step if you do not want to create RAID array on the SATA controller.

```
CMOS Setup Utility-Copyright (C) 1984-2005 Award Software
                      Integrated Peripherals
  IDE/SATAII RAID Config              [Press Enter]          Item Help
  On-Chip IDE Channel0                [Enabled]            Menu Level▶
  On-Chip IDE Channel1                [Enabled]
  IDE1 Conductor Cable                [Auto]
  IDE2 Conductor Cable                [Auto]
  Serial-ATAII 1                      [Enabled]
  Serial-ATAII 2                      [Enabled]
  On-Chip USB                         [V1.1+V2.0]
  USB Keyboard Support                [Disabled]
  USB Mouse Support                   [Disabled]
  AC97 Audio                          [Auto]
  Onboard LAN2 Function               [Auto]
  Onboard SATAII/IDE3                 [Enabled]
  Onboard SATAII/IDE3 Mode            [BASE]
  Onboard 1394b Function              [Enabled]
  Onboard LAN Function                [Enabled]
  Onboard Serial Port 1               [3F8/IRQ4]
  i-Lock                              [Enabled]
  Onboard Parallel Port               [378/IRQ7]
  Parallel Port Mode                  [SPP]
 ↑↓→←: Move    Enter: Select    +/-/PU/PD: Value    F10: Save    ESC: Exit    F1: General Help
       F3: Language    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```
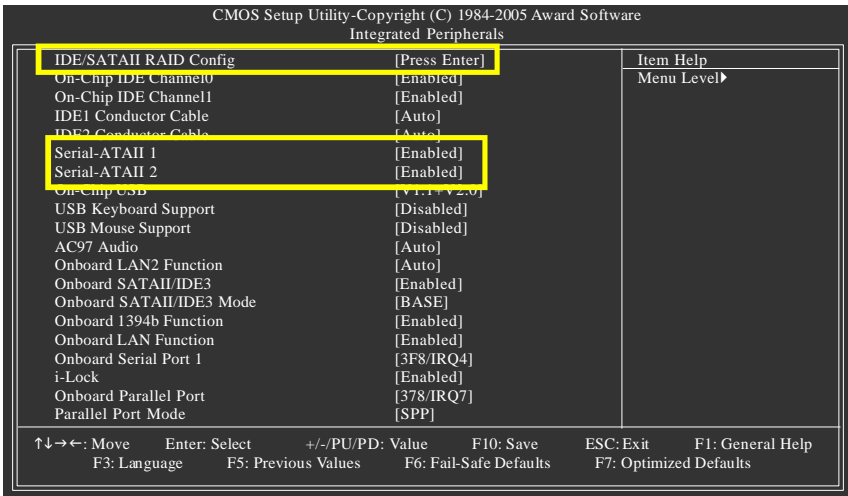
Figure 1

In the **IDE/SATAII RAID Config** submenu, enable **IDE/SATAII RAID function**. Then enable the SATA ports with hard disks that you want to use for RAID. In the example in Figure 2, enable **SATAII 1 Primary/ Secondary RAID** or **SATAII 2 Primary/Secondary RAID**). (For example, if you wish to create RAID with hard disks on the SATAII0 and SATAII1 connectors, set **SATAII 1 Primary/Secondary RAID** to **Enabled)**.

```
CMOS Setup Utility-Copyright (C) 1984-2005 Award Software
                     IDE/SATAII RAID Config
  IDE/SATAII RAID function            [Enabled]            Item Help
  IDE Primary Master RAID             [Disabled]         Menu Level▶
  IDE Primary Slave RAID              [Disabled]
  IDE Secndry Master RAID             [Disabled]
  IDE Secndry Slave RAID              [Disabled]
  SATAII 1 Primary RAID               [Enabled]
  SATAII 1 Secondary RAID             [Enabled]
  SATAII 2 Primary RAID               [Enabled]
  SATAII 2 Secondary RAID             [Enabled]




 ↑↓→←: Move    Enter: Select    +/-/PU/PD: Value    F10: Save    ESC: Exit    F1: General Help
       F3: Language    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```
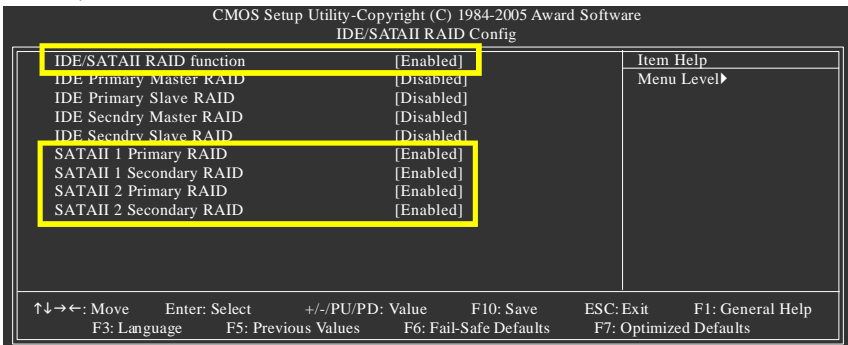
Figure 2

The BIOS Setup menus described in this section may not show the exact settings for your motherboard. The actual BIOS Setup menu options you will see shall depend on the motherboard you have and the BIOS version.

Step 2:

If you do not create RAID, select **Hard Disk Boot Priority** under the **Advanced BIOS Features** menu. In the **Hard Disk Boot Priority** submenu, select the model of the SATA hard drive onto which you wish to install Microsoft Windows 2000/XP. You should see a screen similar to Figure 3 below.

```
                  CMOS Setup Utility-Copyright (C) 1984-2005 Award Software
                                 Hard Disk Boot Priority
   1. CH2 M.    :              ST3120026AS               │ Item Help
   2. CH3 M.    :              ST3120026AS               │ Menu Level  ▶▶
   3. Bootable Add-in Cards                              │
                                                         │
                                                         │ Use <↑>  or <↓> to
                                                         │ select a device, then
                                                         │ press <+> to move it
                                                         │ up, or <-> to move it
                                                         │ down the list. Press
                                                         │ <ESC> to exit this
                                                         │ menu.
                                                         │
                                                         │
                                                         │
                                                         │
                                                         │
                                                         │
 ↑↓: Move      PU/PD/+/-: Change Priority       F10: Save          ESC: Exit
```
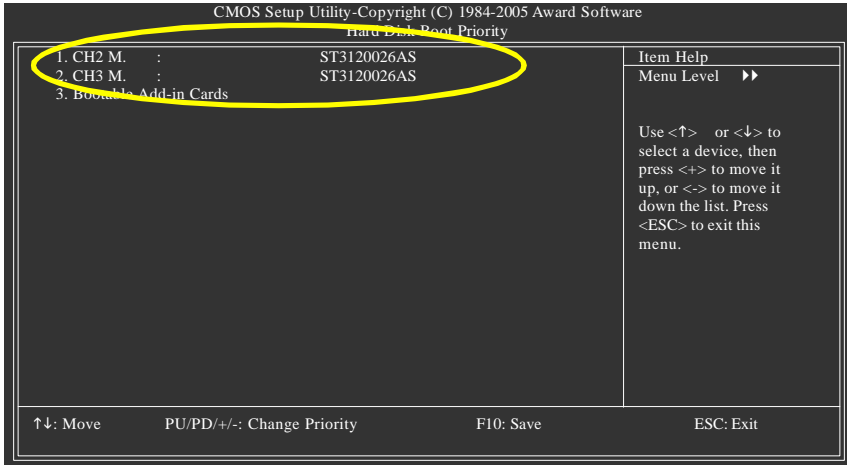
Figure 3

After configuring the SATA controller mode in system BIOS, if you wish to create RAID, save the settings and exit. Then go to RAID BIOS (refer to page 6) to configure the RAID array. After finished, re-enter the system BIOS Setup to set hard disk boot priority before OS installation. Select **Hard Disk Boot Priority** under the **Advanced BIOS Features** menu. In the **Hard Disk Boot Priority** submenu, select the RAID array onto which you wish to install Microsoft Windows 2000/XP (Figure 4).

```
                  CMOS Setup Utility-Copyright (C) 1984-2005 Award Software
                                 Hard Disk Boot Priority
   1. SCSI-0:       NVIDIA   MIRROR 111.7               │ Item Help
   2. Bootable Add-in Cards                              │ Menu Level  ▶▶
                                                         │
                                                         │
                                                         │ Use <↑>  or <↓> to
                                                         │ select a device, then
                                                         │ press <+> to move it
                                                         │ up, or <-> to move it
                                                         │ down the list. Press
                                                         │ <ESC> to exit this
                                                         │ menu.
                                                         │
                                                         │
                                                         │
                                                         │
                                                         │
                                                         │
 ↑↓: Move      PU/PD/+/-: Change Priority       F10: Save          ESC: Exit
```
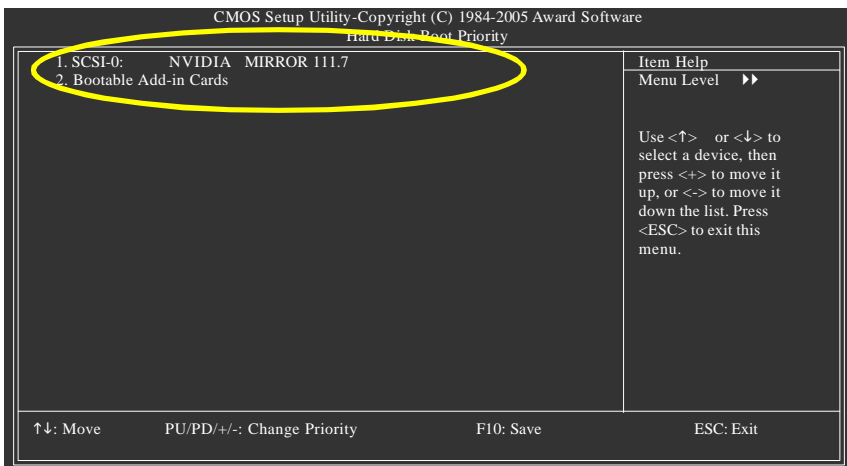
Figure 4

Step 3:
To boot from Windows installation CD-ROM, set **First Boot Device** under the **Advanced BIOS Features** menu to **CD-ROM** (Figure 5).
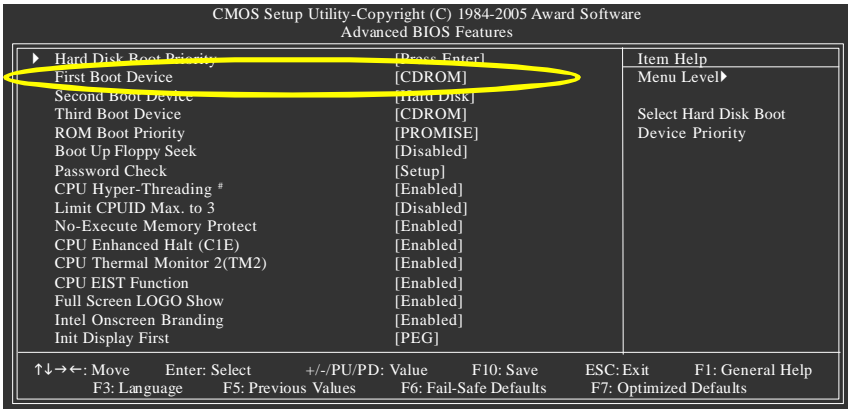
```
          CMOS Setup Utility-Copyright (C) 1984-2005 Award Software
                         Advanced BIOS Features

 ►  Hard Disk Boot Priority               [Press Enter]        Item Help
    First Boot Device                     [CDROM]              Menu Level►
    Second Boot Device                    [Hard Disk]
    Third Boot Device                     [CDROM]              Select Hard Disk Boot
    ROM Boot Priority                     [PROMISE]            Device Priority
    Boot Up Floppy Seek                   [Disabled]
    Password Check                        [Setup]
    CPU Hyper-Threading #                 [Enabled]
    Limit CPUID Max. to 3                 [Disabled]
    No-Execute Memory Protect             [Enabled]
    CPU Enhanced Halt (C1E)               [Enabled]
    CPU Thermal Monitor 2(TM2)            [Enabled]
    CPU EIST Function                     [Enabled]
    Full Screen LOGO Show                 [Enabled]
    Intel Onscreen Branding               [Enabled]
    Init Display First                    [PEG]

 ↑↓→←: Move   Enter: Select    +/-/PU/PD: Value    F10: Save   ESC: Exit    F1: General Help
      F3: Language    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Figure 5

Step 4:
Save and exit BIOS Setup.

(3) Configuring RAID set in RAID BIOS

Enter the RAID BIOS setup utility to configure a RAID array. Skip this step and proceed to Section 4 if you do not want to create RAID.

Step 1:

After the POST memory test begins and before the operating system boot begins, look for a message which says "Press F10 to enter RAID setup utility" (Figure 6). Hit the **F10** key to enter the RAID BIOS setup utility.

MediaShield IDE ROM BIOS 5.16
Copyright (C) 2005 NVIDIA Corp.

Detecting array ...

Press F10 to enter RAID setup utility ...
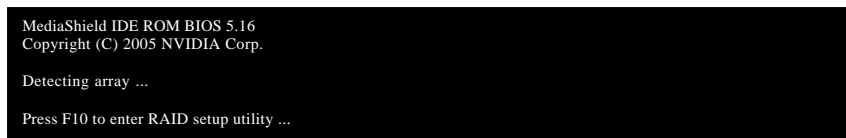
Figure 6

Step 2

The Define a New Array screen is the first option screen when you enter the NVIDIA RAID setup utility. (Figure 7). You can press the TAB key to highlight through options.

Step 3:

In the RAID Mode field, use the UP or DOWN ARROW key to select a RAID mode. The supported RAID modes include Mirroring (default), Striping, Stripe Mirroring, Spanning and Raid 5. The following is an example of RAID 0 array creation.

Step 4:

If RAID 0 (Striping) is selected, you can manually set the striping block size. In the Striping Block field, use the UP or DOWN ARROW key to set the Striping Block size. The *KB* is the standard unit of Striping Block size. We recommend you leaving it to the default setting--Optimal (64K). The size range is from 4K to 128K.

```
                    MediaShield RAID Utility  Feb 8 2005
                           - Define a New Array -

  RAID Mode: Mirroring                    Striping Block: Optimal


  Free Disks                              Array Disks
  Loc      Disk Model Name                Loc      Disk Model Name

   2.0.M   ST3120026AS
   2.1.M   ST3120026AS                    [→] Add


                                          [←] Del


      [ESC] Quit     [F6] Back    [F7] Finish    [TAB] Navigate    [↑↓] Select    [ENTER] Popup
```
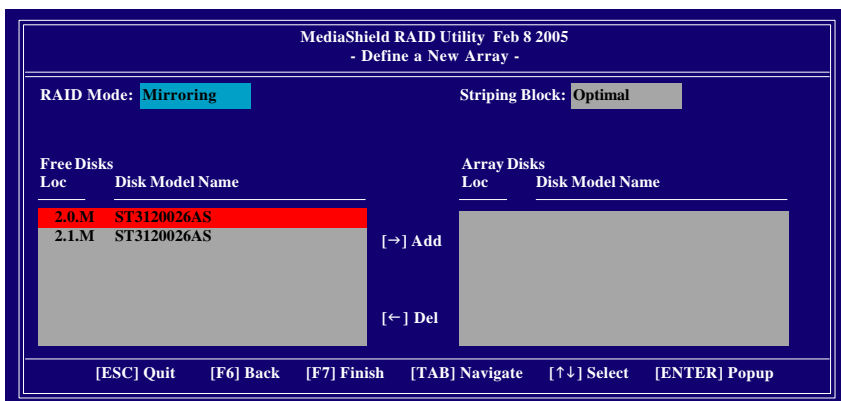
Figure 7

Step 5:

Next, select the hard drives which you wish to be included in the disk array. The Free Disks section displays the information about the currently installed SATA hard drives. Press the TAB key to move to the Free Disks section. Select the target hard drives using the UP or DOWN ARROW key and use the RIGHT ARROW key to add the hard drives to the Array Disks section (Figure 8).
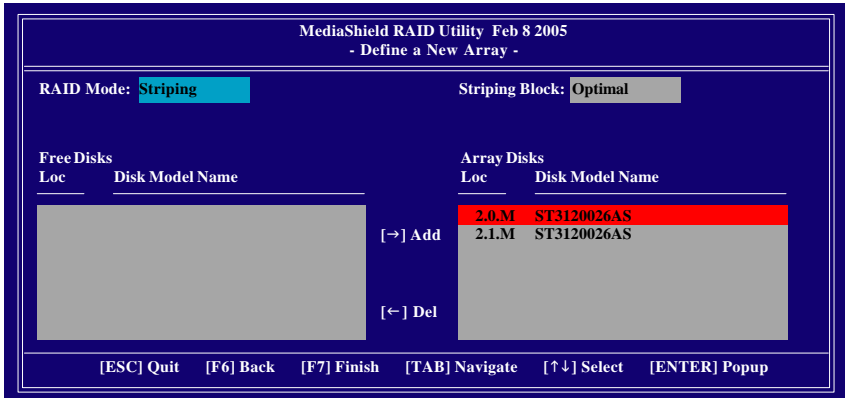
Figure 8

Step 6:

Press F7 after selecting the target hard disks. A message which says "Clear disk data?" will appear (Figure 9). If you are sure to clear the data in the selected hard drives, press Y. (If the hard drives contain previously created RAID array, you need to press Y to clear the data from the hard drives.)
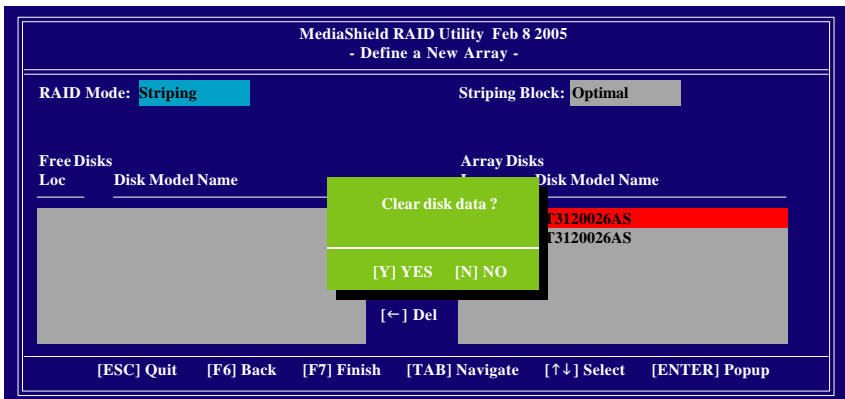
Figure 9

After that, the Array List screen displaying the RAID array you created will appear (Figure 10).
If you want to set the disk array as boot device, use the UP or DOWN ARROW key to select the array and press B. The **Boot** section will show **Yes**.

```
                   MediaShield RAID Utility  Feb 8 2005
                              - Array List -

              Boot     Id    Status      Vendor     Array Model Name

              No       2     Healthy     NVIDIA     STRIPE  223.58G




              [Ctrl-X] Exit     [↑↓] Select     [B] Set Boot     [N] New Array     [ENTER] Detail
```
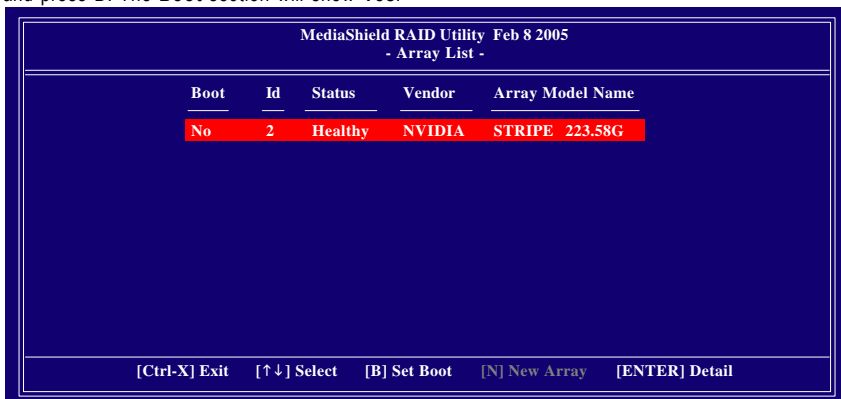
Figure 10

To read more information about the RAID array, press ENTER to enter the Array Detail screen (Figure 11), where you should see detailed information about RAID mode, disk block size, disk model name, and disk capacity, etc.

```
                     Array 2 : NVIDIA STRIPE 223.58G
                              - Array Detail -

   RAID Mode:  Striping
   Striping Width : 2                           Striping Block: 64K


         Adapt    Channel    M/S       Index    Disk Model Name     Capacity

         2        0          Master    0        ST3120026AS         111.79GB
         2        1          Master    1        ST3120026AS         111.79GB




              [R] Rebuild     [D] Delete     [C] Clear Disk     [ENTER] Return
```
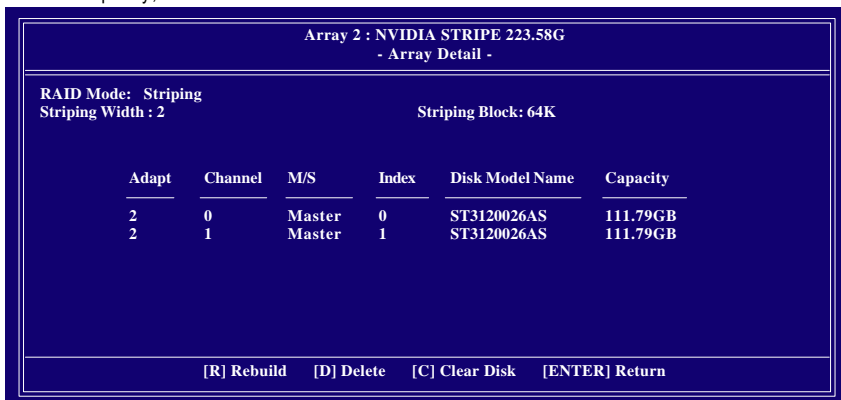
Figure 11

To delete the array, press D in the Array Detail screen. When the "Delete this array?" message appears, press Y to confirm or N to cancel. Press ENTER to return to the Array List screen.

To exit the Nvidia RAID utility, press ESC in the main menu or Ctrl+X in the Array List screen.

Now, you can proceed to install the SATA controller driver and operating system.

(4) Making a SATA controller driver disk

To install Windows 2000/XP onto a SATA hard drive/RAID array on the nVIDIA nForce4 SLI controller successfully, you need to install required driver for the SATA controller during OS installation. Without the driver, the hard drive/RAID array may not be recognized during the Windows setup process.

First of all, you need to copy the driver for the SATA controller from the motherboard driver CD to a floppy disk. The instructions below explain how to copy the driver.

Step 1: Find an available system and insert the motherboard driver CD into the CD-ROM drive. The installation utility will appear automatically. Quit the installation utility first.

Step 2: Go to **My Computer** and right-click the CD-ROM drive icon and select **Open** (Figure 12).

Figure 12

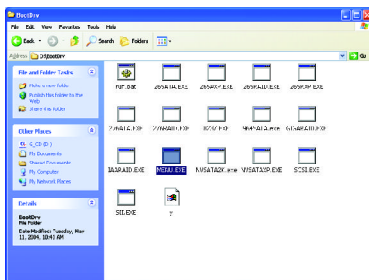Step 3: Go to the **BootDrv** folder and look for an executable program named MENU.*exe* (Figure 13).

Figure 13

Step 4:
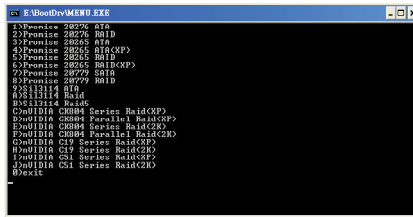Double-click MENU.*exe*. An MS-DOS prompt screen similar to Figure 14 below will appear[(Note)].

Figure 14

Step 5:
Insert an empty floppy disk and select the nVIDIA Serial ATA driver by pressing the corresponding letter from the menu (for example, from the menu in Figure 14, press G to select **nVIDIA C19 Series Raid (XP)** if you wish to install Windows XP or press H to select **nVIDIA C19 Series Raid (2K)** if you wish to install Windows 2000). Then it will take about one minute to copy the SATA driver from the motherboard driver CD to the floppy disk.

Step 6:
Press 0 to exit when the procedure is complete.

(Note): The name of the drivers in the menu might differ, depending on the version of your driver CD-ROM disk.

(5) Installing SATA controller driver during OS installation

Now that you have prepared the SATA driver disk and configured BIOS settings, you are ready to install Windows 2000/XP onto your SATA hard drive with the driver. The following is an example of Windows XP installation.

Step 1: Restart your system to boot from the Windows 2000/XP Setup disk and press F6 as soon as you see the "Press F6 if you need to install a 3rd party SCSI or RAID driver" message (Figure 15). After pressing F6, there will be a few moments of some files being loaded before you see the next screen.
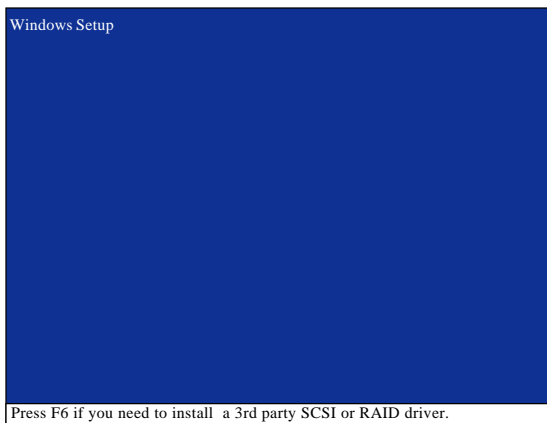
```
Windows Setup




















Press F6 if you need to install  a 3rd party SCSI or RAID driver.
```
Figure 15

Step 2:

When a screen similar to that below appears (Figure 16), insert the floppy disk containing the SATA driver and press S.

```
Windows Setup


  Setup could not determine the type of one or more mass storage devices
  installed in your system, or you have chosen to manually specify an adapter.
  Currently, Setup will load support for the following mass storage devices(s)

     <none>

   * To specify additional SCSI adapters, CD-ROM drives, or special
     disk  controllers for use with Windows, including those for
     which you have a device support disk from a mass storage device
     manufacturer, press S.

   * If you do not have any device support disks from a mass storage
     device manufacturer, or do not want to specify additional
     mass storage devices for use with Windows, press ENTER.



  S=Specify Additional Device   ENTER=Continue   F3=Exit
```
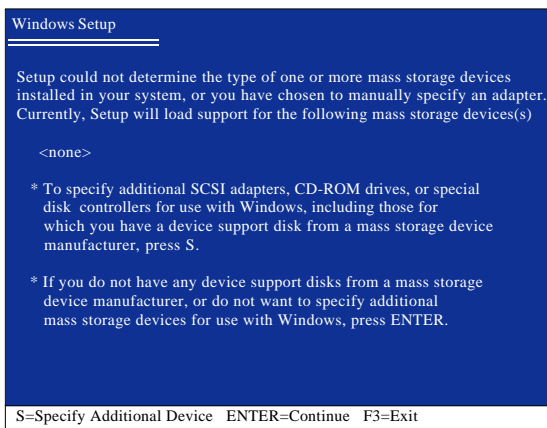Figure 16

Step 3:

If Setup correctly recognizes the driver in the floppy disk, a controller menu similar to Figure 17 below will appear. Use the ARROW keys to select **NVIDIA RAID CLASS DRIVER*** (Figure 17) and press ENTER. Later, when a screen similar to Figure 18 appears, you must press S to select additional driver. The screen will return to previous screen as shown in Figure 17. Select **NVIDIA NForce Storage Controller** and press ENTER.
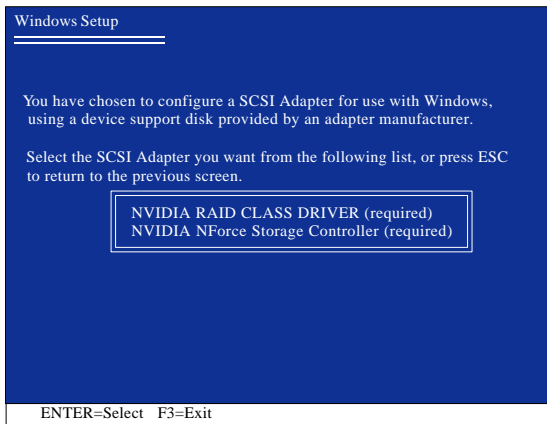
```
 Windows Setup
 _____

   You have chosen to configure a SCSI Adapter for use with Windows,
   using a device support disk provided by an adapter manufacturer.

   Select the SCSI Adapter you want from the following list, or press ESC
   to return to the previous screen.

              NVIDIA RAID CLASS DRIVER (required)
              NVIDIA NForce Storage Controller (required)



   ENTER=Select   F3=Exit
```
Figure 17

```
 Windows Setup
 _____

   Setup will load support for the following mass storage device(s):

    NVIDIA RAID CLASS DRIVER (required)

   * To specify additional SCSI adapters, CD-ROM drives, or special
     disk  controllers for use with Windows, including those for
     which you have a device support disk from a mass storage device
     manufacturer, press S.

   * If you do not have any device support disks from a mass storage
     device manufacturer, or do not want to specify additional
     mass storage devices for use with Windows, press ENTER.



   S=Specify Additional Device Enter=Continue   F3=Exit
```
Figure 18

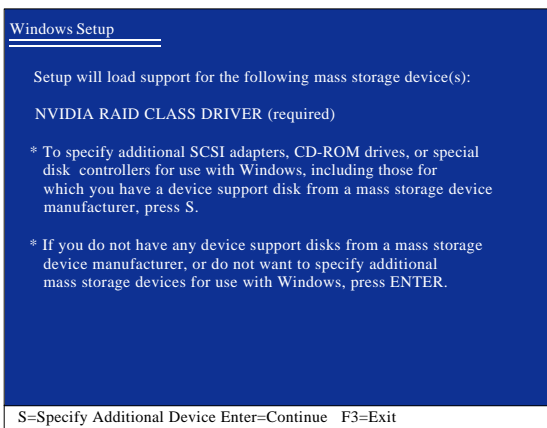⚠ **CAUTION** If a message appears saying one or some file(s) cannot be found, please check the floppy disk or copy the correct SATA driver again from the motherboard driver CD.

"*" If you want to create RAID, select both **NVIDIA RAID CLASS DRIVER** and then **NVIDIA NForce Storage Controller**.

If you do not create RAID, select **NVIDIA NForce Storage Controller** only.

Step 4:
When the next screen (Figure 19) appears, press ENTER to continue the SATA driver installation from the floppy disk.

```
Windows Setup

   Setup will load support for the following mass storage device(s):

   NVIDIA RAID CLASS DRIVER (required)
   NVIDIA NForce Storage Controller (required)

 * To specify additional SCSI adapters, CD-ROM drives, or special
   disk  controllers for use with Windows, including those for
   which you have a device support disk from a mass storage device
   manufacturer, press S.

 * If you do not have any device support disks from a mass storage
   device manufacturer, or do not want to specify additional
   mass storage devices for use with Windows, press ENTER.




 S=Specify Additional Device Enter=Continue   F3=Exit
```
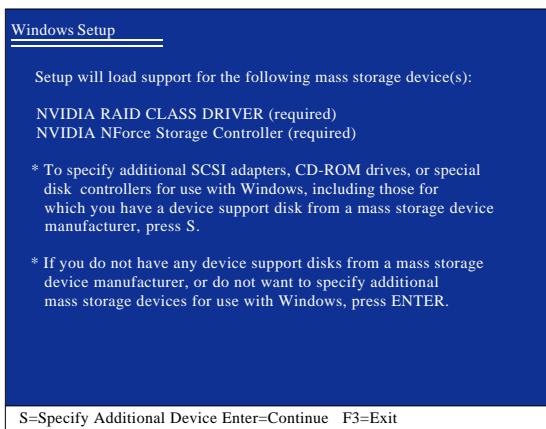Figure 19

After the SATA controller driver installation is completed, you should see a screen similar to that below. You can proceed with the Windows 2000/XP installation now.
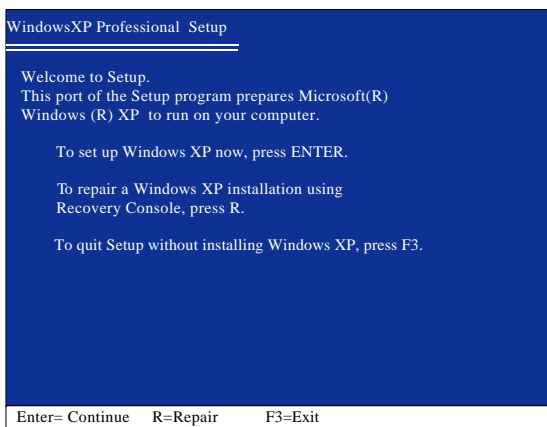
```
WindowsXP Professional  Setup

 Welcome to Setup.
 This port of the Setup program prepares Microsoft(R)
 Windows (R) XP  to run on your computer.

      To set up Windows XP now, press ENTER.

      To repair a Windows XP installation using
      Recovery Console, press R.

      To quit Setup without installing Windows XP, press F3.




 Enter= Continue    R=Repair       F3=Exit
```
Figure 20

(6) Configuring a bootable RAID array with Microsoft Windows 2000

Problem: Users cannot install Windows 2000 with Service Pack 2 (or previous versions) to a bootable RAID volume.

There are two solutions to resolve this issue.

Solutions 1:

Use the NVRAID tool (nForce Driver Version 5.xx) to convert the boot volume to a RAID array. Here are the detailed step-by-step instructions:

Step 1:

Install Windows 2000 onto a selected hard drive. Download and install Windows 2000 Service Pack 4 from Microsoft's website.

Step 2:

After system restarts, press Del to enter system BIOS Setup during POST (Power-On Self Test). Under the **Integrated Peripherals** menu (Figure 21) assure the SATA port connecting the SATA hard disk (the one containing the Windows 2000) is **Enabled** (Figure 21/22). Save settings and exit the BIOS setup.
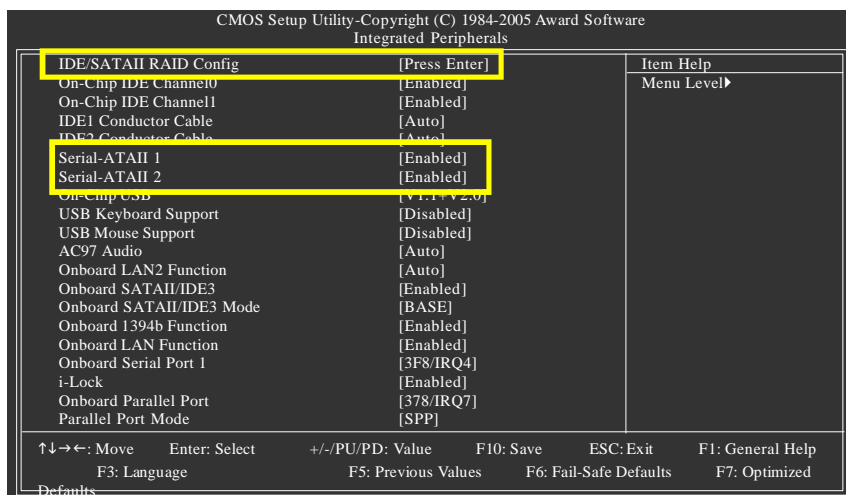
```
         CMOS Setup Utility-Copyright (C) 1984-2005 Award Software
                         Integrated Peripherals
  IDE/SATAII RAID Config              [Press Enter]        Item Help
  On-Chip IDE Channel0               [Enabled]             Menu Level▶
  On-Chip IDE Channel1               [Enabled]
  IDE1 Conductor Cable               [Auto]
  IDE2 Conductor Cable               [Auto]
  Serial-ATAII 1                     [Enabled]
  Serial-ATAII 2                     [Enabled]
  On-Chip USB                        [V1.1+V2.0]
  USB Keyboard Support               [Disabled]
  USB Mouse Support                  [Disabled]
  AC97 Audio                         [Auto]
  Onboard LAN2 Function              [Auto]
  Onboard SATAII/IDE3                [Enabled]
  Onboard SATAII/IDE3 Mode           [BASE]
  Onboard 1394b Function             [Enabled]
  Onboard LAN Function               [Enabled]
  Onboard Serial Port 1              [3F8/IRQ4]
  i-Lock                             [Enabled]
  Onboard Parallel Port              [378/IRQ7]
  Parallel Port Mode                 [SPP]

  ↑↓→←: Move    Enter: Select    +/-/PU/PD: Value    F10: Save    ESC: Exit    F1: General Help
       F3: Language           F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized
  Defaults
```

Figure 21

```
         CMOS Setup Utility-Copyright (C) 1984-2005 Award Software
                         IDE/SATAII RAID Config
  IDE/SATAII RAID function           [Enabled]             Item Help
  IDE Primary Master RAID            [Disabled]            Menu Level▶
  IDE Primary Slave RAID             [Disabled]
  IDE Secndry Master RAID            [Disabled]
  IDE Secndry Slave RAID             [Disabled]
  SATAII 1 Primary RAID              [Enabled]
  SATAII 1 Secondary RAID            [Enabled]
  SATAII 2 Primary RAID              [Enabled]
  SATAII 2 Secondary RAID            [Enabled]




  ↑↓→←: Move    Enter: Select    +/-/PU/PD: Value    F10: Save    ESC: Exit    F1: General Help
       F3: Language    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```
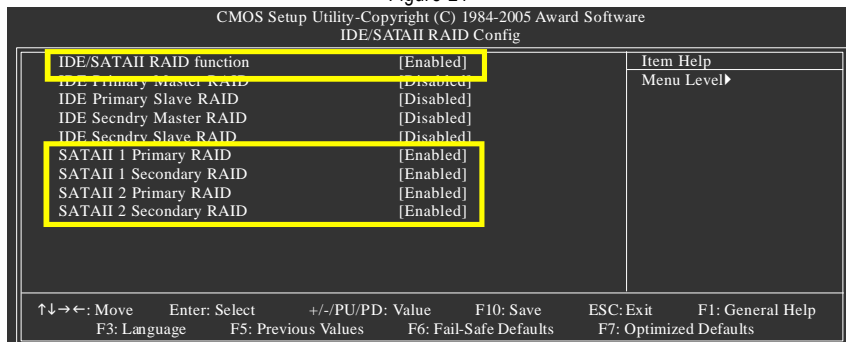
Figure22

Step 3:

After system restarts, press F10 to enter the NVIDIA RAID setup utility. Select Striping in the RAID Mode filed (Figure 23). Move to the Free Disks section with the TAB key. Select the desired disk and use the RIGHT ARROW key to add it to Array Disks menu.
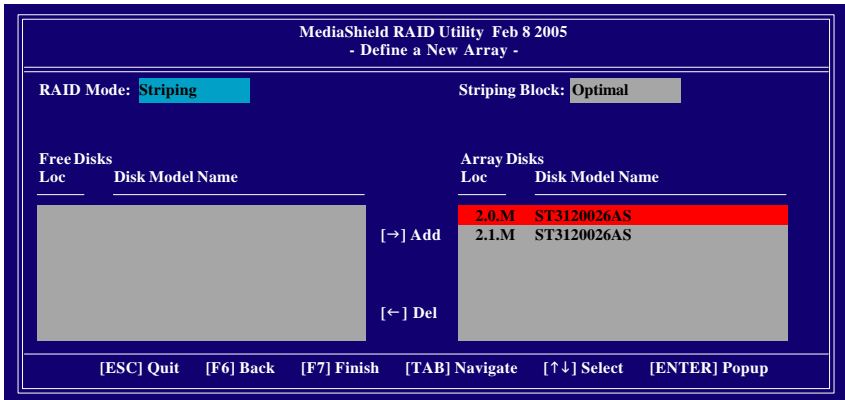

Figure 23

Step 4:

After all the settings, press F7 to complete the configuration. When prompted to **Clear Disk Data** (Figure 24), press N. Then press CTRL+X to exit the NVIDIA RAID BIOS. Restart the computer to boot into Windows 2000.
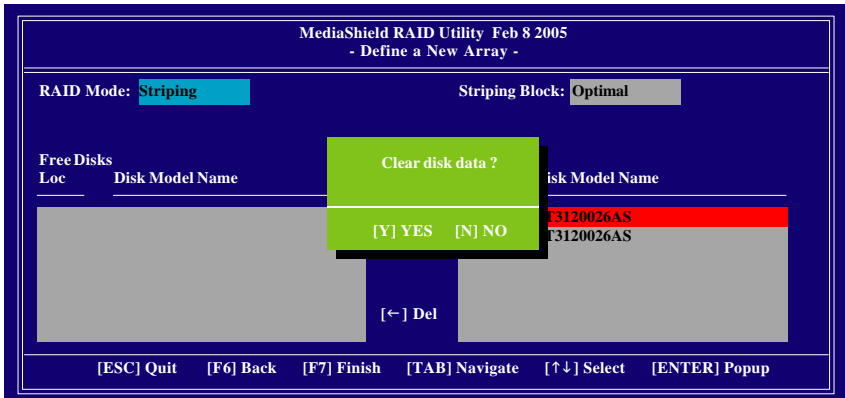

Figure 24

Step 5:

Install the NVIDIA nForce Driver Package while in Windows 2000 and reboot the system. Go to **START>Programs>Nvidia Corporation** and select **NVRAID manager**. You should see the single disk RAID array (in striping mode) that was created from the boot disk. Select the single boot disk RAID Array by clicking on it. Select **Convert Array** under the **System Tasks** and select **Next** following the instructions. Select the desired type of RAID array you want to convert and then select **Next**. You are prompted to select the desired Free Disk(s) to add to the bootable RAID array. Press **Finish** then NVRAID will start converting the single disk RAID array into a multi-disk RAID array in a bootable format.

Note: Conversion may take 1~2 hours depending on disk size.

Solutions 2:

Users must create a combination installation CD that includes Windows 2000 and Service Pack 3 or Service Pack 4 fixes integrated in. To create the combination installation CD, refer to the following website:

http://www.microsoft.com/windows2000/downloads/servicepacks/sp4/HFdeploy.htm

Note: If users choose not to install Windows 2000 Service Pack 3 or 4, RAID is still supported on Windows 2000. However, users will not be able to create a bootable RAID volume.