K9N Neo Series

MS-7260 (V1.X) Mainboard

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Revision History

Revision	Revision History	Date
V1.0	First release for PCB 1.0	April 2006

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

 Visit the MSI website for FAQ, technical guide, BIOS updates, driver updates, and other information: *http://www.msi.com.tw/program/service/faq/faq/esc_faq_list.php*

 Contact our technical staff at: *http://support.msi.com.tw/*

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Safety Instructions

1. Always read the safety instructions carefully.

2. Keep this User's Manual for future reference.

3. Keep this equipment away from humidity.

4. Lay this equipment on a reliable flat surface before setting it up.

5. The openings on the enclosure are for air convection hence protects the equipment from overheating. DO NOT COVER THE OPENINGS.

6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.

7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.

8. Always Unplug the Power Cord before inserting any add-on card or module.

9. All cautions and warnings on the equipment should be noted.

10. Never pour any liquid into the opening that could damage or cause electrical shock.

11. If any of the following situations arises, get the equipment checked by a service personnel:

    † The power cord or plug is damaged.
    † Liquid has penetrated into the equipment.
    † The equipment has been exposed to moisture.
    † The equipment has not work well or you can not get it work according to User's Manual.
    † The equipment has dropped and damaged.
    † The equipment has obvious sign of breakage.

12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60^0 C (140^0F), IT MAY DAMAGE THE EQUIPMENT.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成無線電干擾，在這種情況下，使用者會被要求採取某些適當的對策。

廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the measures listed below.

- † Reorient or relocate the receiving antenna.
- † Increase the separation between the equipment and receiver.
- † Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- † Consult the dealer or an experienced radio/television technician for help.

Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

Micro-Star International
MS-7260

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

WEEE (Waste Electrical and Electronic Equipment) Statement

ENGLISH

To protect the global environment and as an environmentalist, MSI must remind you that...

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2002/96/EC, which takes effect on August 13, 2005, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life. MSI will comply with the product take back requirements at the end of life of MSI-branded products that are sold into the EU. You can return these products to local collection points.

DEUTSCH

Hinweis von MSI zur Erhaltung und Schutz unserer Umwelt

Gemäß der Richtlinie 2002/96/EG über Elektro- und Elektronik-Altgeräte dürfen Elektro- und Elektronik-Altgeräte nicht mehr als kommunale Abfälle entsorgt werden. MSI hat europaweit verschiedene Sammel- und Recyclingunternehmen beauftragt, die in die Europäische Union in Verkehr gebrachten Produkte, am Ende seines Lebenszyklus zurückzunehmen. Bitte entsorgen Sie dieses Produkt zum gegebenen Zeitpunkt ausschliesslich an einer lokalen Altgerätesammelstelle in Ihrer Nähe.

FRANÇAIS

En tant qu'écologiste et afin de protéger l'environnement, MSI tient à rappeler ceci...

Au sujet de la directive européenne (EU) relative aux déchets des équipement électriques et électroniques, directive 2002/96/EC, prenant effet le 13 août 2005, que les produits électriques et électroniques ne peuvent être déposés dans les décharges ou tout simplement mis à la poubelle. Les fabricants de ces équipements seront obligés de récupérer certains produits en fin de vie. MSI prendra en compte cette exigence relative au retour des produits en fin de vie au sein de la communauté européenne. Par conséquent vous pouvez retourner localement ces matériels dans les points de collecte.

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Компания MSI предпринимает активные действия по защите окружающей среды, поэтому напоминаем вам, что....

В соответствии с директивой Европейского Союза (ЕС) по предотвращению загрязнения окружающей среды использованным электрическим и электронным оборудованием (директива WEEE 2002/96/EC), вступающей в силу 13 августа 2005 года, изделия, относящиеся к электрическому и электронному оборудованию, не могут рассматриваться как бытовой мусор, поэтому производители вышеперечисленного электронного оборудования обязаны принимать его для переработки по окончании срока службы. MSI обязуется соблюдать требования по приему продукции, проданной под маркой MSI на территории ЕС, в переработку по окончании срока службы. Вы можете вернуть эти изделия в специализированные пункты приема.

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Chapter 1

Getting Started

Thank you for choosing the K9N Neo Series (MS-7260 v1.X) ATX mainboard. The K9N Neo Series mainboards are based on **nVIDIA® nForce 550** chipsets for optimal system efficiency. Designed to fit the advanced **AMD® Athlon 64/ X2 & Sempron** processor, the K9N Neo Series deliver a high performance and professional desktop platform solution.

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Mainboard Specifications

Processor Support

- AMD® Athlon 64/ X2 & Sempron in the socket AM2 package.
(For the latest information about CPU, please visit *http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_cpu_support.php*)

Supported FSB

- HyperTransport supporting speed up to 1GHz (2000MT/s)

Chipset

- nVIDIA® nForce 550 chipset

Memory Support

- DDRII 667/800 SDRAM (4GB Max)
- 4 DDRII DIMMs (240-pin)
(For more information on compatible components, please visit *http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_trp_list.php)*

LAN

- Supports 10/100/1000 Fast Ethernet LAN by Vitesse VSC8601

Audio

- Chip integrated by Realtek® ALC883
- Flexible 8-channel audio with jack sensing
- Compliant with Azalia 1.0 Spec

IDE

- 1 IDE port by nForce 550
- Supports Ultra DMA 66/100/133 mode
- Supports PIO, Bus Master operation mode

SATA

- 4 SATA II ports by nForce 550
- Supports storage and data transfers at up to 300 MB/s

RAID

- SATA1~4 supports RAID 0/ 1 or 0+1 mode by nForce 550

Floppy

- 1 floppy port
- Supports 1 FDD with 360K, 720K, 1.2M, 1.44M and 2.88Mbytes

Connectors

● **Back panel**
- 1 PS/2 mouse port
- 1 PS/2 keyboard port.
- 1 serial port
- 1 parallel port supporting SPP/EPP/ECP mode
- 4 USB 2.0 Ports.
- 1 LAN jack (10/100/1000) by Vitesse VSC8601
- 6 flexible audio jacks.

● **On-Board Pinheaders**
- 1 IrDA pinheader
- 3 USB 2.0 pinheaders

Slots

- 1 PCI Express x 16 slot
- 2 PCI Express x 1 slots
- 3 PCI slots, support 3.3V/ 5V PCI bus Interface, includes one orange slot which supports 2 master for MSI special PCI function card (ex. wireless LAN and bluetooth combo card.).

Form Factor

- ATX (20.0 cm X 30.5 cm)

Mounting

- 6 mounting holes

Mainboard Layout
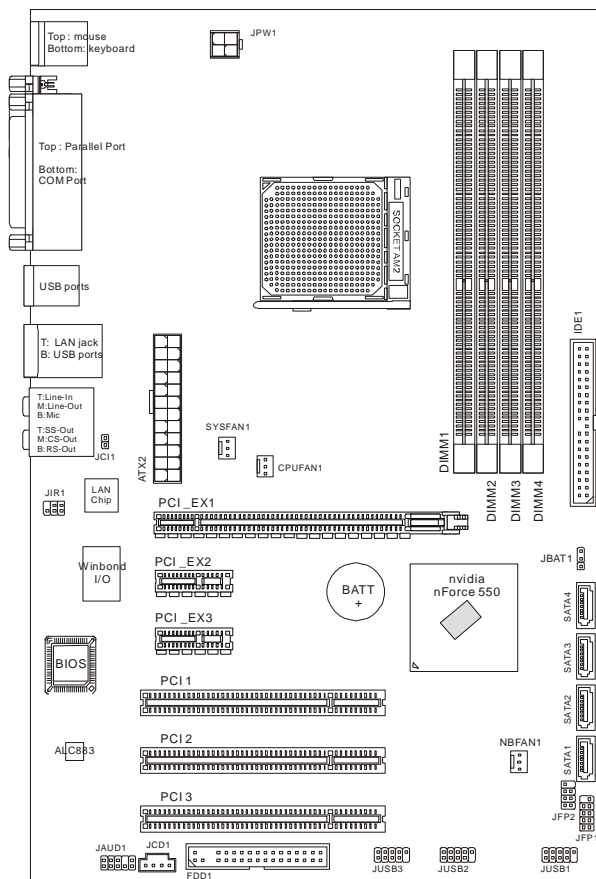
K9N Neo Series
(MS-7260 v1.X) ATX Mainboard

Packing Checklist

MSI motherboard
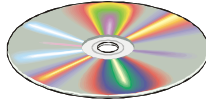
MSI Driver/Utility CD

Power Cable

SATA Cable

Standard Cable for
IDE Devices

Standard Cable for
Floppy Disk

Back IO Shield

User's Guide

* The pictures are for reference only and may vary from the packing contents of the
product you purchased.

MSI Special Feature

Core Center

The Core Center is a new utility you can find in the CD-ROM disk. The utility is just like your PC doctor that can detect, view and adjust the PC hardware and system status during real time operation.

Cool'n'Quiet

This utility provides a CPU temperature detection function called *Cool'n'Quiet*. *Cool'n'Quiet* is a special feature designed only for AMD® Athlon64 processor, and with *Cool'n'Quiet*, the system will be capable of detecting the temperature of the CPU according to the CPU's working loading. When the CPU temperature climbs up to a certain degree, the speed of the system cooling fan will be risen automatically. On the other hand, the speed of the system cooling fan will slow down instantly when the CPU temperature descends to its normal degree.

Here the current system status (including Vcore, 3.3V, +5V and 12V) and the current PC hardware status (such as the CPU & system temperatures and all fans speeds) are shown on the left and right sides for you to monitor.
When you click the red triangles in the left and right sides, two sub-menus will open for users to overclock, overspec or to adjust the thresholds of system to send out the warning messages.

Left-side: Current system status
In the left sub-menu, you can configure the settings of FSB, Vcore, Memory Voltage and AGP Voltage by clicking the radio button in front of each item and make it available (the radio button will be lighted as yellow when selected), use the "**+**" and "**-**" buttons to adjust, then click **"OK"** to apply the changes. Then you can click **"Save"** to save the desired FSB you just configured.

Right-side: PC hardware status during real time operation
In the right sub-menu, here you can configure the PC hardware status such as CPU & system temperatures and fan speeds. You may use the scroll bars to adjust each item, then click "**OK**" to apply the changes. The values you set for the temperatures are the maximum thresholds for the system warnings, and the values for fan speeds are the minimum thresholds.

Center-side: Cool'n'Quiet / User mode
Here you may adjust the CPU fan speed. If you choose *User mode*, you may adjust the CPU fan speed in 8 different modes, from **High Speed** to **Low speed**. If you choose *Cool'n'Quiet*, the system will automatically configure an optimal setting for you.

Important

To ensure that Cool'n'Quiet function is activated and will be working properly, it is required to double confirm that:

1. *Run BIOS Setup, and select **H/W Monitor**. Under **H/W Monitor**, find **Cool'n'Quiet**, and set this item to [Enable].*

2. *Enter Windows, and select [Start]->[Settings]->[Control Pannel]->[Power Options]. Enter **Power Options Properties** tag, and select **Minimal Power Management** under **Power schemes**.*

1-7
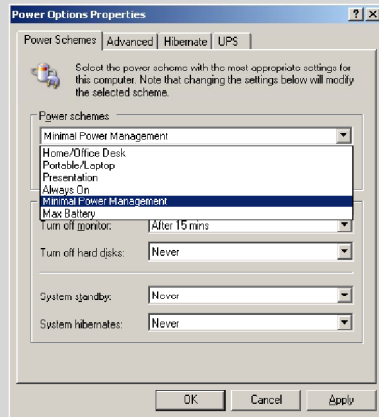
Chapter 2
Hardware Setup

This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

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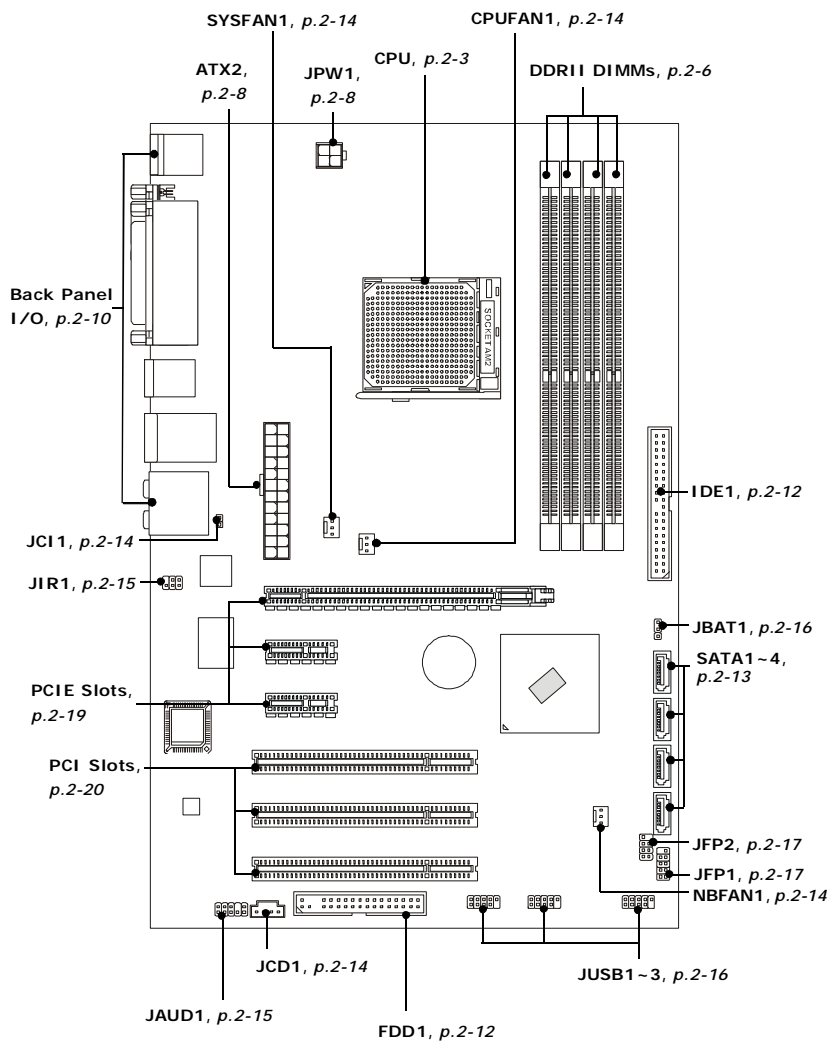
CPU (Central Processing Unit)

The mainboard supports AMD® Athlon 64/ X2 & Sempron processors. The mainboard uses a CPU socket called Socket AM2 (940-pin) for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

For the latest information about CPU, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_cpu_support.php

> **Important**
>
> 1. *Overheating will seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating.*
> 2. *Make sure that you apply an even layer of heat sink paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.*
> 3. *While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.*

CPU Installation Procedures for Socket AM2

1. Please turn off the power and unplug the power cord before installing the CPU.

2. Pull the lever sideways away from the socket. Make sure to raise the lever up to a 90-degree angle.

3. Look for the gold arrow of the CPU. The gold arrow should point as shown in the picture. The CPU can only fit in the correct orientation.

4. If the CPU is correctly installed, the pins should be completely embedded into the socket and can not be seen. Please note that any violation of the correct installation procedures may cause permanent damages to your mainboard.

5. Press the CPU down firmly into the socket and close the lever. As the CPU is likely to move while the lever is being closed, always close the lever with your fingers pressing tightly on top of the CPU to make sure the CPU is properly and completely embedded into the socket.

Open Lever

Sliding Plate

90 degree

Gold arrow

Correct CPU placement

Gold arrow

O

Incorrect CPU placement

Gold arrow

X

Press down the CPU

Close Lever
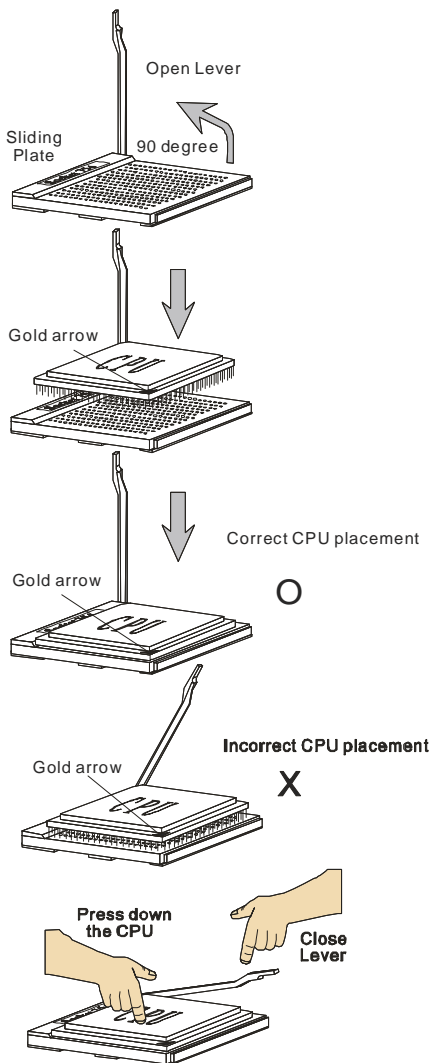
Installing AMD Socket AM2 CPU Cooler Set

When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

Important

Mainboard photos shown in this section are for demonstration of the cooler installation for Socket AM2 CPUs only. The appearance of your mainboard may vary depending on the model you purchase.

1. Position the cooling set onto the retention mechanism.

   Hook one end of the clip to hook first.
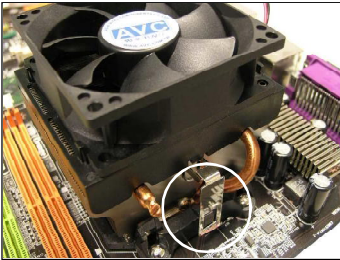
2. Then press down the other end of the clip to fasten the cooling set on the top of the retention mechanism. Locate the Fix Lever and lift up it .

Fixed Lever
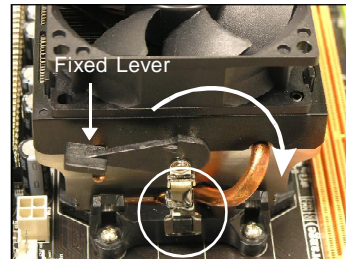
3. Fasten down the lever.
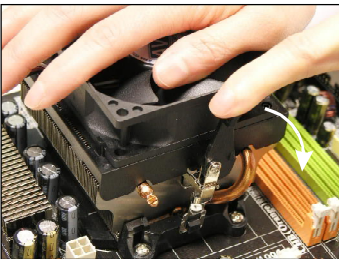
4. Attach the CPU Fan cable to the CPU fan connector on the mainboard.
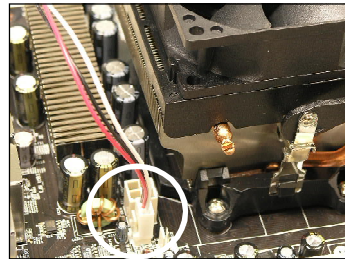
* While disconnecting the Safety Hook from the fixed bolt, it is necessary to keep an eye on your fingers, because once the Safety Hook is disconnected from the fixed bolt, the fixed lever will spring back instantly.

Memory

The mainboard provides four 240-pin non-ECC **DDRII** DIMMs and supports up to 4GB system memory.

For more information on compatible components, please visit *http://www.msi.com.tw/ program/products/mainboard/mbd/pro_mbd_trp_list.php*

DDRII
240-pin, 1.8V

56x2=112 pin   64x2=128 pin
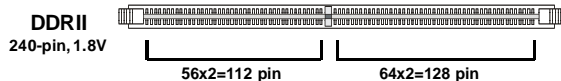
Dual-Channel Memory Population Rules

1
DIMM1
DIMM2
DIMM3
DIMM4

2
DIMM1
DIMM2
DIMM3
DIMM4

3
DIMM1
DIMM2
DIMM3
DIMM4
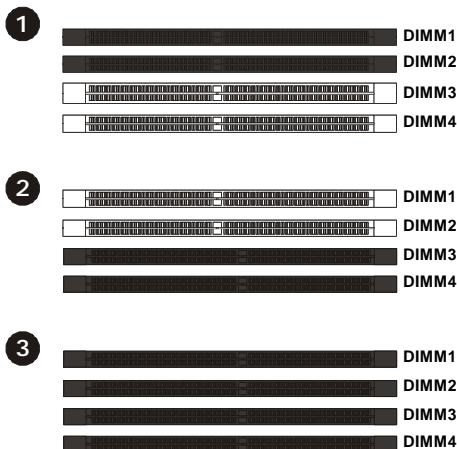
Installing DDRII Modules

1. The memory module has only one notch on the center and will only fit in the right orientation.

2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the socket.

Important

You can barely see the golden finger if the module is properly inserted in the socket.

3. The plastic clip at each side of the DIMM slot will automatically close.

Volt   **Notch**
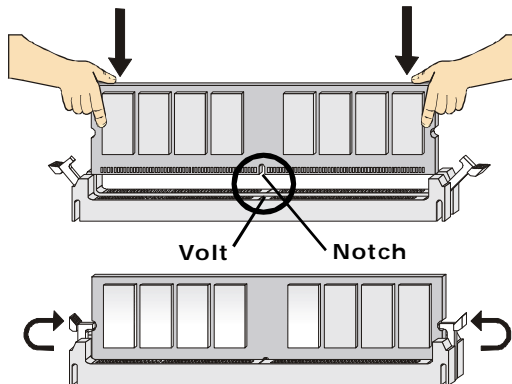
Important

- *DDRII modules are not interchangeable with DDR and the DDRII standard is not backwards compatible. You should always install DDRII memory modules in the DDRII DIMMs and DDR memory modules in the DDR DIMMs.*
- *In dual-channel mode, make sure that you install memory modules of **the same type and density** in different channel DDR DIMMs.*
- *To enable successful system boot-up, always insert the memory modules into the **DIMM1 first.***

Power Supply

ATX 24-Pin Power Connector: ATX2

This connector allows you to connect an ATX 24-pin power supply. To connect the ATX 24-pin power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

You may use the 20-pin ATX power supply as you like. If you'd like to use the 20-pin ATX power supply, please plug your power supply along with pin 1 & pin 13 (refer to the image at the right hand). There is also a foolproof design on pin 11, 12, 23 & 24 to avoid wrong installation.

pin 13

pin 12
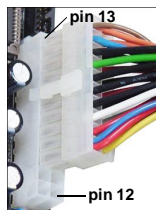
Pin Definition

ATX2

13 — 1
24 — 12

PIN	SIGNAL	PIN	SIGNAL
1	+3.3V	13	+3.3V
2	+3.3V.	14	-12V
3	GND	15	GND
4	+5V	16	PS-ON#
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWROK	20	Res
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

ATX 12V Power Connector: JPW1

This 12V power connector is used to provide power to the CPU.

JPW1

1   3
2   4
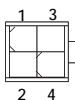
JPW1 Pin Definition

PIN	SIGNAL
1	GND
2	GND
3	12V
4	12V

Important

1. Maker sure that all the connectors are connected to proper ATX power supplies to ensure stable operation of the mainboard.
2. Power supply of 350 watts (and above) is highly recommended for system stability.

Important Notification about Power Issue

NForce chipset is very sensitive to ESD (Electrostatic Discharge), therefore this issue mostly happens while the users intensively swap memory modules under S5 (power-off) states, and the power code is plugged while installing modules. Due to several pins are very sensitive to ESD, so this kind of memory-replacement actions might cause system chipset unable to boot. Please follow the following solution to avoid this situation.

Unplug the AC power cable (shown in figure 1) or unplug the ATX2 & JPW1 power connectors (shown in figure 2 & figure 3) before the 1st installation or during system upgrade procedure.
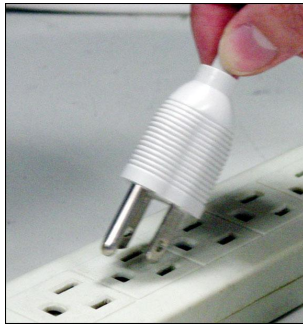
Figure 1:
Unplug the AC power cable
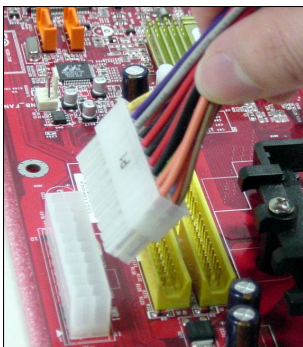
Figure 2:
Unplug the ATX2 power conn.
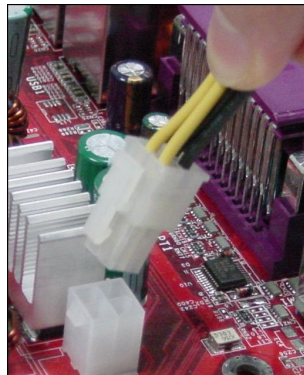
Figure 3:
Unplug the JPW1 power conn.

Back Panel

Mouse

Parallel Port

LAN **LAN**

L-In **RS-Out**

Keyboard **Serial Port**

USB Ports

L-Out **CS-Out**
Mic **SS-Out**
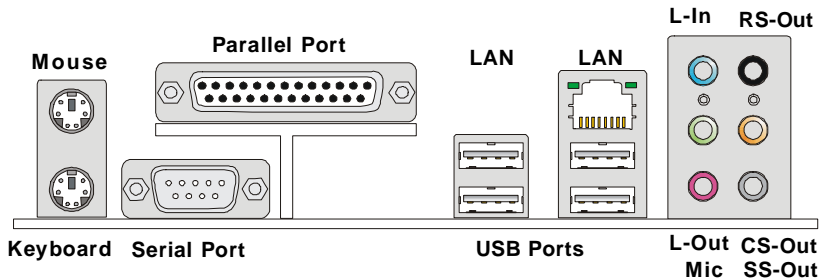
▶ **Mouse/Keyboard Connector**

The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

▶ **Parallel Port Connector**

A parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.

▶ **Serial Port Connector**

The serial port is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

▶ **LAN (RJ-45) Jack**

The standard RJ-45 jack is for connection to single Local Area Network (LAN). You can connect a network cable to it.

Activity Indicator
(Left LED)

Link Indicator
(Right LED)
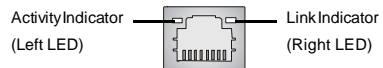
LED	Color	LED State	condition
Left	Yellow	Off	LAN link is not established.
		On (steady state)	LAN link is established.
		On (brighter & pulsing)	The computer is communicating with another computer on the LAN.
Right	Green	Off	10 Mbit/sec data rate is selected.
		On	100 Mbit/sec data rate is selected.
	Orange	On	1000 Mbit/sec data rate is selected.

▶ USB Connectors

The OHCI (Open Host Controller Interface) Universal Serial Bus root is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

▶ Audio Port Connectors

These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.

- **Green audio jack** - Line Out, is a connector for speakers or headphones.
- **Blue audio jack** - Line In / Side-Surround Out in 7.1 channel mode, is used for external CD player, tapeplayer or other audio devices.
- **Pink audio jack** - Mic In, is a connector for microphones.
- **Orange audio jack** - Center/ Subwoofer Out in 5.1/ 7.1 channel mode.
- **Black audio jack** - Rear-Surround Out in 5.1/ 7.1 channel mode.
- **Gray audio jack** - Side-Surround Out in 7.1 channel mode.

Connectors

Floppy Disk Drive Connector: FDD1

This standard FDD connector supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.
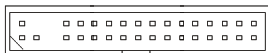
FDD1

ATA133 Hard Disk Connectors: IDE1

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 66/100/133 function. You can connect hard disk drives, CD-ROM and other IDE devices.

The Ultra ATA133 interface boosts data transfer rates between the computer and the hard drive up to 133 megabytes (MB) per second. The new interface is one-third faster than earlier record-breaking Ultra ATA/100 technology and is backwards compatible with the existing Ultra ATA interface.

IDE1 (Primary IDE Connector)

IDE1 can connect a Master and a Slave drive. You must configure the second hard drive to Slave mode by setting the jumper accordingly.
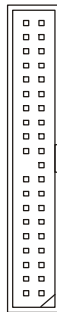
IDE1

Important

If you install two hard disks on cable, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Serial ATA II Connectors: SATA1~SATA4

SATA1~SATA4 are high-speed SATAII interface ports. Each supports data rates of 300 MB/s and is fully compliant with Serial ATA specifications. Each Serial ATA connector can connect to 1 hard disk device.

SATA4

1

7

SATA3

SATA2

SATA1
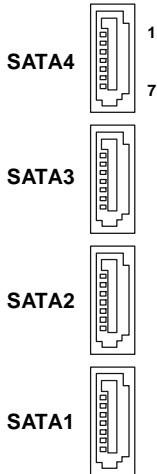
Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	TXP
3	TXN	4	GND
5	RXN	6	RXP
7	GND		
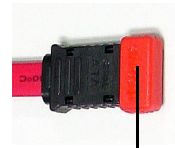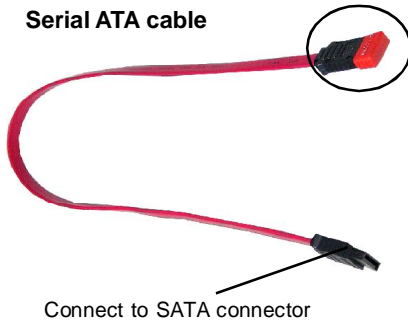
Serial ATA cable

Take out the dust cover and connect to the hard disk devices

Connect to SATA connector

Important

Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.

Fan Power Connectors: CPUFAN1, SYSFAN1 & NBFAN1

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.
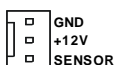
GND	GND	GND
+12V	+12V	+12V
SENSOR	SENSOR	NC
CPUFAN1	**SYSFAN1**	**NBFAN1**

Important

1. Please refer to the recommended CPU fans at AMD® official website or consult the vendors for proper CPU cooling fan.
2. Always consult the vendors for proper CPU cooling fan.

Chassis Intrusion Switch Connector: JCI1

This connector connects to a 2-pin chassis switch. If the chassis is opened, the switch will be short. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.

2 GND
1 CINTRU

JCI1

CD-In Connector: JCD1

This connector is provided for CD-ROM audio.

JCD1

R GND L
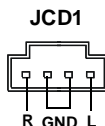
Front Panel Audio Connector: JAUD1

The JAUD1 front panel audio connector allows you to connect the front panel audio and is compliant with Intel® Front Panel I/O Connectivity Design Guide.

2⎡⎤⎡⎤⎡⎤⎡⎤⎡⎤**10** JAUD1
1⎣⎦⎣⎦⎣⎦⎣⎦⎣⎦**9**

JAUD1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	PORT 1L	Analog Port 1 - Left channel
2	GND	Ground
3	PORT 1R	Analog Port 1 - Right channel
4	PRESENCE#	Active low signal - signals BIOS that a High Definition Audio dongle is connected to the analog header. PRESENCE# = 0 when a High Definition Audio dongle is connected.
5	PORT 2R	Analog Port 2 - Right channel
6	SENSE1_RETIRN	Jack detection return from front panel JACK1
7	SENSE_SEND	Jack detection sense line from the High Definition Audio CODEC jack detection resistor network
8	KEY	Connector Key
9	PORT 2L	Analog Port 2 - Left channel
10	SENSE2_RETIRN	Jack detection return from front panel JACK2

IrDA Infrared Module Header: JIR1

The connector allows you to connect to IrDA Infrared module. You must configure the setting through the BIOS setup to use the IR function. JIR1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

JIR1

2⎡⎤⎡⎤⎡⎤**6**
1⎣⎦⎣⎦⎣⎦**5**

Pin Definition

Pin	Signal
1	NC
2	NC
3	VCC5
4	GND
5	IRTX
6	IRRX

Front USB Connectors: JUSB1, JUSB2 & JUSB3

The mainboard provides USB 2.0 pinheaders (optional USB 2.0 bracket available) that are compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.

Pin Definition

JUSB1/2/3

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key (no pin)	10	USBOC

USB 2.0 Bracket
(Optional)

Connected to USB connector

Important

Note that the pins of VCC and GND must be connected correctly to avoid possible damage.

Front Panel Connectors: JFP1/JFP2

The mainboard provides two front panel connectors for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.
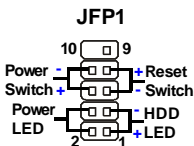
JFP1

JFP1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED +	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED -	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW -	Reset Switch low reference pull-down to GND
6	PWR_SW+	Power Switch high reference pull-up
7	RST_SW +	Reset Switch high reference pull-up
8	PWR_SW-	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.
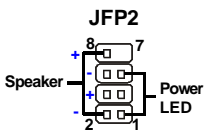
JFP2

JFP2 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	GND	Ground
2	SPK-	Speaker-
3	SLED	Suspend LED
4	BUZ+	Buzzer+
5	PLED	Power LED
6	BUZ-	Buzzer-
7	NC	No connection
8	SPK+	Speaker+

Jumper

The motherboard provides the following jumper for you to set the computer's function. This section will explain how to change your motherboard's function through the use of jumper.

Clear CMOS Jumper: JBAT1

There is a CMOS RAM onboard that has a power supply from external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the JCMOS1 (Clear CMOS Jumper) to clear data.

JBAT1   Keep Data   Clear Data
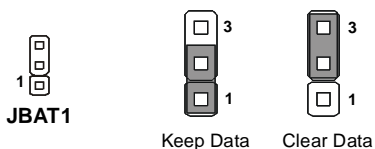
> **Important**
>
> *You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.*

Slots

PCI (Peripheral Component Interconnect) Express Slots

PCI Express architecture provides a high performance I/O infrastructure for Desktop Platforms with transfer rates starting at 2.5 Giga transfers per second over a PCI Express x1 lane for Gigabit Ethernet, TV Tuners, 1394 controllers, and general purpose I/O. Also, desktop platforms with PCI Express Architecture will be designed to deliver highest performance in video, graphics, multimedia and other sophisticated applications. Moreover, PCI Express architecture provides a high performance graphics infrastructure for Desktop Platforms doubling the capability of existing AGP 8x designs with transfer rates of 4.0 GB/s over a PCI Express x16 lane for graphics controllers, while PCI Express x1 supports transfer rate of 250 MB/s.
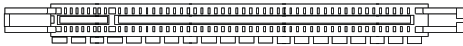
PCI Express x16 Slot
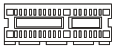
PCI Express x1 Slot

Important

1. When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

PCI (Peripheral Component Interconnect) Slots

The PCI slots support LAN cards, SCSI cards, USB cards, and other add-on cards that comply with PCI specifications. At 32 bits and 33 MHz, it yields a throughput rate of 133 MBps.
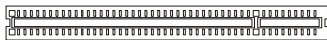
32-bit PCI Slot

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus pins as follows:

	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT E#	INT F#	INT G#	INT H#
PCI Slot 2	INT F#	INT G#	INT H#	INT E#
PCI Slot 3	INT G#	INT H#	INT E#	INT F#

Chapter 3
BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.
You may need to run the Setup program when:

* An error message appears on the screen during the system booting up, and requests you to run SETUP.

* You want to change the default settings for customized features.

MSI
MICRO-STAR INTERNATIONAL

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <DEL> key to enter Setup.

Press DEL to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Important

1. The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

2. Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:

A7260NMS V1.0 041506 where:

1st digit refers to BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.
2nd - 5th digit refers to the model number.
6th digit refers to the chipset as I = Intel, N = nVidia, and V = VIA.
7th - 8th digit refers to the customer as MS = all standard customers.
V1.0 refers to the BIOS version.
041506 refers to the date this BIOS was released.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load Optimized Defaults
<F7>	Load Fail-Safe Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to high-

▶ IDE Primary Master
▶ IDE Primary Slave
▶ SATA 0 Primary Channel
▶ SATA 0 Secondary Channel

light the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

The Main Menu

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.

  ▶ Standard CMOS Features          ▶ H/W Monitor

  ▶ Advanced BIOS Features          ▶ Cell_Menu

  ▶ Advanced Chipset Features         Load Optimized Defaults

  ▶ Integrated Peripherals            BIOS Setting Password

  ▶ Power Management Setup            Save & Exit Setup

  ▶ PNP/PCI Configurations            Exit Without Saving


  ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
                F6:Load Optimized Defaults

                Set Time, Date, Hard Disk Type ...

        v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.
```

► Standard CMOS Features
Use this menu for basic system configurations, such as time, date etc.

► Advanced BIOS Features
Use this menu to setup the items of AMI® special enhanced features.

► Advanced Chipset Features
Use this menu to change the values in the chipset registers and optimize your system's performance.

► Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.

► Power Management Setup
Use this menu to specify your settings for power management.

► PNP/PCI Configurations
This entry appears if your system supports PnP/PCI.

► H/W Monitor
This entry shows your PC health status.

► Cell Menu
Use this menu to specify your settings for frequency/voltage control and overclocking.

▶ **Load Optimized Defaults**
Use this menu to load the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard.

▶ **BIOS Setting Password**
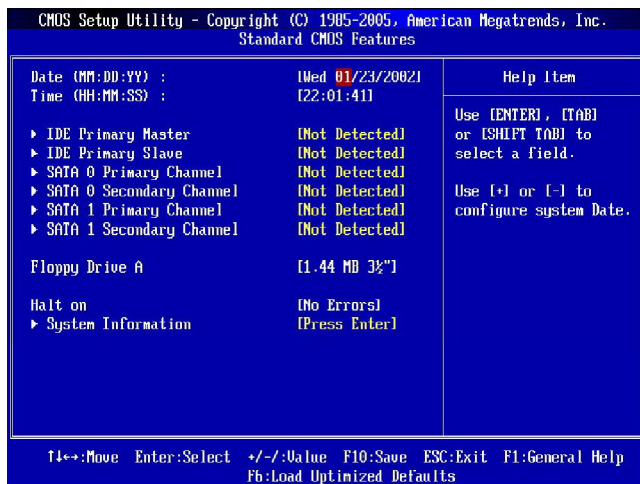Use this menu to set the password for BIOS.

▶ **Save & Exit Setup**
Save changes to CMOS and exit setup.

▶ **Exit Without Saving**
Abandon all changes and exit setup.

Standard CMOS Features

The items in Standard CMOS Features Menu includes some basic setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                        Standard CMOS Features

  Date (MM:DD:YY) :          [Wed 01/23/2002]         Help Item
  Time (HH:MM:SS) :          [22:01:41]
                                                   Use [ENTER], [TAB]
  ▶ IDE Primary Master       [Not Detected]        or [SHIFT TAB] to
  ▶ IDE Primary Slave        [Not Detected]        select a field.
  ▶ SATA 0 Primary Channel   [Not Detected]
  ▶ SATA 0 Secondary Channel [Not Detected]        Use [+] or [-] to
  ▶ SATA 1 Primary Channel   [Not Detected]        configure system Date.
  ▶ SATA 1 Secondary Channel [Not Detected]

  Floppy Drive A             [1.44 MB 3½"]

  Halt on                    [No Errors]
  ▶ System Information       [Press Enter]




  ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
                        F6:Load Optimized Defaults
```

► **Date (MM:DD:YY)**
This allows you to set the system to the date that you want (usually the current date). The format is <day><month> <date> <year>.

day	Day of the week, from Sun to Sat, determined by BIOS. Read-only.
month	The month from Jan. through Dec.
date	The date from 1 to 31 can be keyed by numeric function keys.
year	The year can be adjusted by users.

► **Time (HH:MM:SS)**
This allows you to set the system time that you want (usually the current time). The time format is <hour> <minute> <second>.

► **IDE Primary Master/ Slave, Serial-ATA 0/1 Primary/ Secondary Channel**
Press <Enter> to enter the sub-menu, and the following screen appears.

▶ **Device/ Vender/ Size/ LBA Mode/ Block Mode/ PIO Mode/ Async DMA/ Ultra DMA/ S.M.A.R.T.**
It will showing the device information that you connected to the IDE/SATA connector.

▶ **LBA/Large Mode**
This allows you to enable or disable the LBA Mode. Setting to Auto enables LBA mode if the device supports it and the devices is not already formatted with LBA mode disabled.

▶ **DMA Mode**
Select DMA Mode.

▶ **Hard Disk S.M.A.R.T.**
This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S.M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline.

Important

IDE Primary Master/ Slave, Serial-ATA 0/ 1 Primary/ Secondary Channel are appearing when you connect the HD devices to the IDE/ SATA connector on the mainboard.

▶ **Floppy Drive A**
This item allows you to set the type of floppy drives installed.

▶ Halt On
The setting determines whether the system will stop if an error is detected at boot.
Available options are:

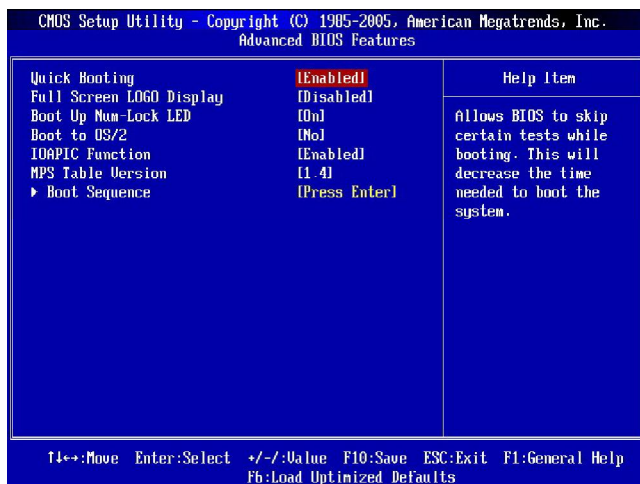|	
[No Errors]	The system doesn't stop for any detected error.
[All, But Keyboard]	The system doesn't stop for a keyboard error.

▶ System Information
Press <Enter> to enter the sub-menu, and the following screen appears.

▶ Usage Memory/ BIOS Version
These items show the CPU information, BIOS version and memory status of your system (read only).

Advanced BIOS Features

► **Quick Booting**

Setting the item to [Enabled] allows the system to boot within 5 seconds since it will skip some check items.

► **Full Screen LOGO Display**

This item enables you to show the company logo on the bootup screen. Settings are:

      [Enabled]   Shows a still image (logo) on the full screen at boot.

      [Disabled]   Shows the POST messages at boot.

► **Boot Up NumLock LED**

This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

► **Boot To OS/2**

This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose [No], you cannot run the OS/2® operating system with DRAM larger than 64MB. But it is possible if you choose [Yes].

► **IOAPIC Function**

This field is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance with PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQ resources for the system.

▶ MPS Table Version
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system.

▶ Boot Sequence
Press <Enter> to enter the sub-menu and the following screen appears:
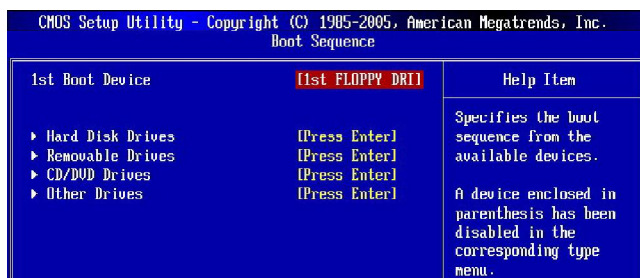
▶ 1st Boot Device
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

▶ Hard Disk Drives
This feature allows you to specify the hard disk boot priority.

▶ Removable Drives
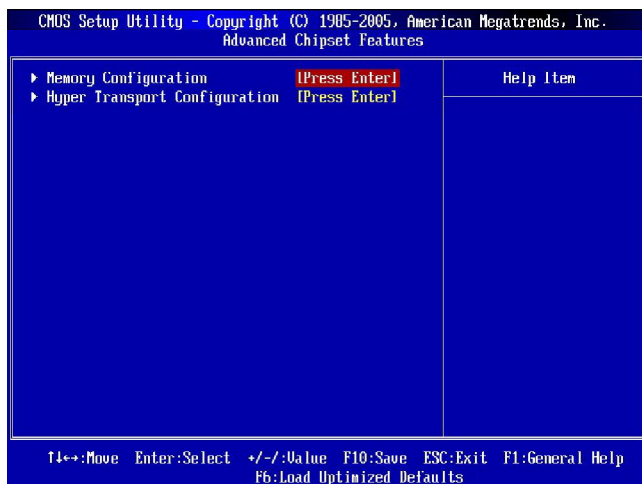This feature allows you to specify the removable device boot priority.

▶ CD/DVD Drives
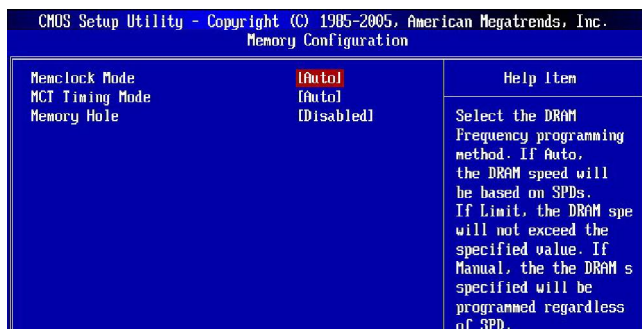This feature allows you to specify the CD/DVD device boot priority.

▶ Other Drives
This feature allows you to specify the other device boot priority.

Advanced Chipset Features

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                        Advanced Chipset Features

  ▶ Memory Configuration            [Press Enter]          Help Item
  ▶ Hyper Transport Configuration   [Press Enter]




 ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
                      F6:Load Optimized Defaults
```

▶ Memory Configuration
Press <Enter> to enter the sub-menu and the following screen appears:

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                        Memory Configuration

  Memclock Mode            [Auto]              Help Item
  MCT Timing Mode          [Auto]
  Memory Hole              [Disabled]          Select the DRAM
                                               Frequency programming
                                               method. If Auto,
                                               the DRAM speed will
                                               be based on SPDs.
                                               If Limit, the DRAM spe
                                               will not exceed the
                                               specified value. If
                                               Manual, the the DRAM s
                                               specified will be
                                               programmed regardless
                                               of SPD.
```

▶ Memclock Mode
Select the DRAM frequency programming method. If set to "Auto", the DRAM speed will be based on SPDs. If set to "Limit", the DRAM speed will not exceed the specified value. If set to "Manual", the DRAM speed specified will be pro-grammed regardless of SPD.

▶ MCT Timing Mode
This field has the capacity to automatically detect all of the DRAM timing. If you set this field to [Manual], the following fields will be selectable.

3-11

▶ Memory Hole
In order to improve performance, certain space in memory can be reserved for ISA peripherals. This memory must be mapped into the memory space below 16MB. When this area is reserved, it cannot be cached. Settings: *Disabled, 15MB-16MB.*

▶ Hyper Transport Configuration
Press <Enter> to enter the sub-menu and the following screen appears:

▶ SB to CPU Freq. Auto
[Enabled]   Auto Detect HT frequency.
[Disabled]   Manual to setting HT frequency.

▶ SB to CPU Frequency
When the **SB to CPU Freq. Auto** set to *Disabled*, the item will appear. This item allows you to select the frequency from South Bridge to CPU.

▶ SB to CPU LinkWidth
This item allows you to select the HT width from SB to CPU.

Integrated Peripherals

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                        Integrated Peripherals

USB Controller                  [Enabled]           Help Item
USB 2.0 Controller              [Enabled]
USB Device Legacy Support       [Auto]              Options
Onboard LAN Controller          [Auto]
Onboard Audio Controller        [Enabled]           Enabled
▶ On-Chip ATA Devices           [Press Enter]       Disabled
▶ I/O Devices                   [Press Enter]
▶ nVidia RAID Setup             [Press Enter]




 ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
                        F6:Load Optimized Defaults
```

► USB / 2.0 Controller
This setting allows you to enable/disable the onboard USB 1.1/ 2.0 controller.

► USB Device Legacy Support
Select [Enabled] if you need to use a USB-interfaced device in the operating system.

► Onboard LAN Controller
These items are used to enable/disable the onboard LAN controller.

► Onboard Audio Controller
This setting is used to enable/disable the onboard audio controller.

► On-Chip ATA Devices
Press <Enter> to enter the sub-menu and the following screen appears:

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                        On-Chip ATA Devices

PCI IDE BusMaster               [Enabled]           Help Item
On-Chip IDE Controller          [Enabled]
Serial-ATA Devices              [Devcie 0/1]        ENABLED: BIOS uses
                                                    PCI busmastering for
                                                    reading / writing to
                                                    IDE drives.
```

► PCI IDE BusMaster
This item allows you to enable/ disable BIOS to used PCI busmastering for reading/ writing to IDE drives.

3-13

► **On-Chip IDE Controller**
This item allows you to enable/ disable IDE Controller.

► **Serial-ATA Devices**
These items allow users to enable or disable the SATA controller.

►**I/O Devices**
Press <Enter> to enter the sub-menu and the following screen appears:

► **Onboard Floppy Controller**
Select [Enabled] if your system has a floppy disk controller (FDD) installed on the system board and you wish to use it. If you install add-on FDC or the system has no floppy drive, select [Disabled] in this field.

► **COM Port 1/2**
Select an address and corresponding interrupt for the first serial port.

► **COM Port 2 Mode**
This setting allows you to specify the operation mode for serial port 2. Settings are:

    [IrDA]   IrDA-compliant Serial Infrared Port
    [ASKIR]   Amplitude Shift Keyed Infrared Port

► **Parallel Port**
There is a built-in parallel port on the on-board Super I/O chipset that provides Standard, ECP, and EPP features. It has the following options:
          [Disabled]
          [3BC]   Line Printer port 0
          [278]   Line Printer port 2
          [378]   Line Printer port 1

► **Parallel Port Mode**
          [SPP]   Standard Parallel Port
          [EPP]   Enhanced Parallel Port
          [ECP]   Extended Capability Port
          [ECP+EPP]   Extended Capability Port + Enhanced Parallel Port

To operate the onboard parallel port as Standard Parallel Port only, choose [SPP]. To operate the onboard parallel port in the EPP mode simultaneously, choose [EPP]. By choosing [ECP], the onboard parallel port will operate in ECP mode only. Choosing [ECP + EPP] will allow the onboard parallel port to support both the ECP and EPP modes simultaneously.

► Parallel Port IRQ
This item allows you to set parallel port IRQ.

► nVidia RAID Setup
Press <Enter> to enter the sub-menu and the following screen appears:

► nVidia RAID Function
This item is used to enable/disable the nVidia RAID function.

► SATA 0/ 1 Primary/ Secondary Channel
These itemsallow users to enable or disable the RAID function for each SATA hard disk drive.

Power Management Setup
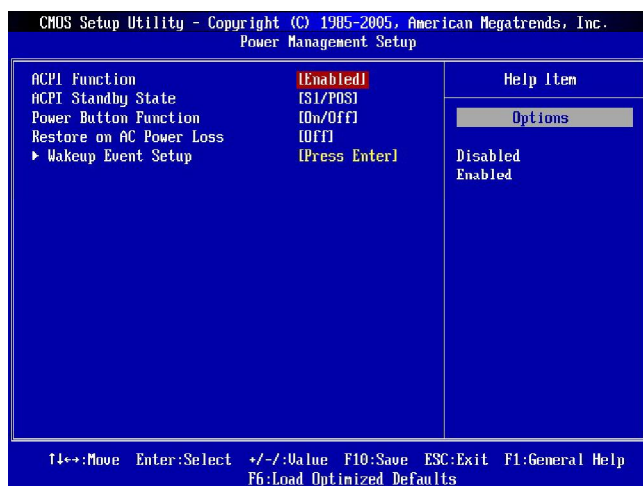
> **Important**
>
> *S3-related functions described in this section are available only when your BIOS supports S3 sleep mode.*

▶ **ACPI Function**
This item is to activate the ACPI (Advanced Configuration and Power Management Interface) Function. If your operating system is ACPI-aware, such as Windows 98SE/2000/ME, select [Enabled].

▶ **ACPI Standby State**
This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE/ ME/ 2000 , you can choose to enter the Standby mode in S1(POS) or S3(STR) fashion through the setting of this field. Settings are:

[S1/POS]   The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.

[S3/STR]   The S3 sleep mode is a lower power state where the in formation of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

[Auto]

3-16

▶ **Power Button Function**

This feature sets the function of the power button. Settings are:

[On/ Off]   The power button functions as normal power off button.

[Suspend]   When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

▶ **Restore On AC Power Loss**

This item specifies whether your system will reboot after a power failure or interrupt occurs. Settings are:

[Off]   Always leaves the computer in the power off state.

[On]   Always leaves the computer in the power on state.

[Last State] Restores the system to the status before power failure or interrupt occurred.

▶ **Wakeup Event Setup**

Press <Enter> and the following sub-menu appears.

▶ **Resume by PS/2 Keyboard**

This controls how the PS/2 keyboard is able to power on the system. If you choose *Specific Key*, the power button on the case will not function anymore and you must type the password to power on the system.

▶ **Resume by PS/2 Mouse**

This setting determines whether the system will be awakened from what power saving modes when input signal of the PS/2 mouse is detected.

▶ **Resume by MAC LAN**

An input signal on modem awakens the system from a soft off state.

▶ **Resume by PCI Device (PME#)**

When set to [Enabled], the feature allows your system to be awakened from the power saving modes through any event on PME (Power Management Event).

▶ **Resume by PCIE Device**

When set to [Enabled], the feature allows your system to be awakened from the power saving modes through any event on PCIE device.

3-17

▶ Resume by RTC Alarm
The field is used to enable or disable the feature of booting up the system on a scheduled time/date.

PNP/PCI Configurations

This section describes configuring the PCI bus system and PnP (Plug & Play) feature. PCI, or **P**eripheral **C**omponent **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

```
  CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                        PNP/PCI Configurations

  Primary Graphics Adapter     [PCI]              Help Item
  PCI Latency Timer            [64]
  PCI Slot1 IRQ                [Auto]             Options
  PCI Slot2 IRQ                [Auto]
  PCI Slot3 IRQ                [Auto]             PCI
  ▶ IRQ Resource Setup         [Press Enter]      PCIE
  ▶ DMA Resource Setup         [Press Enter]




  ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
                        F6:Load Optimized Defaults
```
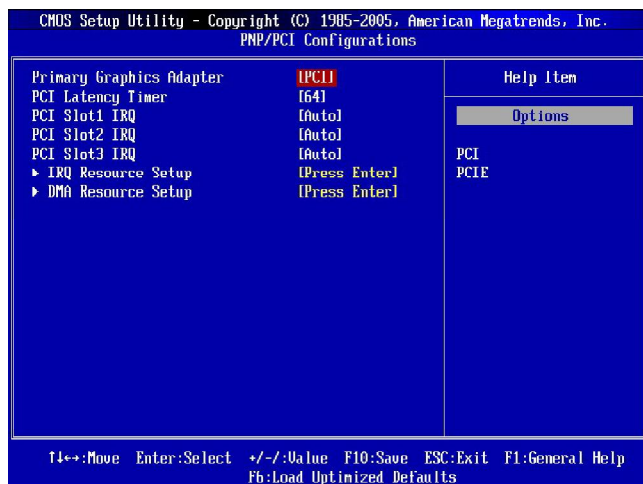
▶ Primary Graphics Adapter
This setting specifies which graphics card is your primary graphics adapter. Settings are:

> [PCIE] The system initializes the PCI Express graphics card that installed in PCIE x 16 slot first.
> [PCI] The system initializes the PCI graphics card that installed in PCI slot first.

▶ PCI Latency Timer
This item controls how long each PCI device can hold the bus before another takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. For better PCI performance, you should set the item to higher values.

▶ PCI Slot 1/2/3 IRQ
These items specify the IRQ line for each PCI slot.

► IRQ Resource Setup

Press <Enter> to enter the sub-menu and the following screen appears.

► IRQ 3/4/5/7/9/10/11/14/15

These items specify the bus where the specified IRQ line is used.

The settings determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the IRQ pool, the end user can use these settings to reserve the IRQ by assigning an [Reserved] setting to it. Onboard I/O is configured by AMIBIOS. All IRQs used by onboard I/O are configured as [Available]. If all IRQs are set to [Reserved], and IRQ 14/15 are allocated to the onboard PCI IDE, IRQ 9 will still be available for PCI and PnP devices.

Important

IRQ (Interrupt Request) lines are system resources allocated to I/O devices. When an I/O device needs to gain attention of the operating system, it signals this by causing an IRQ to occur. After receiving the signal, when the operating system is ready, the system will interrupt itself and perform the service required by the I/O device.

► DMA Resource Setup

Press <Enter> to enter the sub-menu and the following screen appears.

► DMA Channel 0/1/3/5/6/7

The settings determine if AMIBIOS should remove a DMA (Direct Memory Access) from the available DMAs passed to devices that are configurable by the system BIOS. The available DMA pool is determined by reading the ESCD NVRAM. If more DMAs must be removed from the pool, the end user can reserve the DMA.

H/W Monitor


```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                              H/W Monitor

 CPU Spread Spectrum            [Center Spread]        Help Item
 PCIE Spread Spectrum           [Enabled]
 SATA Spread Spectrum           [Enabled]                Options
 Cool'n'Quiet                   [Enabled]
 Chassis Intrusion              [Disabled]          Disabled
 CPUFAN1 Mode Setting           [Step Smart Fan]    Center Spread
   CPU Step Smart Fan Low Temp  [040]               Down Spread
   CPU Step Smart Fan High Temp [056]
 CPUFAN1 Tolerance Value        [02]
 Current Smart Fan Step         8 Step
 Each Step Increase Fan Output  8%

 ▶ PC Health Status             [Press Enter]




 ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
                        F6:Load Optimized Defaults
```

▶ **CPU Spread Spectrum**
This setting is used to enable or disable the CPU Spread Spectrum feature. When overclocking the CPU, always set it to [Disabled].

▶ **PCIE Spread Spectrum**
This setting is used to enable or disable the PCIE Spread Spectrum feature.

▶ **SATA Spread Spectrum**
This setting is used to enable or disable the SATA Spread Spectrum feature.

▶ **Cool'n'Quiet**
This feature is especially desiged for AMD processor, which provides a CPU temperature detecting function to prevent your CPU's from overheading due to the heavy working loading.

Important

For the purpose of ensuring the stability of Cool'n'Quiet function, it is always recommended to have the memories plugged in DIMM1.

3-21

▶ Chassis Intrusion
The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear the warning message, set the field to [Reset]. The setting of the field will automatically return to [Enabled] later.

▶ CPUFAN1 Mode Setting
This field allows you to set the CPU fan mode. Settings are: [Step Smart Fan], [Thermal Cruise], [Disabled].

▶ CPU Step Smart Fan Low/ High Temp
When the *CPUFAN Mode Setting* set to the "*Step Smart Fan*", this item will apear. The mainboard provides another Smart Fan system which can control the fan speed automatically depending on the current temperature to keep it within a specific step. In these items you can set the low and high tempertures, and the values between are the range of the steps.

▶ CPUFAN1 Tolerance Value
When the *CPUFAN Mode Setting* set to the "*Step Smart Fan*", this item will apear. The Fan tolerance value will decide the intervals of the steps from low temperature to high temperature. The fan speed will increase at higher steps and decrease at lower steps according to the steps.

▶ Current Smart Fan Step
This item shows how many steps between the low and high temperatures. Read only.

▶ Each Step Increase Fan Output
This item shows the percentage for the CPU fan speed to increase or decrease between two steps. Read only.

▶ CPU Fan TargetTemp Value
When the *CPUFAN Mode Setting* set to the "*Thermal Cruise*" this item will appear. The mainboard provides the Smart Fan system which can control the fan speed automatically depending on the current temperature to keep it with in a specific range.

▶ CPU Fan Tolerance Value
When the *CPUFAN Mode Setting* set to the "*Thermal Cruise*" this item will appear. You can select a fan tolerance value here for the specific range for the "CPU Fan TargetTemp. Value" item. If the current temperature of the fan reaches to the maximum threshold (the temperatures set in the "CPU Fan TargetTemp. Value" plus the tolerance values you set here), the fan will speed up for cooling down. On the contrary, if the current temperature reaches to the minimum threshold (the set temperatures minus the tolerance value), the fan will slow down to keep the temperature stable.

▶ **PC Health Status**
Press <Enter> to enter the sub-menu and the following screen appears.

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                          PC Health Status

System Temperature        : 33°C/91°F              Help Item
CPU Temperature           : 46°C/114°F

System FAN Speed          : 0 RPM
CPU FAN Speed             : 2191 RPM

CPU Vcore                 : 1.432 V
+12.0V                    : 12.144 V
+5.0V                     : 5.171 V
+3.3V                     : 3.344 V
3VSB                      : 3.344 V
```

▶ **System/ CPU Temperature, CPUFAN/System FAN Speed, CPU Vcore, +12.0V, +3.3V, +5.0V, 3VSB**
These items display the current status of all of the monitored hardware devices/components such as CPU voltage, temperatures and all fans' speeds.

Cell Menu

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                              Cell_Menu

    Current CPU Clock              2428MHz          Help Item
    Current Memory Speed           533 MHz
                                                      Options
    Adjust CPU FSB Frequency       [200.0]
    CPU Dynamic Overclocking       [Disabled]      200.0
    Adjust DDR Voltage (V)         [1.80]          200.5
                                                   200.9
                                                   201.5
                                                   202.0
                                                   202.5
                                                   203.0
                                                   203.5
                                                   204.0
                                                   204.5
                                                   205.0
                                                   205.5
                                                   206.0
                                                   206.5
                                                   207.0

   ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
                          F6:Load Optimized Defaults
```

Important

Change these settings only if you are familiar with the chipset.

▶ **Current CPU Clock/ Memory Speed**
These items show the current clocks of CPU and Memory speed. Read-only.

▶ **Adjust CPU FSB Frequency**
This item allows you to select the CPU Front Side Bus clock frequency (in MHz).

▶ **CPU Dynamic OverClocking**
Dynamic Overclocking Technology is the automatic overclocking function, included in the MSI™'s newly developed CoreCell™ Technology. It is designed to detect the load balance of CPU while running programs, and to adjust the best CPU frequency automatically. When the motherboard detects CPU is running programs, it will speed up CPU automatically to make the program run smoothly and faster. When the CPU is temporarily suspending or staying in the low load balance, it will restore the default settings instead. Usually the Dynamic Overclocking Technology will be powered only when users' PC need to run huge amount of data like 3D games or the video process, and the CPU frequency need to be boosted up to enhance the overall performance. Settings are:

[Disabled]	Disable Dynamic Overclocking.
[Private]	1st level of overclocking, increasing the frequency by 1%.
[Sergeant]	2nd level of overclocking, increasing the frequency by 3%.
[Captain]	3rd level of overclocking, increasing the frequency by 5%.
[Colonel]	4th level of overclocking, increasing the frequency by 7%.
[General]	5th level of overclocking, increasing the frequency by 10%.
[Commander]	6th level of overclocking, increasing the frequency by 15%.

Important

Even though the Dynamic Overclocking Technology is more stable than manual overclocking, basically, it is still risky. We suggest user to make sure that your CPU can afford to overclocking regularly first. If you find the PC appears to be unstable or reboot incidentally, it's better to disable the Dynamic Overclocking or to lower the level of overclocking options. By the way, if you need to conduct overclocking manually, you also need to disable the Dynamic OverClocking first.

▶ **Adjust DDR Voltage**
Adjusting the DDR voltage can increase the DDR speed. Any changes made to this setting may cause a stability issue, so *changing the DDR voltage for long-term purpose is NOT recommended*.

Important

*The settings shown in different color in **DDR Voltage** help to verify if your setting is proper for your system.*
Gray: Default setting.
Yellow: High performance setting.
Red: Not recommended setting and the system may be   unstable.
*Changing **DDR Voltage** may result in the instability of the system; therefore, it is **NOT** recommended to change the default setting for long-term usage.*

Load Optimized Defaults

The option on the main menu allows users to restore all of the BIOS settings to the default Optimized values. The Optimized Defaults are the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard.

When you select Load Optimized Defaults, a message as below appears:

Load Optimized Defaults?

[Ok]   [Cancel]

Pressing *Y* loads the default factory settings for optimal system performance.

BIOS Setting Password

When you select this function, a message as below will appear on the screen:

Enter New Password

Type the password, up to six characters in length, and press <Enter>. The password typed now will replace any previously set password from CMOS memory. You will be prompted to confirm the password. Retype the password and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To clear a set password, just press <Enter> when you are prompted to enter the password. A message will show up confirming the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup without entering any password.

When a password has been set, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Appendix A
Realtek ALC883 Audio

The Realtek ALC883 provides 10-channel DAC that simultaneously supports 7.1 sound playback and 2 channels of independent stereo sound output (multiple streaming) through the Front-Out-Left and Front-Out-Right channels.

MSI
MICRO-STAR INTERNATIONAL

Installing the Realtek HD Audio Driver

You need to install the driver for Realtek ALC883 codec to function properly before you can get access to 2-, 4-, 6-, 8- channel or 7.1+2 channel audio operations. Follow the procedures described below to install the drivers for different operating systems.

Installation for Windows 2000/XP

For Windows® 2000, you must install Windows® 2000 Service Pack4 or later before installing the driver. For Windows® XP, you must install Windows® XP Service Pack1 or later before installing the driver.

The following illustrations are based on Windows® XP environment and could look slightly different if you install the drivers in different operating systems.

1. Insert the application CD into the CD-ROM drive. The setup screen will automatically appear.
2. Click **Realtek HD Audio Driver**.

Click here
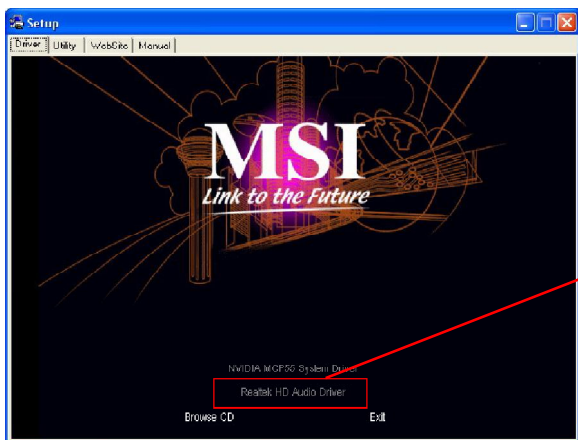
Important

*The **HD Audio Configuration** software utility is under continuous update to enhance audio applications. Hence, the program screens shown here in this section may be slightly different from the latest software utility and shall be held for reference only.*

3. Click **Next** to install the Realtek High Definition Audio Driver.

Click here

4. Click **Finish** to restart the system.

Select this option

Click here
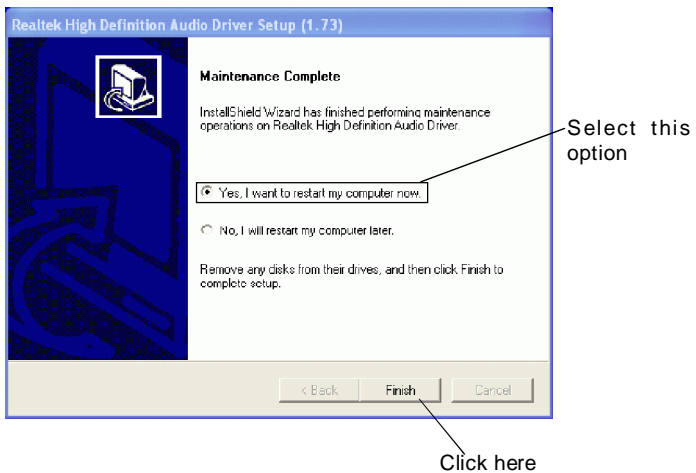
Software Configuration

After installing the audio driver, you are able to use the 2-, 4-, 6- or 8- channel audio feature now. Click the audio icon 🔊 from the system tray at the lower-right corner of the screen to activate the **HD Audio Configuration**. It is also available to enable the audio driver by clicking the **Azalia HD Sound Effect Manager** from the **Control Panel**.

Double click
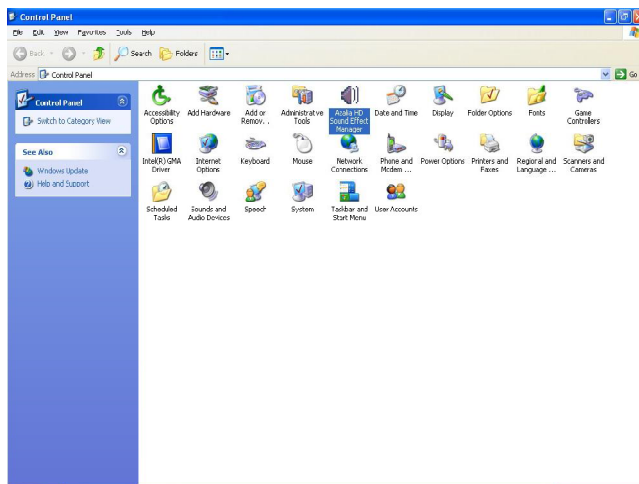
Sound Effect

Here you can select a sound effect you like from the **Environment** list.

Environment Simulation

You will be able to enjoy different sound experience by pulling down the arrow, totally 23 kinds of sound effect will be shown for selection. Realtek HD Audio Sound Manager also provides five popular settings "Stone Corridor", "Bathroom", "Sewer pipe", "Arena" and "Audio Corridor" for quick enjoyment.

You may choose the provided sound effects, and the equalizer will adjust automatically. If you like, you may also load an equalizer setting or make an new equalizer setting to save as an new one by using the "**Load EQ Setting**" and "**Save Preset**" button, click "**Reset EQ Setting**" button to use the default value, or click "**Delete EQ Setting**" button to remove a preset EQ setting.

There are also other pre-set equalizer models for you to choose by clicking "**Others**" under the **Equalizer** part.

A-5

Equalizer Selection
Equalizer frees users from default settings; users may create their owned preferred settings by utilizing this tool.

10 bands of equalizer, ranging from 100Hz to 16KHz.
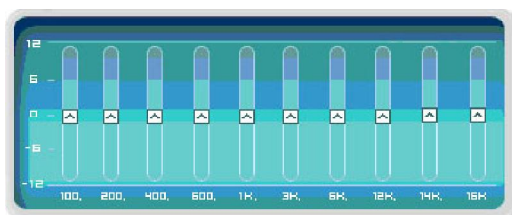
Save
The settings are saved permanently for future use

Reset
10 bands of equalizer would go back to the default setting

Enable / Disable
To disable, you can temporarily stop the sound effect without losing the settings

Load
Whenever you would like to use preload settings, simply click this, the whole list will be shown for your selection.

Delete
To delete the pre-saved settings which are created from previous steps.

Frequently Used Equalizer Setting

Realtek recognizes the needs that you might have. By leveraging our long experience at audio field, Realtek HD Audio Sound Manager provides you certain optimized equalizer settings that are frequently used for your quick enjoyment.

[How to Use It]

Other than the buttons "Pop" "Live" "Club" & "Rock" shown on the page, to pull down the arrow in "Others", you will find more optimized settings available to you.

Karaoke Mode

Karaoke mode brings Karaoke fun back home. Simply using the music you usually play, Karaoke mode can help you eliminate the vocal of the song or adjust the key to accommodate your range.

1. Vocal Cancellation: Single click on "Voice Cancellation", the vocal of the song would be eliminated, while the background music is still in place, and you can be that singer!

2. Key Adjustment: Using "Up / Down Arrow" to find a key which better fits your vocal range.

Remove the human voice

Raise the key

Lower the key
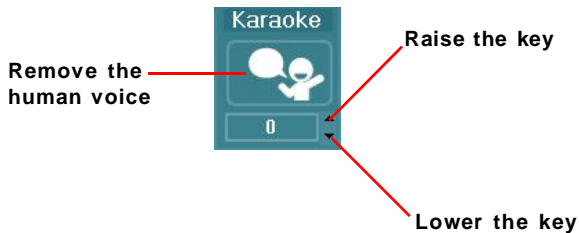
Mixer

In the **Mixer** part, you may adjust the volumes of the rear and front panels individually.

1. Adjust Volume

You can adjust the volume of the speakers that you pluged in front or rear panel by select the **Realtek HD Audio rear output** or **Realtek HD Audio front output** items.

Important

*Before set up, please make sure the playback devices are well plugged in the jacks on the rear or front panel. The **Realtek HD Audio front output** item will appear after you pluging the speakers into the jacks on the front panel.*

2. Multi-Stream Function

ALC883 supports an outstanding feature called Multi-Stream, which means you may play different audio sources simultaneously and let them output respectively from the indicated real panel or front panel. This feature is very helpful when 2 people are using the same computer together for different purposes.

Click the button and the Mixer **ToolBox** menu will appear. Then check the **Enable playback multi-streaming** and click **OK** to save the setup.

Important

*If you use **AC97 front panel**, the device have to be plugged into the jacks on the panel before enable the multi-stream function.*
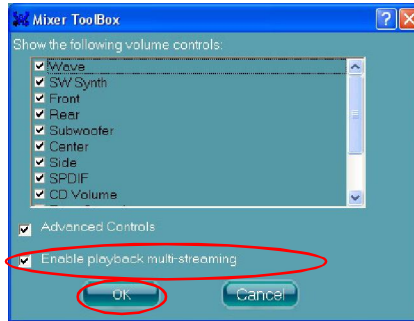
When you are playing the first audio source (for example: use Windows Media Player to play DVD/VCD), the output will be played from the rear panel, which is the default setting.

Then you **must** to select the **Realtek HD Audio front output** from the scroll list **first**, and use a different program to play the second audio source (for example: use Winamp to play MP3 files). You will find that the second audio source (MP3 music) will come out from the Line-Out audio jack of Front Panel.

A-9

3. Playback control

Playback device
This function is to let you freely decide which ports to output the sound. And this is essential when multi-streaming playback enabled.
- Realtek HD Audio Output
- Realtek HD Audio 2nd Output

Mute
You may choose to mute single or multiple volume controls or to completely mute sound output.

Tool
- *Show the following volume controls*
This is to let you freely decide which volume control items to be displayed.
- Advanced controls
- Enable playback multi-streaming
With this function, you will be able to have an audio chat with your friends via headphone (stream 1 from front panel) while still have music (stream 2 from back panel) in play. At any given period, you can have maximum 2 streams operating simultaneously.
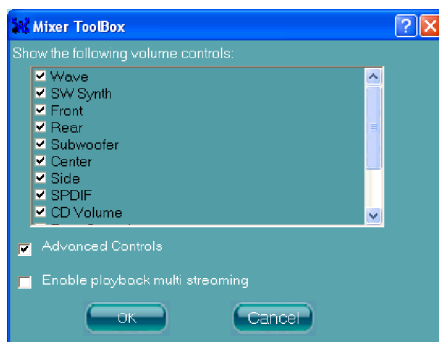
4. Recording control

Tool   Mute

Recording device
-Back Line in/Mic, Front Lin in
-Realtek HD Audio Input
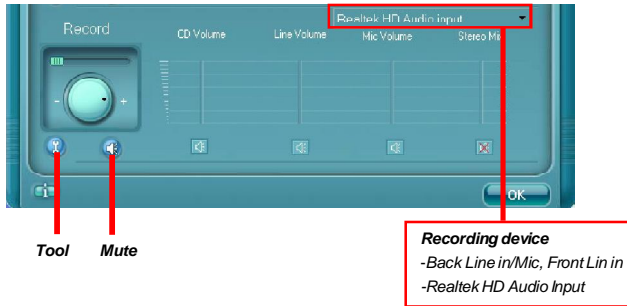
Mute
You may choose to mute single or multiple volume controls or to completely mute sound input.
Tool
- Show the following volume controls
This is to let you freely decide which volume control items to be displayed.
- Enable recording multi-streaming
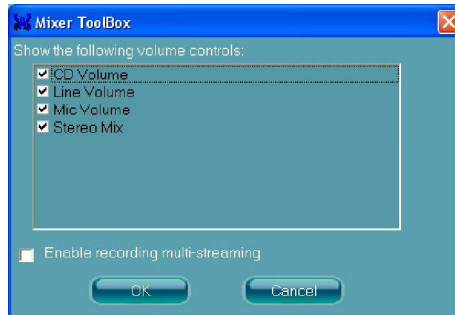
Important

ALC883 allows you to record the CD, Line, Mic and Stereo Mix channels simultaneously, frees you from mixing efforts. At any given period, you may choose 1 of the following 4 channels to record.

Audio I/O

In this tab, you can easily configure your multi-channel audio function and speakers. You can choose a desired multi-channel operation here.

      a. **Headphone** for the common headphone

      b. **2CH Speaker** for Stereo-Speaker Output

      c. **4CH Speaker** for 4-Speaker Output

      d. **6CH Speaker** for 5.1-Speaker Output

      e. **8CH Speaker** for 7.1-Speaker Output

Speaker Configuration:

1. Plug the speakers in the corresponding jack.

2. Dialogue "connected device" will pop up for your selection. Please select the device you have plugged in.

   - If the device is being plugged into the correct jack, you will be able to find the icon beside the jack changed to the one that is same as your device.

   - If not correct, Realtek HD Audio Manager will guide you to plug the device into the correct jack.

Connector Settings

Click to access connector settings.

Disable front panel jack detection (option)
Find no function on front panel jacks? Please check if front jacks on your system are so-called AC'97 jacks. If so, please check this item to disable front panel jack detection.

Mute rear panel output when front headphone plugged in.

Enable auto popup dialogue, when device has been plugged in
Once this item checked, the dialog "Connected device" would not automatically pop up when device plugged in.

A-13

Test Speakers

You can select the speaker by clicking it to test its functionality. The one you select will light up and make testing sound. If any speaker fails to make sound, then check whether the cable is inserted firmly to the connector or replace the bad speakers with good ones. Or you may click the **auto test** ▶ button to test the sounds of each speaker automatically.
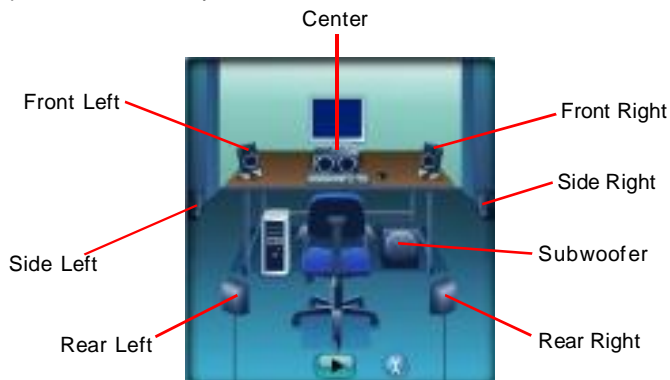
Microphone

In this tab you may set the function of the microphone. Select the **Noise Suppression** to remove the possible noise during recording, or select **Acoustic Echo Cancelltion** to cancel the acoustic echo druing recording.

Acoustic Echo Cancelltion prevents playback sound from being recorded by microphone together with your sound. For example, you might have chance to use VOIP function through Internet with your friends. The voice of your friend will come out from speakers (playback). However, the voice of your friend might also be recorded into your microphone then go back to your friend through Internet. In that case, your friend will hear his/her own voice again. With AEC(Acoustic Echo Cancellation) enabled at your side, your friend can enjoy the benefit with less echo.
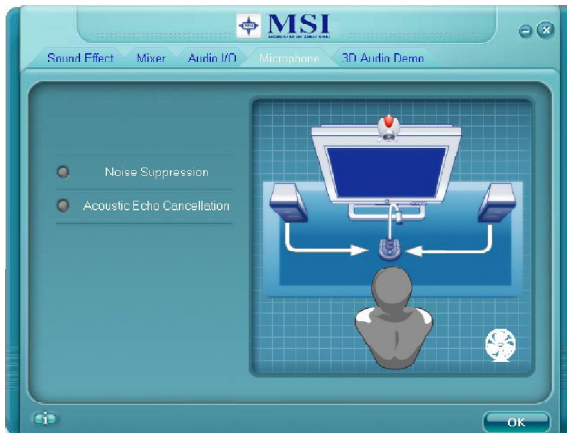
3D Audio Demo

In this tab you may adjust your 3D positional audio before playing 3D audio applications like gaming. You may also select different environment to choose the most suitable environment you like.

Information

In this tab it provides some information about this HD Audio Configuration utility, including Audio Driver Version, DirectX Version, Audio Controller & Audio Codec. You may also select the language of this utility by choosing from the **Language** list.

Also there is a selection **Show icon in system tray**. Switch it on and an icon will show in the system tray. Right-click on the icon and the **Audio Accessories** dialogue box will appear which provides several multimedia features for you to take advantage of.

Hardware Setup

Connecting the Speakers

When you have set the Multi-Channel Audio Function mode properly in the software utility, connect your speakers to the correct phone jacks in accordance with the setting in software utility.

n 2-Channel Mode for Stereo-Speaker Output

Refer to the following diagram and caption for the function of each phone jack on the back panel when 2-Channel Mode is selected.
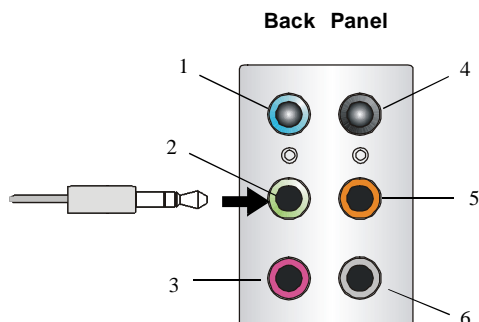
Back Panel

1 Line In
2 Line Out *(Front channels)*
3 MIC
4 Line Out *(Rear surround channels, but no functioning in this mode)*
5 Line Out *(Center and Subwoofer channel, but no functioning in this mode)*
6 Line Out *(Side surround channels, but no functioning in this mode)*

n 4-Channel Mode for 4-Speaker Output
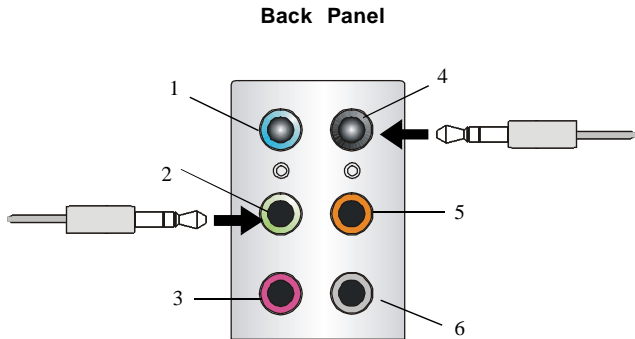
Back Panel

Description:
Connect two speakers to back
panel's front-channel Line Out
connector and two speakers to
the real-channel Line Out
connector.

4-Channel Analog Audio Output

1 Line In
2 Line Out *(Front channels)*
3 MIC
4 Line Out *(Rear surround channels)*
5 Line Out *(Center and Subwoofer channel, but no functioning in this mode)*
6 Line Out *(Side surround channels, but no functioning in this mode)*

n **6-Channel Mode for 6-Speaker Output**
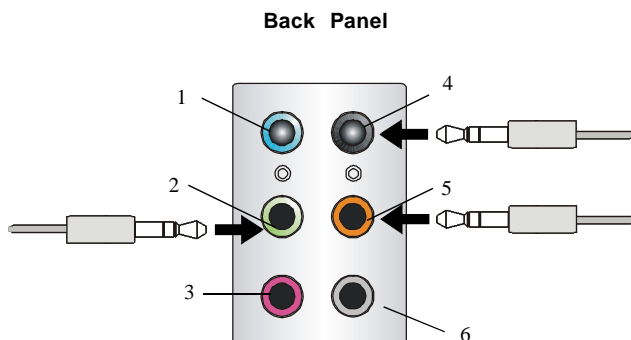
Back Panel

Description:
Connect two speakers to back panel's Line Out connector, two speakers to the rear-channel Line out connector and two speakers to the center/subwoofer-channel Line Out connector.

6-Channel Analog Audio Output

1 Line In
2 Line Out *(Front channels)*
3 MIC
4 Line Out *(Rear surround channels)*
5 Line Out *(Center and Subwoofer channel)*
6 Line Out *(Side surround channels, but no functioning in this mode)*

n 8-Channel Mode for 8-Speaker Output
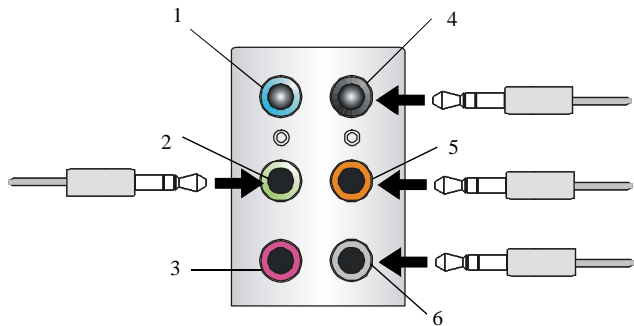
Description:
Connect two speakers to back panel's Line Out connector, two speakers to the rear-channel Line out connector, two speakers to the center/subwoofer-channel Line Out connector and two speakers to the side-channel Line Out connector.

8-Channel Analog Audio Output

1. Side Surround Out *(Side channels)*
2. Line Out *(Front channels)*
3. MIC
4. Line Out *(Rear surround channels)*
5. Line Out *(Center and Subwoofer channel)*
6. Line Out *(Side channels)*

Appendix B
nVidia RAID

NVIDIA brings Redundant Array of Independent Disks (RAID) technology—which is used by the world's leading businesses—to the common PC desktop. This technology uses multiple drives to either increase total disk space or to offer data protection. For all levels, RAID techniques optimize storage solutions by using multiple disks grouped together and treating them as a single storage resource.

MSI
MICRO-STAR INTERNATIONAL

Introduct ion

System Requirement

Operating System Support
NVRAID supports the following operating systems:
    Windows XP

RAID Arrays
NVRAID supports the following types of RAID arrays described in this section:
RAID 0: RAID 0 defines a disk striping scheme that improves the disk read and write times for many applications.
RAID 1: RAID 1 defines techniques for mirroring data.
RAID 0+1: RAID 0+1 combines the techniques used in RAID 0 and RAID 1 arrays.
Spanning (JBOD): JBOD provides a method for combining drives of different sizes into one large disk

Summary of RAID Configurations

Array	Uses	Advantages	Drawbacks	# Hard Disks	Fault Tolerance
RAID 0	Non-critical data requiring high performance.	High data throughput.	No fault tolerance.	multiple	None
RAID 1	Small databases or any other small capacity environment requiring fault tolerance.	100% data redundancy.	Requires 2 drives for the storage space of 1 drive.	2	Yes
RAID 0+1	Critical data requiring high performance.	Optimized for both 100% data redundancy and performance. Allows spare disks.	Requires 2 drives for the storage space of 1 drive—the same as RAID level 1.	4+	Yes
JBOD	Combining odd size drives into one big drive	Combines and uses the capacity of odd size drives.	Decreases performance because of the difficulty in using drives concurrently or to optimize drives for different uses.	Multiple	No

RAID Configuration

Basic Configuration Instructions
The following are the basic steps for configuring NVRAID:

Non-Bootable RAID Array
1. Choose the hard disks that are to be RAID enabled in the system BIOS. (To enable the *SATA 0/ 1 Primary/ Secondary Channel* in **nVidia RAID Setup** of **Integrated Peripherals** in BIOS.)
2. Specify the RAID level, either Mirroring (RAID 1), Striping (RAID 0), Striping and Mirroring (RAID 0+1) or JBOD and create the desired RAID array.
3. Enter the Windows OS, run the Windows nForce Setup application and install the RAID software. (Check p.C-9 for details.)
4. Initialize the NVRAID Array Disks.

Bootable RAID Array
1. Choose the hard disks that are to be RAID enabled in the system BIOS. (To enable the *SATA 0/ 1 Primary/ Secondary Channel* in **nVidia RAID Setup** of **Integrated Peripherals** in BIOS.)
2. Specify the RAID level, either Mirroring (RAID 1), Striping (RAID 0), Striping and Mirroring (RAID 0+1) or JBOD and create the desired RAID array.
3. Boot from the Windows CD, use the floppy disk that has the RAID driver to copy and install the nForce RAID software. (Check p.C-7 for details.)
4. Initialize the NVRAID Array Disks.

Setting Up the NVRAID BIOS
Be sure to enable the *SATA 0/ 1 Primary/ Secondary Channel* in **nVidia RAID Setup** of **Integrated Peripherals** in BIOS before configuring the NVRAID BIOS. After that press F10 to save the configuration and exit. The PC will reboot right away. Then enter the RAID BIOS Setup by pressing **F10** when prompted, and follow the procedures described below to set up the NVRAID BIOS.
NVRAID BIOS setup lets you choose the RAID array type and which hard drives you want to make part of the array.

Entering the RAID BIOS Setup
1. After rebooting your PC, wait until you see the RAID software prompting you to press **F10**. The RAID prompt appears as part of the system POST and boot process prior to loading the OS.
2. Press **F10**, and the NVIDIA RAID Utility --- **Define a New Array** window will appear.
   The default **RAID Mode** is set to *Mirroring* and **Striping Block** is set to *Optimal*.
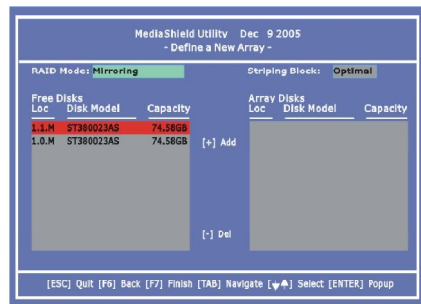
Understanding the "Define a New Array" Window
Use the Define a New Array window to
• Select the RAID Mode
• Set up the Striping Block
• Specify which disks to use for the RAID Array
Depending on the platform used, the system can have one or more channels. In a typical system there is usually one controller and multiple channels, and each channel has a slave and a master.
The channel/controller/master/slave status of each hard disk is given in the Loc (location) columns of the Free Disks and Array Disks lists.

```
1.0.M
 ▲ ▲ ▲
 │ │ └──── M: Master
 │ │
 │ └────── Channel
 │
 └──────── Controller
```
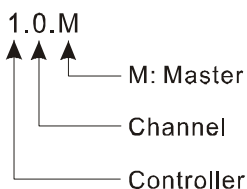
In the example above, 1.0.M means the hard drive is attached to Channel 2, Controller 0, and the drive is set to Master. The following is a list of all possible combinations:

Serial ATA

1.0.M	Controller 1, Channel 0, Master (SATA1)
1.1.M	Controller 1, Channel 1, Master (SATA2)
2.0.M	Controller 2, Channel 0, Master (SATA3)
2.1.M	Controller 2, Channel 1, Master (SATA4)

Important

There is no such thing as Slave drive in Serial ATA. All drives are considered to be Master since there is a one to one connection between the drive and the controller.

Using the Define a New Array Window
If necessary, press the tab key to move from field to field until the appropriate field is highlighted.

• Selecting the RAID Mode
By default, this is set to [Mirroring]. To change to a different RAID mode, press the down arrow key until the mode that you want appears in the RAID Mode box—either [Mirroring], [Striping], [Spanning], or [Stripe Mirroring].

• Selecting the Striping Block Size
Striping Block size is given in kilobytes, and affects how data is arranged on the disk. It is recommended to leave this value at the default [Optimal], which is 32KB, but the values can be between [4 KB] and [128 KB].

• Assigning the Disks
The disks that you enabled from the RAID Config BIOS setup page appear in the **Free Disks** block. These are the drives that are available for use as RAID array disks.
To designate a free disk to be used as a RAID array disk,
1. Tab to the **Free Disks** section. The first disk in the list is selected.
2. Move it from the Free Disks block to the Array Disks block by pressing the right arrow key (-->). The first disk in the list is moved, and the next disk in the list is selected and ready to be moved.
3. Continue pressing the right-arrow key (<--) until all the disks that you want to use as RAID array disks appear in the **Array Disks** block.
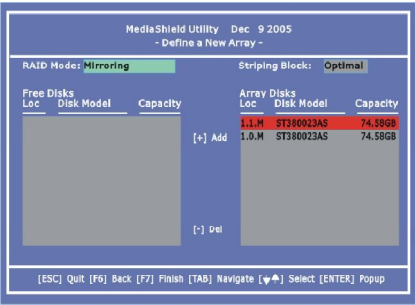
It shows that two disks have been assigned as RAID1 array disks in the figure above.

Completing the RAID BIOS Setup

1. After assigning your RAID array disks, press **F7.** The Clear disk data prompt appears.
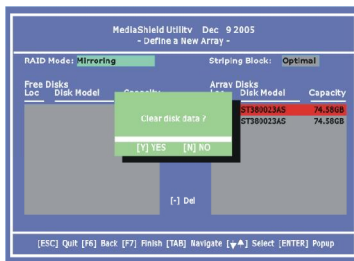
2. Press **Y** if you want to wipe out all the data from the RAID array, otherwise press **N**. You must choose **Yes** if the drives were previously used as RAID drives.
The **Array List** window appears, where you can review the RAID arrays that you have set up.
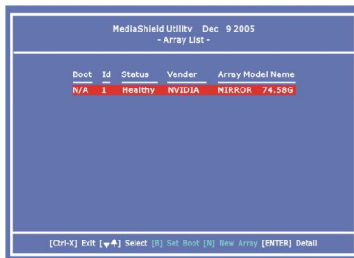
3. Use the arrow keys to select the array that you want to set up, then press **Enter.** The **Array Detail** window appears.
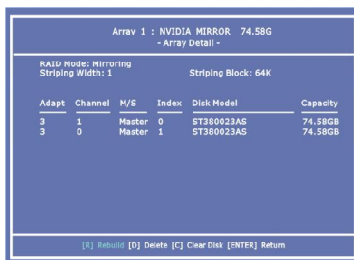
4. If you want to mark this disk as empty and wipe out all its contents then press **C**.
5. At the prompt, press **Y** to wipe out all the data, otherwise press **N**.
6. Press **Enter** again to go back to the previous window and then press **Ctrl+X** to exit the RAID setup. Now that the RAID setup has been configured from the RAID BIOS, the next step is to configure and load NVRAID drivers under Windows, as explained in "Installing the NVIDIA RAID Software Under Windows" on C-9.

Installing the RAID Driver (for bootable RAID Array)

1. After you complete the RAID BIOS setup, boot from the Windows CD, and the Windows Setup program starts.
2. Press **F6** and wait for the Windows Setup screen to appear.
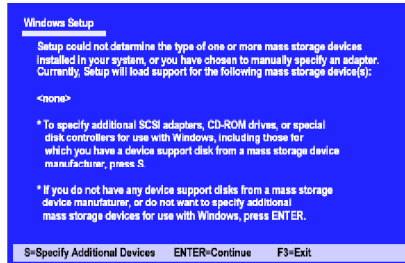
3. Specify the NVIDIA drivers:
   (1) Insert the floppy that has the RAID driver, press S, then press Enter. The Windows Setup screen appears as below:
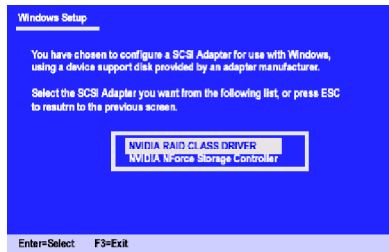
> **Important**
>
> *Please follow the instruction below to make an nVIDIA Serial ATA RAID driver for yourself.*
>   1. *Insert the MSI CD into the CD-ROM drive.*
>   2. *Click the "Browse CD" on the Setup screen.*
>   3. *Copy all the contents in the* **:\\nVidia \System \MCP55 \IDE \Win XP\sataraid** *to a formatted floppy disk.*
>   4. *The driver disk for nVIDIA RAID controller is done.*

   (2) Select "NVIDIA RAID CLASS DRIVER" and then press **Enter**.
   (3) Press **S** again at the Specify Devices screen, then press **Enter.**
   (4) Select "NVIDIA NForce Storage Controller" and then press **Enter.** The following Windows Setup screen appears listing both drivers:

```
Windows Setup

  Setup will load support for the following mss storage device:

    NVIDIA RAID CLASS DRIVER
    NVIDIA NForce Storage Controller

  * 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 manufaturer, or do not want to specify additional
    mass storage devices for use with Windows, press ENTER.

S=Specify Additional Devices    ENTER=Continue       F3=Exit
```

4. Press **Enter** to continue with Windows XP Installation. Be sure to leave the floppy disk inserted in the floppy drive until the blue screen portion of Windows XP installation is completed, then take out the floppy.

5. Follow the instructions on how to install Windows XP. After Windows XP is completely installed, it is recommended that you install the the RAID management tool.

Important

Each time you add a new hard drive to a RAID array, the RAID driver will have to be installed under Windows once for that hard drive. After that, the driver will not have to be installed.

NVIDIA IDE Drive/ RAID Utility Installation

Installing the NVIDIA RAID Software Under Windows

(for Non-bootable RAID Array)

The existing Windows IDE Parallel ATA driver (as well as the Serial ATA driver if SATA is enabled) must be upgraded to use the NVIDIA IDE Parallel ATA driver (as well as the NV Serial ATA driver if SATA is enabled).

This section describes how to run the setup application and install the RAID software which will upgrade the Windows IDE driver and install the RAID software.

1. Start the NVIDIA nForce Drivers installation program to open the NVIDIA Windows nForce Drivers page.
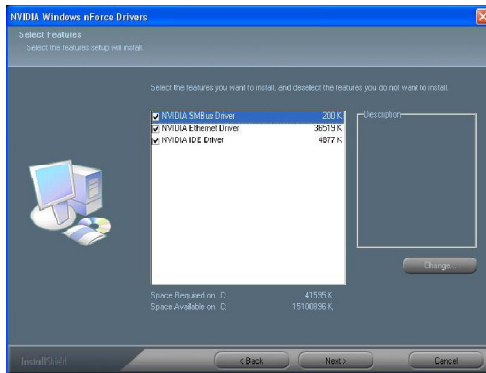
2. Select the modules that you want to install. Make sure that the "NVIDIA IDE Driver" is selected.

Important

You must install the NVIDIA IDE driver in order to enable NVIDIA RAID. If you do not install the NVIDIA IDE driver, NVIDIA RAID will not be enabled.

3. Click **Next** and then follow the instructions.
4. After the installation is completed, be sure to reboot the PC.
5. After the reboot, initialize the newly created array.

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Initializing and Using the Disk Array

The RAID array is now ready to be initialized under Windows.

1. Launch Computer Management by clicking "Start" --> "Settings" --> "Control Panel" then open the "Administrative Tools" folder and double click on "Computer Management".

2. Click "Disk Management" (under the "Storage" section). The Initialize and Convert Disk Wizards appears.

3. Click **Next**. The Select Disks to Initialize window appears. The disks listed depend on how many arrays you have configured.
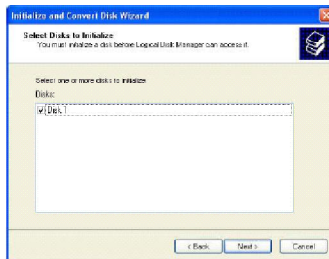
4. Click **Next**. The Select Disks to Convert window appears.

5. Check the disk in the list if you want to make the array a dynamic disk, then click **Next**. The Completing the Initialize and Convert Disk Wizard window appears.
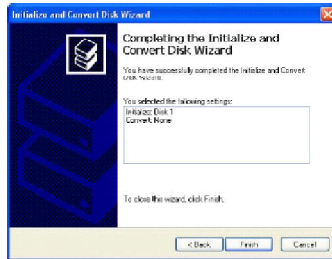
6. Click **Finish**. The "Computer Management" window appears.
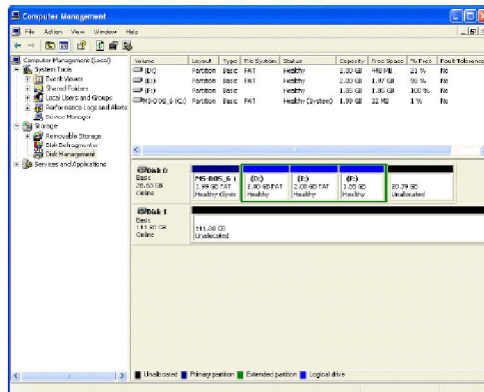
The actual disks listed will depend on your system, and the unallocated partition is the total combined storage of two hard disks. You must format the unallocated disk space in order to use it.

7. Format the unallocated disk space. Right click "Unallocated space", select "New Partition…" and follow the wizard. After the drive has been formatted, it is ready for use.

NVRAID Management Utility

There is an application called NVRAIDMAN which helps you perform the following tasks of nVDIA RAID.

- **Viewing RAID Array Configurations**
  View an array configuration (mirrored, striped, mirror-striped, JBOD, or any supported combination)
- **Setting Up a Spare RAID Disk**
  - View free and/or dedicated free disks
  - Designate a free disk to a particular array
- **Creating RAID Arrays**
- **Deleting a RAID Array**
- **Morphing From One RAID Array to Another**
- **Hot Plug Array**
- **Initializing a RAID Array**
  - Erase the data on the array by writing all zeros to the sectors of each hard disk.
- **Rebuilding a RAID Mirrored Array**
  - Rebuild a broken mirrored array
  - Watch the progress of rebuilding an array
  - Only applies to RAID 1 and RAID 0+1 arrays
- **Synchronizing a RAID Array**
  - Rebuild the redundancy in RAID 1 or RAID 0+1 arrays (copy the data to the redundant disk—the same operation as rebuilding)

Viewing RAID Array Configurations

To view your RAID configuration from Windows, launch the NVRAID Management utility by double-clicking NvRaidMan.exe (the default location of NvRaidMan.exe is in \\nVidia\System\MCP55\IDE\Win2k\raidtool\ of the setup CD accompanied with your mainboard).

The RAID configuration information appears in the right-side pane, as shown below.
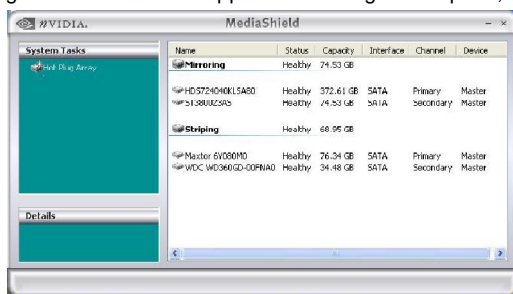
Important

The information in the figures in this part may very from what it is shown in your system.

Setting Up a Spare RAID Disk

You can designate a hard drive to be used as a spare drive for a RAID 1 or RAID 0+1 array. The spare drive can take over for a failed disk. NVRAID supports two types of spare drives:

• Free Disk

A free disk is a disk that is not part of any RAID array, but can be used by any available RAID 1 or RAID 0+1 array that requires a particular disk when one of its disks crashes or becomes unusable. The process is automatic and doesn't require any user interaction.

For example, if you have a system with four hard disks where one disk is used to boot the OS, two hard drives are set up in a mirrored array, and a fourth hard disk is set up as a free disk, then if one of the mirrored array drives fails, the free disk will be automatically assigned to the mirrored array to be used instead of the failed disk.

• Dedicated Disk

A dedicated free disk is a disk that is assigned to a RAID 1 or RAID 0+1 array and that disk is used by that array only when needed, for example during a system crash where a RAID mirrored drive is broken. The dedicated disk can be used only by the array that it is assigned to and not by any other array, unlike a free disk which can be used by any available RAID 1 or RAID 0+1 array.

Note: You must have at least two RAID arrays to use this feature.

Assigning a Free Disk

To mark a disk as free, or not a part of any array,

1. Enter the system BIOS setup and make sure that the drive that you want to mark as free is RAID enabled.
2. Enter the RAID BIOS and make sure that the drive is not part of any array (if one exists).
3. Boot into Windows and run the NVRAIDMAN program. The drive appears under the Free Disk section. The figure below shows an example of the NVRAIDMAN display if you have a mirror array and one free disk.
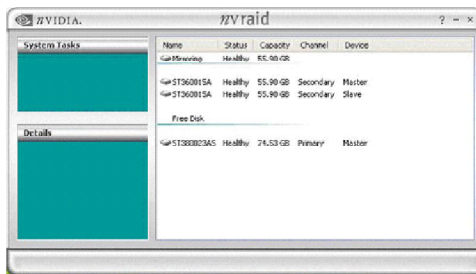
Assigning a Dedicated Disk
To mark a disk as dedicated, or reserve it for use by a specific array,

Step 1: Mark the Disk as a Free Disk
1. Enter the system BIOS setup and make sure that the drive that you want to mark as free is RAID enabled.
2. Boot into Windows and run the NVRAIDMAN program.
If the disk is not part of any RAID array, then it will appear under the Free Disk section of the RAID GUI.

Step 2: Dedicate the Free Disk to an Array
While running NVRAIDMAN, dedicate the free disk to an array by doing the following:

1. Right click one of the two Mirrored arrays as shown below.
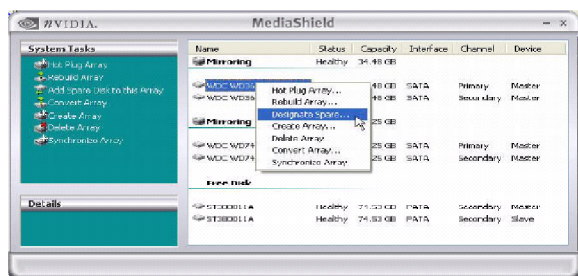
2. Select **Designate Spare** from the menu to launch the Spare Disk Allocation Wizard.

3. Click **Next**.
The RAID Array Selection page appears.
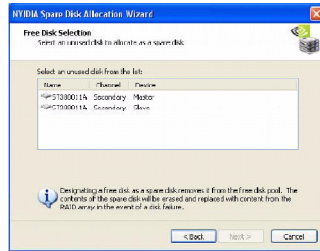
4. From the Free Disk Selection page, select one of the two free disks available. This would be the disk that will be designated to the mirror array.

5. Click **Next**.
The Completing the NVIDIA Spare Disk Allocation page appears.
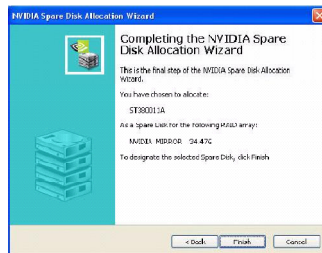
6. Click **Finish**.
As shown in figure below, the ST380011A drive is now a dedicated free disk in the mirrored array. If a system crash occurs that causes any of the two WD360GD drives to fail, the ST380011A hard drive will take over and be used in the newly formed mirrored array.
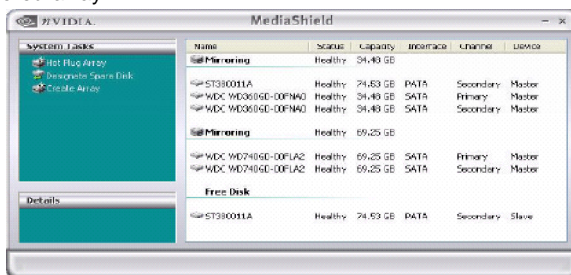
Removing a Dedicated Disk
Once a dedicated disk has been assigned to a particular array, it can be removed at any time. To remove the disk, right click on the dedicated disk and select "Remove Disk..." to remove it. In the previous example, simply right click on the ST380011A drive and select "Remove Disk...". as shown in the screen shot below:
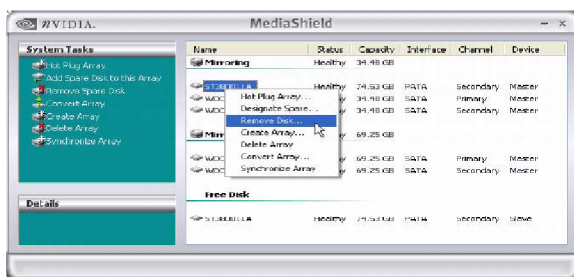
Morphing From One RAID Array to Another

In a traditional RAID environment, when a user wants to change the current state of a disk or a current array to a new RAID configuration, the process of reconfiguring the new array involves multiple steps. The user must back up the data, delete the array, re-boot the PC, and then reconfigure the new array.

NVIDIA RAID allows the end user to change the current state of the disk or array to another with a one-step process called .Morphing.. This section describes the NVIDIA Morphing process and explains how to use Morphing to convert from one RAID array type to another.

General Morphing Principles

NVIDIA RAID includes extensive support for morphing, a process of converting from one RAID mode to another RAID mode.

General Requirements and Limitations

• The new array capacity must be equal to or greater than the previous array.
For example, it is possible to morph from a RAID 1 array to a RAID 0 array as long as the RAID 0 array is the same size as (or larger than) the RAID 1 array.
• You can't morph
- To or from a JBOD (Spanning) array
- From RAID 1 to RAID 1
- From RAID 0+1 to RAID 1

Specific Morphing Requirements

The following table lists the disk requirements for a new RAID array for various morphing combinations.

From	To	New Array Disk Requirements
RAID 0	RAID 0	$m > n$ Number of disks in the new array must be greater than the original array.
	RAID 1	$m = 2, n = 1$ RAID 1 array must include two disks, converted from a one disk RAID 0 array.
	RAID 0+1	$m >= 2 \times n$ Number of RAID 0+1 disks must be equal to or greater than twice the number of RAID 0 disks.
RAID 1	RAID 0	No additional restrictions.
	RAID 1	** Not a valid combination **
	RAID 0+1	No additional restrictions.
RAID 0+1	RAID 0	$m >= n2$ Number of RAID 0 disks must be equal to or greater than half the number of RAID 0+1 disks.
	RAID 1	** Not a valid combination **
	RAID 0+1	$m >= n+2$; where m must be an even number of disks. The new array must include at least two more disks than the original array, and can include any even number of disks beyond that.
RAID 5	RAID 0	$m >= n - 1$
	RAID 1	** Not a valid combination **
	RAID 0+1	$m >= 2 \times (n - 1)$; where m is an even number of disks.

Hot Plug Array

With respect to RAID, hot plugging is the ability to add a disk to a system safely and without causing problems for the RAID software. For example, when a drive in a mirrored array fails, the user can launch the Hot Plug Array Wizard which instructs the user as to when a drive can be safely added to the system. As soon as the drive is added, the user can then finish running the RAID wizard and the drive becomes usable by the system. Hot Plug Array allows the user to add or remove an entire array without degrading the array in the process.

NVRAIDMAN can be used to hot plug a RAID disk. To hot plug a disk, simply do the following:

1 Launch NVRAIDMAN and click on "Hot Plug Array" and the following screen shot will appear:

2 Click **Nex**t and the following screen shot will appear:
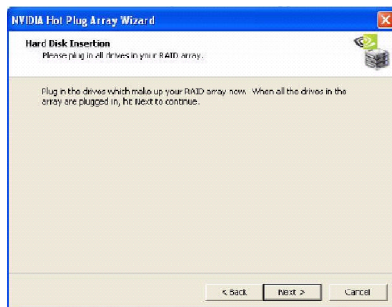
3 Connect the RAID disk that you want to use with any given RAID array.
4 Click **Next** and the following screen shot will appear:

5 Click **Finish**.

Initializing a RAID Array

Initializing a RAID array erases all the data that is stored on that array, and writes all zeros to the disks. Initialization of newly configured RAID arrays is recommended to ensure consistency and reliable performance on any supported fault tolerant array such as RAID 0, and RAID 0+1. Use this feature only if you are absolutely sure that you want to wipe out all the data on *that array*.

Initialization of a fault tolerant array can only be done when the array is being created. To initialize an array, perform the following steps:

Note: In this example, a mirror array is initialized.

1 From the NVRAIDMAN window, right click on any available free disk and select **Create Array** as show in Figure below.

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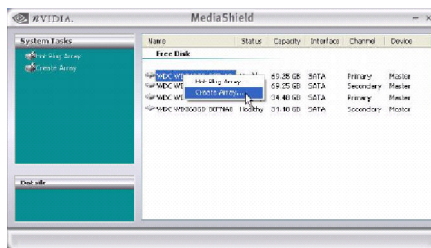
2 The Create Array Wizard opens. Follow the Wizard to create a Mirror array.
3 At the Create Array Wizard Welcome screen, click **Next**.
4 At the RAID Array Selection page, make sure that RAID Mode is set to "**Mirroring**" and Stripe Size is set to its default value of 64K, then click **Next**.
5 At the Free Disk Selection page, select the two drives that you want to Mirror and click **Next**.
6 Click **Next** again and the following screen shot will appear:
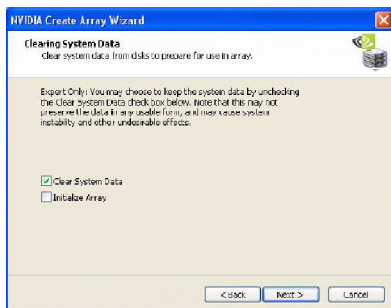
7 Check "Intialize Array" and then click **Next**. The Initialization Warning dialog appears.
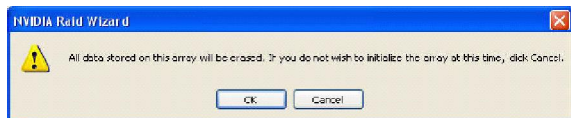
8 Click **OK**. The Clearing System Data screen appears again with the Initialize Array check box checked as shown below.
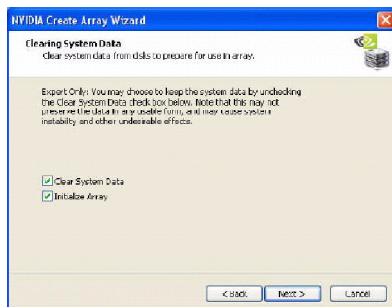
9 Click **Next**, then click **Finish** at the Completing the NVIDIA Create Array Wizard screen. The NVRAIDMAN windows shows the created RAID array as shown below.
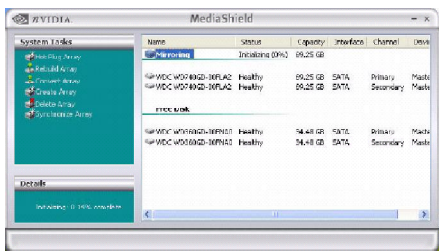
The Initialization Process

As you can see from the screen shot above, the initialization process has started and it will be completed in a short period of time. As soon as the Initialization process starts, a popup window similar to the following will appear:

followed by the following pop-up window:
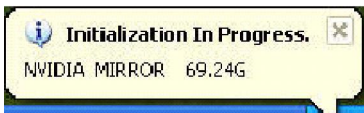
Rebuilding a RAID Array

Rebuilding is the process of restoring data to a hard drive from other drives in the array. This applies only to fault tolerant arrays such as RAID 1 and RAID 0+1. For example, assuming you have a two disk RAID 1 array, and one of the drives fail, then you need the lost data on the newly added drive.

Rebuilding Instructions

After creating a mirrored array, you can rebuild the array using the following steps:
1. Go to Windows and run the NVIDIA RAID Management utility.
The picture below shows an example of a system with one mirrored array and two free disks.
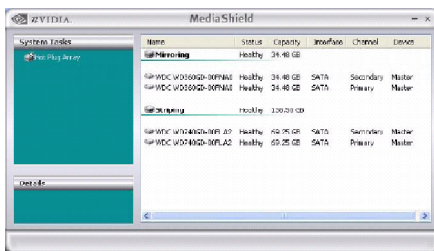
2. Right-click on Mirroring. The popup menu appears.
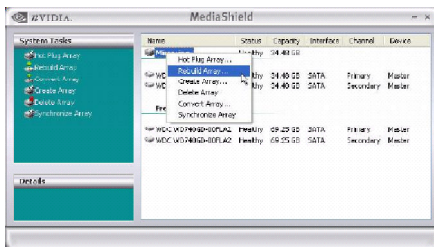
3. From the popup menu, click **Rebuild Array**. The NVIDIA Rebuild Array Wizard appears.
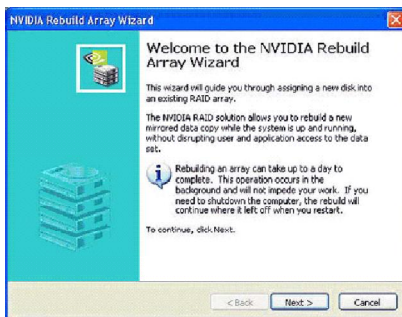
4. Click **Next.** The Disk Selection page appears.
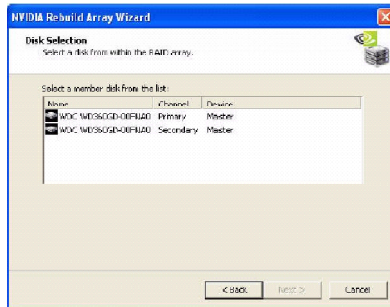
5. Select the drive that you want to rebuild by clicking it from the list, then click **Next**. The Completing the NVIDIA Rebuild Array page appears.
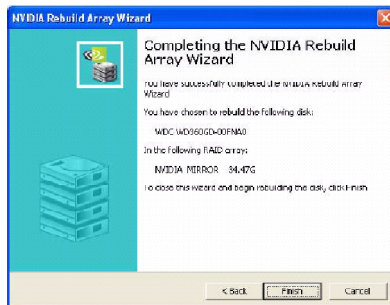
6. Click **Finish**. The array rebuilding starts after a few seconds, and a small pop-up message appears towards the bottom right corner of the screen as shown in the figure below.

When the rebuilding process is finished you will see the pop up box shown in Figure below.

During the rebuilding process, the NVRAID Management utility screen shows the status under the System Tasks and Details sections.
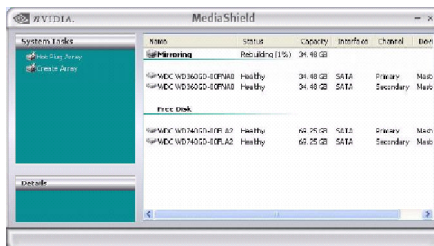
More About Rebuilding Arrays
• *Rebuilding Occurs in the Background*
The rebuilding process is very slow (it can take up to a day) and occurs in the background so as not to affect the performance of the system.
• *Rebuilding Applies Only to RAID 1 or RAID 0+1 Arrays*
Rebuilding an array works only when using RAID 1 or RAID 0+1. Rebuilding does not apply to RAID 0 and JBOD arrays.
• *Rebuilding applies to a degraded fault tolerant array*
You can rebuild a degraded mirrored array using any available Free Disk or Dedicated Disk. For example, Figure below shows a mirrored array using two 34.48 GB drives while having two Free Disks each 55.90 GB large.
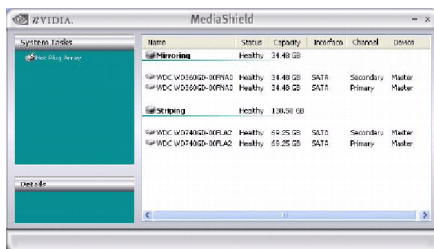
To use one of these available free disks to rebuild your array, follow the same steps as explained in "Rebuilding a RAID Array" on C-22, except when prompted to select a disk, choose one of the two available free disks.

Synchronizing a RAID Array

Synchronizing an array will force a rebuild of redundancy or parity. The operation is applicable to any fault tolerant array such as RAID 1 and RAUD 0+1.

• For RAID1 and RAID 0+1, "sync" results in copying the data to the redundancy disk,

To sync an array, do the following (This example assumes you have already created a fault tolerant array such as RAID 1):
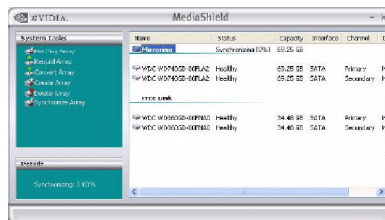
1. Right click on "Mirroring" and select **Synchronize Array** as shown in Figure below.
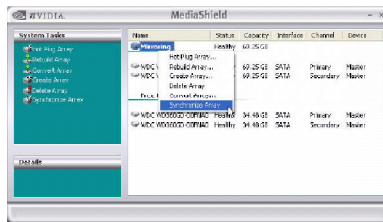
2. The Synchronize Array Wizard Welcome screen appears.

3. Click on **Next** and then click **Finish** at the Wizard Completion screen. The NVRAIDMAN window indicates that the array is synchronizing, as shown in Figure below.

As you can see from the screen shot above, the synchronization process has started and it will be completed in a short period of time.

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Appendix C
nVidia System Driver

MSI provides a setup CD along with your mainboard, which contains the required drivers for your system, and many other useful and powerful utility to bring you the best experience for your office professional working and for your home leisure entertainment.

MSI
MICRO-STAR INTERNATIONAL
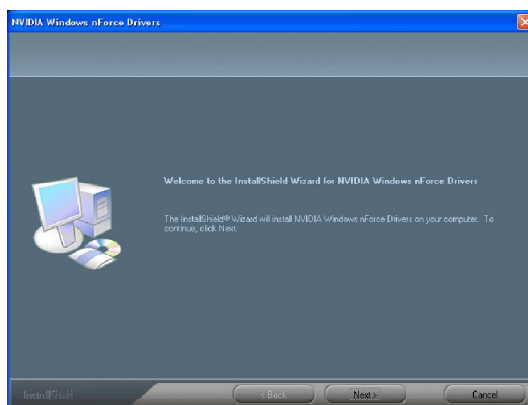
nVidia System Driver Installation

Click on the **Driver** tab and the screen below will display.
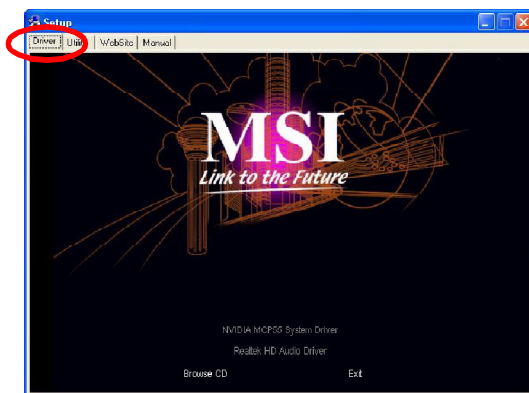
NVIDIA System Driver

This driver is only available for Windows 2000 and Windows XP operating system. Please follow the following step to install the driver correctly.

1. Click on the **NVIDIA MCP55 System Driver** button to install the NVIDIA System Drivers for your Windows OS. Then the welcome dialogue will display. Click **Next** to continue.
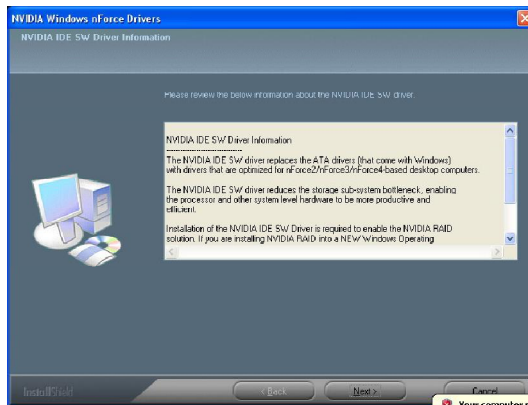
2. Then the following screen displays the available components to install. All the components shown here will be selected to be installed by default. Then click **Next**.
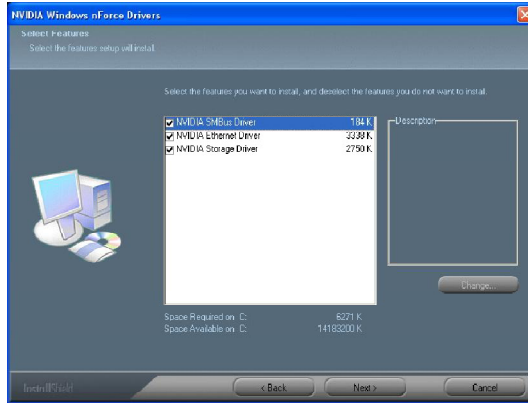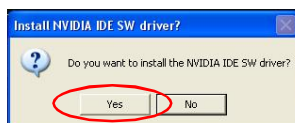

3. The system will start installing the selected driver components automatically.
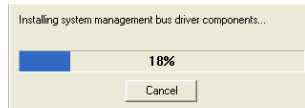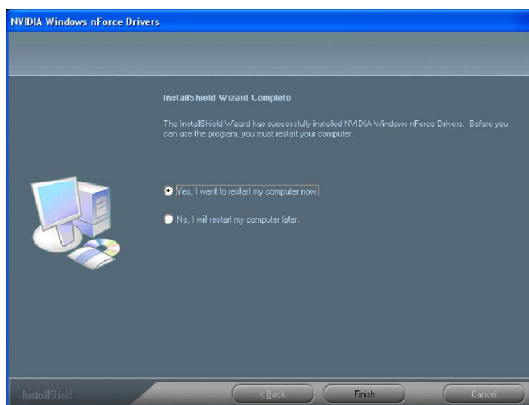

4. Then the following screen displays the information for the NVIDIA IDE SW Driver installation. Click **Next** to continue.

C-3

5. Then the following screen displays the installation of NVIDIA IDE SW Driver. Click **Yes** to continue.
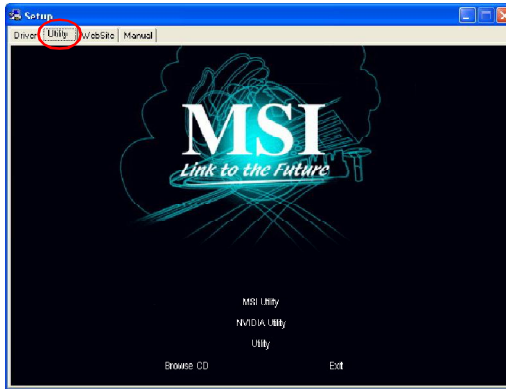

6. The following screen indicates that the installation is complete. Click **Yes** to restart your computer or click **No** to restart it later.
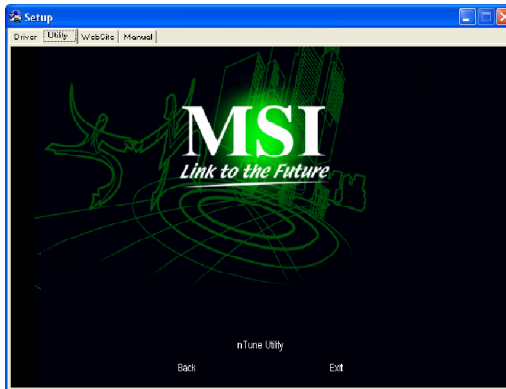
nVidia Utility Installation

1. Click on the **Utility** tab and the screen below will display.

2. Then click on the **NVIDIA Utility** tab and the screen below will display.

3. Click the nTune Utility icon to install it.

NVIDIA nTune Utility - provides a safe and easy way to optimize PC performance.