MSI
MICRO-STAR INTERNATIONAL

K9NGM/ K9NGM2 Series

MS-7252 (V1.X) Mainboard

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Revision History

Revision	Revision History	Date
V1.0	First release	May 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/***

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 60^0C (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

$C\mathcal{E}$ **N1996**

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.

FC **Micro-Star International**
MS-7252

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.

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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.

РУССКИЙ

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.

ESPAÑOL

MSI como empresa comprometida con la protección del medio ambiente, recomienda:

Bajo la directiva 2002/96/EC de la Unión Europea en materia de desechos y/o equipos electrónicos, con fecha de rigor desde el 13 de agosto de 2005, los productos clasificados como "eléctricos y equipos electrónicos" no pueden ser depositados en los contenedores habituales de su municipio, los fabricantes de equipos electrónicos, están obligados a hacerse cargo de dichos productos al termino de su período de vida. MSI estará comprometido con los términos de recogida de sus productos vendidos en la Unión Europea al final de su periodo de vida. Usted debe depositar estos productos en el punto limpio establecido por el ayuntamiento de su localidad o entregar a una empresa autorizada para la recogida de estos residuos.

NEDERLANDS

Om het milieu te beschermen, wil MSI u eraan herinneren dat....

De richtlijn van de Europese Unie (EU) met betrekking tot Vervuiling van Electrische en Electronische producten (2002/96/EC), die op 13 Augustus 2005 in zal gaan kunnen niet meer beschouwd worden als vervuiling.

Fabrikanten van dit soort producten worden verplicht om producten retour te nemen aan het eind van hun levenscyclus. MSI zal overeenkomstig de richtlijn handelen voor de producten die de merknaam MSI dragen en verkocht zijn in de EU. Deze goederen kunnen geretourneerd worden op lokale inzamelingspunten.

SRPSKI

Da bi zaštitili prirodnu sredinu, i kao preduzeće koje vodi računa o okolini i prirodnoj sredini, MSI mora da vas podesti da...

Po Direktivi Evropske unije ("EU") o odbačenoj ekektronskoj i električnoj opremi, Direktiva 2002/96/EC, koja stupa na snagu od 13. Avgusta 2005, proizvodi koji spadaju pod "elektronsku i električnu opremu" ne mogu više biti odbačeni kao običan otpad i proizvođači ove opreme biće prinuđeni da uzmu natrag ove proizvode na kraju njihovog uobičajenog veka trajanja. MSI će poštovati zahtev o preuzimanju ovakvih proizvoda kojima je istekao vek trajanja, koji imaju MSI oznaku i koji su prodati u EU. Ove proizvode možete vratiti na lokalnim mestima za prikupljanje.

POLSKI

Aby chronić nasze środowisko naturalne oraz jako firma dbająca o ekologię, MSI przypomina, że...

Zgodnie z Dyrektywą Unii Europejskiej ("UE") dotyczącą odpadów produktów elektrycznych i elektronicznych (Dyrektywa 2002/96/EC), która wchodzi w życie 13 sierpnia 2005, tzw. "produkty oraz wyposażenie elektryczne i elektronieczne " nie mogą być traktowane jako śmieci komunalne, tak więc producenci tych produktów będą zobowiązani do odbierania ich w momencie gdy produkt jest wycofywany z użycia. MSI wypełni wymagania UE, przyjmując produkty (sprzedawane na terenie Unii Europejskiej) wycofywane z użycia. Produkty MSI będzie można zwracać w wyznaczonych punktach zbiorczych.

TÜRKÇE

Çevreci özelliğiyle bilinen MSI dünyada çevreyi korumak için hatırlatır:

Avrupa Birliği (AB) Kararnamesi Elektrik ve Elektronik Malzeme Atığı, 2002/96/EC Kararnamesi altında 13 Ağustos 2005 tarihinden itibaren geçerli olmak üzere, elektrikli ve elektronik malzemeler diğer atıklar gibi çöpe atılamayacak ve bu elektonik cihazların üreticileri, cihazların kullanım süreleri bittikten sonra ürünleri geri toplamakla yükümlü olacaktır. Avrupa Birliği'ne satılan MSI markalı ürünlerin kullanım süreleri bittiğinde MSI ürünlerin geri alınması isteği ile işbirliği içerisinde olacaktır. Ürünlerinizi yerel toplama noktalarına bırakabilirsiniz.

ČESKY

Záleží nám na ochraně životního prostředí - společnost MSI upozorňuje...

Podle směrnice Evropské unie ("EU") o likvidaci elektrických a elektronických výrobků 2002/96/EC platné od 13. srpna 2005 je zakázáno likvidovat "elektrické a elektronické výrobky" v běžném komunálním odpadu a výrobci elektronických výrobků, na které se tato směrnice vztahuje, budou povinni odebírat takové výrobky zpět po skončení jejich životnosti. Společnost MSI splní požadavky na odebírání výrobků značky MSI, prodávaných v zemích EU, po skončení jejich životnosti. Tyto výrobky můžete odevzdat v místních sběrnách.

MAGYAR

Annak érdekében, hogy környezetünket megvédjük, illetve környezetvédőként fellépve az MSI emlékezteti Önt, hogy ...

Az Európai Unió („EU") 2005. augusztus 13-án hatályba lépő, az elektromos és elektronikus berendezések hulladékairól szóló 2002/96/EK irányelve szerint az elektromos és elektronikus berendezések többé nem kezelhetőek lakossági hulladékként, és az ilyen elektronikus berendezések gyártói kötelessé válnak az ilyen termékek visszavételére azok hasznos élettartama végén. Az MSI betartja a termékvisszavétellel kapcsolatos követelményeket az MSI márkanév alatt az EU-n belül értékesített termékek esetében, azok élettartamának végén. Az ilyen termékeket a legközelebbi gyűjtőhelyre viheti.

ITALIANO

Per proteggere l'ambiente, MSI, da sempre amica della natura, ti ricorda che....

In base alla Direttiva dell'Unione Europea (EU) sullo Smaltimento dei Materiali Elettrici ed Elettronici, Direttiva 2002/96/EC in vigore dal 13 Agosto 2005, prodotti appartenenti alla categoria dei Materiali Elettrici ed Elettronici non possono più essere eliminati come rifiuti municipali: i produttori di detti materiali saranno obbligati a ritirare ogni prodotto alla fine del suo ciclo di vita. MSI si adeguerà a tale Direttiva ritirando tutti i prodotti marchiati MSI che sono stati venduti all'interno dell'Unione Europea alla fine del loro ciclo di vita. È possibile portare i prodotti nel più vicino punto di raccolta.

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Chapter 1
Getting Started

Thank you for choosing the K9NGM/ K9NGM2 Series (MS-7252 v1.X) Micro ATX mainboard. The K9NGM/ K9NGM2 Series mainboards are based on nVidia® C51G/ C51PV & MCP51G/ MCP51 chipsets for optimal system efficiency. Designed to fit the advanced AMD® Athlon 64 FX processor, the K9MGM/ K9NGM2 Series deliver a high performance and professional desktop platform solution.

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Mainboard Specifications

Processor Support

- AMD® Athlon 64 and Athlon FX 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® C51G/ C51PV chipset
- nVIDIA® MCP51G/ MCP51 chipset

Memory Support

- DDRII 400/ 533/ 667/ 800 SDRAM (8GB Max)
- 4 DDRII DIMMs (240pin, non-ECC)
(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 or 10/100 Ethernet LAN by Realtek RTL8201CL

IEEE 1394 (optional)

- Chip integrated by VIA VT6308P
- Transfer rate is up to 400Mbps

Audio

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

IDE

- 2 IDE ports by MCP51G/ MCP51
- Supports Ultra DMA 66/100/133 mode
- Supports PIO, Bus Master operation mode

SATA

- 4 SATA II ports by MCP51
- 2 SATA II ports by MCP51G
- Supports storage and data transfers at up to 300 MB/s

RAID

- SATA1~4 support RAID0/ RAID1/ RAID0+1/ RAID5 or JBOD mode (for K9NGM2 series)
- SATA1~2 support RAID0/ RAID1 or JBOD mode (for K9NGM series)

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 VGA port
- 1 DVI port (only for K9NGM2 series)
- 1 parallel port supporting SPP/EPP/ECP mode
- 1 IEEE 1394 port (optional)
- 4 USB 2.0 Ports
- 1 LAN jack (10/100/1000)
- 3 flexible audio jacks

● **On-Board Pinheaders**

- 2 USB 2.0 pinheaders
- 1 IEEE 1394 pinheader
- 1 TV-out pinheader (only for K9NGM2 series)
- 1 SPDIF-out pinheader/ 1 SPDIF-in pinheader
- 1 COM port pinheader
- 1 Audio-out pinheader

Slots

- 1 PCI Express x 16 slot
- 1 PCI Express x 1 slot
- 2 PCI slots, support 3.3V/ 5V PCI bus Interface

Form Factor

- Micro-ATX (24.4 cm X 24.4 cm)
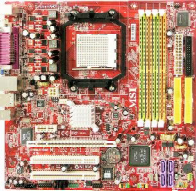
Mounting

- 8 mounting holes
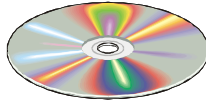
Mainboard Layout
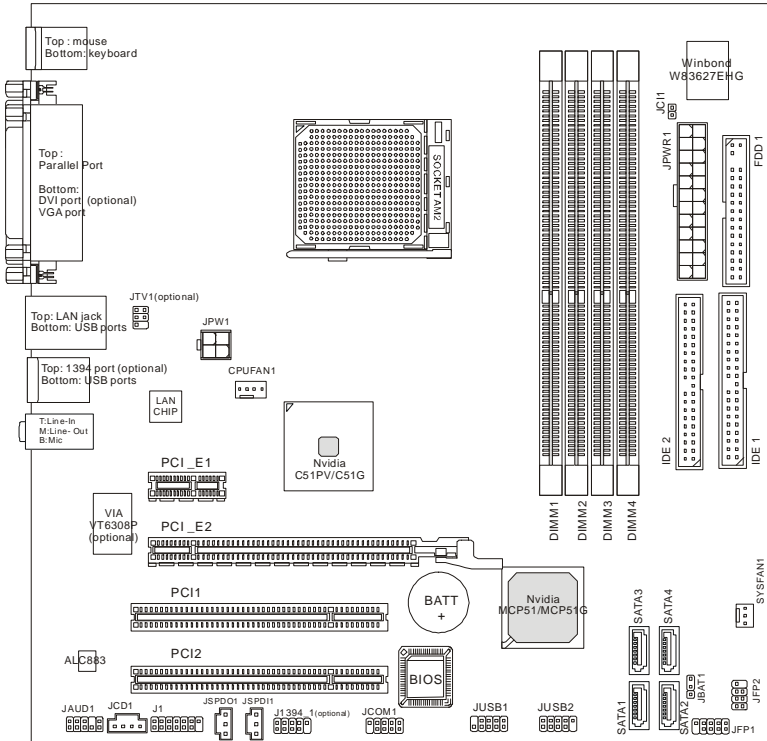
K9NGM2/ K9NGM Series
(MS-7252 v1.X) Micro-ATX Mainboard

Packing Checklist

MSI motherboard

MSI Driver/Utility CD

Standard Cable for
IDE Devices

Power Cable

SATA Cable

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

PC Alert™ 4

The PC Alert™ 4 is a utility you can find in the CD-ROM disk. The utility is just like your PC doctor that can detect the following PC hardware status during real time operation:

      ö monitor CPU & system temperatures
      ö monitor fan speeds
      ö monitor system voltages

If one of the items above is abnormal, the program main screen will be immediately shown on the screen, with the abnormal item highlighted in red. This will continue to be shown until the condition returns to the normal status.

Adjusting Keys
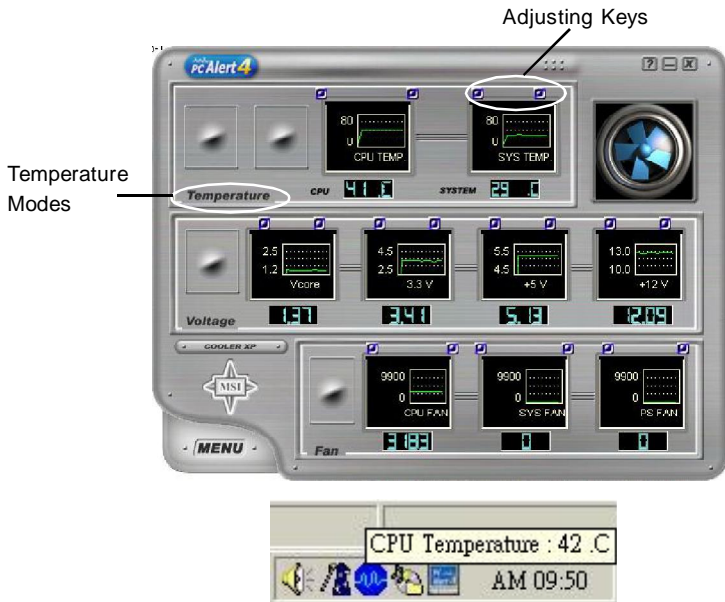
Temperature Modes

Users can use the Adjusting Keys to change the minimum and maximum threshold of each item for the system to send out a warning message. Click *Temperature* to select the temperature modes of either Fahrenheit (°F) or Celsius (°C). The PC Alert™ 4 icon on the Status Area will show the current CPU temperature.

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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Quick Components Guide

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JSPDO1, *p.2-18*

J1, *p.2-18*
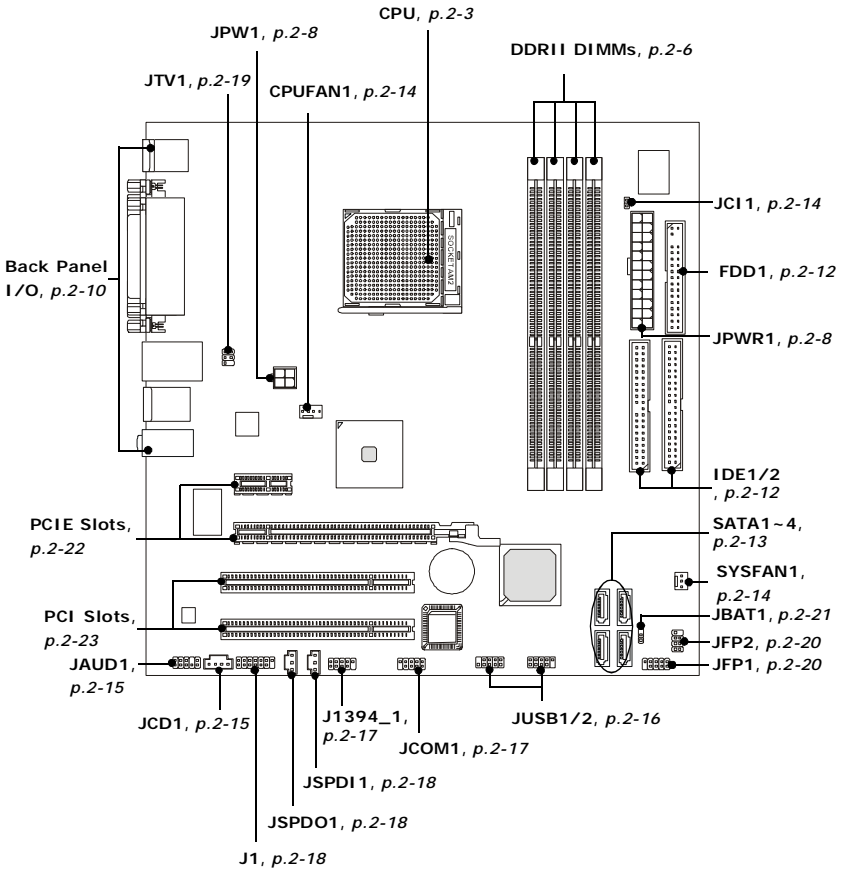
CPU (Central Processing Unit)

The mainboard supports AMD® Athlon64 X2/ Athlon64 & Athlon FX 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
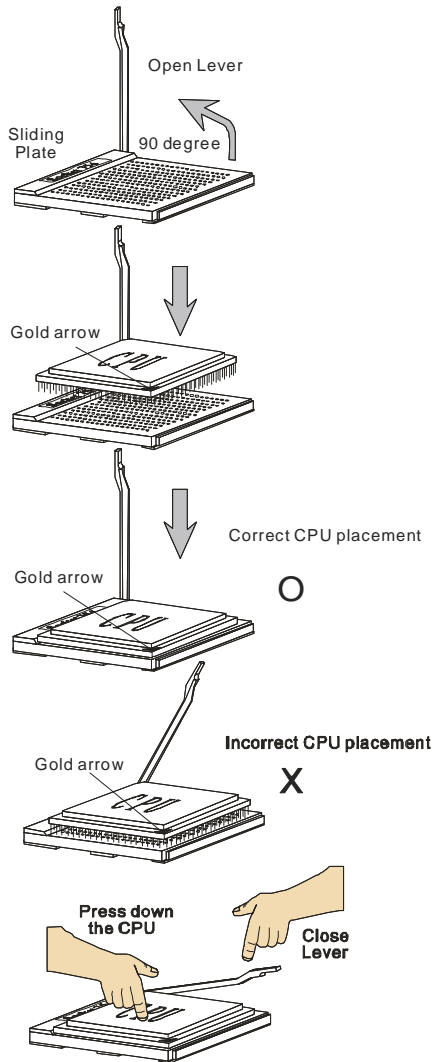
Installing AMD Socket AM2 CPU Cooler Set

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.
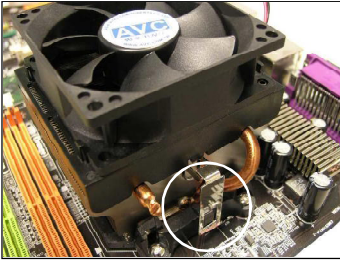
Important

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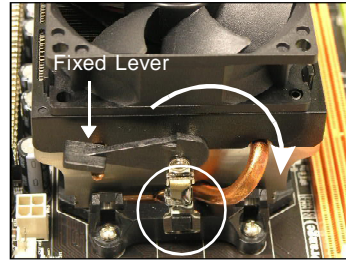
3. Fasten down the lever.
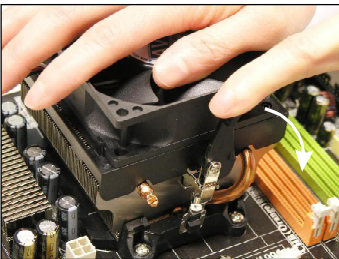
4. Attach the CPU Fan cable to the CPU fan connector on the mainboard.
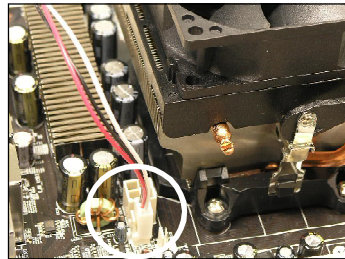
* While disconnecting the Safety Hook from the fixed bolt, it is necessary to keep an eye on your fingers, because once the Safety Hook is disconnected from the fixed bolt, the fixed lever will spring back instantly.

Memory

The mainboard provides four 240-pin non-ECC **DDRII** DIMMs and supports up to 8 GB 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
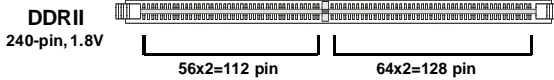
Dual-Channel Memory Population Rules

❶
DIMM1
DIMM2
DIMM3
DIMM4

❷
DIMM1
DIMM2
DIMM3
DIMM4

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

Important

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

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

Volt   **Notch**
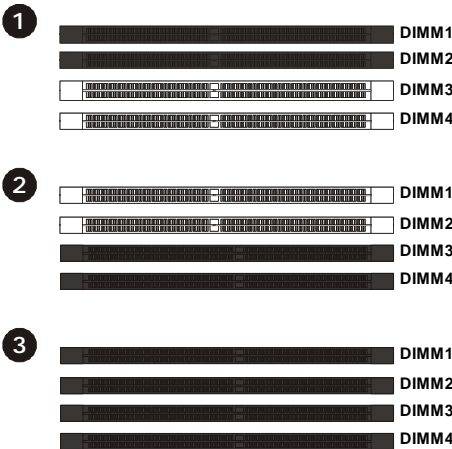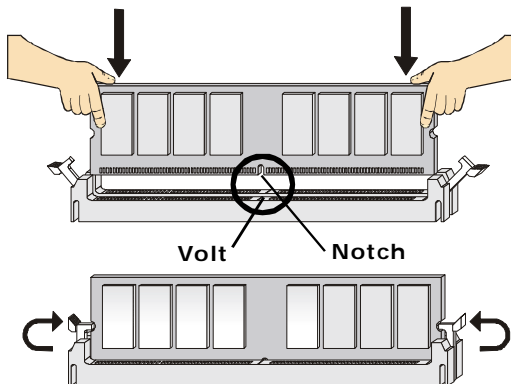
Important

- *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 differentchannel DDR DIMMs.*
- *To enable successful system boot-up, always insert the memory modules into the **DIMM1 first.***
- *Due to the chipset resource deployment, the system density will only be detected up to 7+GB (not full 8 GB) when each DIMM is installed with a 2GB memory module.*

Power Supply

ATX 24-Pin Power Connector: JPWR1

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

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

JPWR1

13 1

24 12

ATX 12V Power Connector: JPW1

This 12V power connector JPW1 is used to provide power to the CPU.

JPW1

4 2

3 1
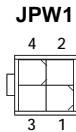
Pin Definition

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 JPWR1 & JPW1 power connectors (shown in figure 2 & figure 3) before the 1st installation or during system upgrade procedure.
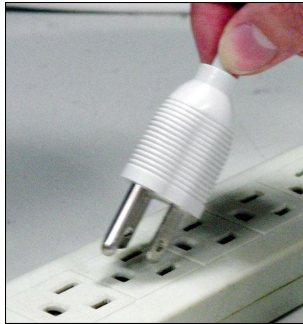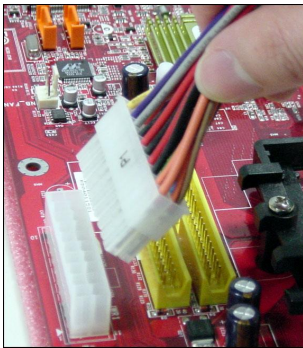

Figure 1:
Unplug the AC power cable

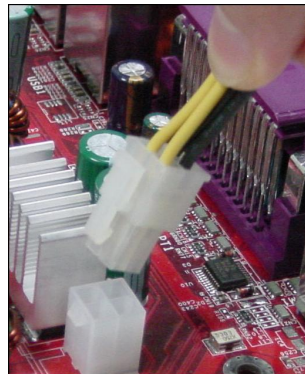

Figure 2:
Unplug the JPWR1 power conn.

Figure 3:
Unplug the JPW1 power conn.

Back Panel

Mouse · Parallel Port · LAN · IEEE 1394 (optional) · L-In · L-Out · Mic

Keyboard · DVI-D Port (optional) · VGA Port · USB Ports
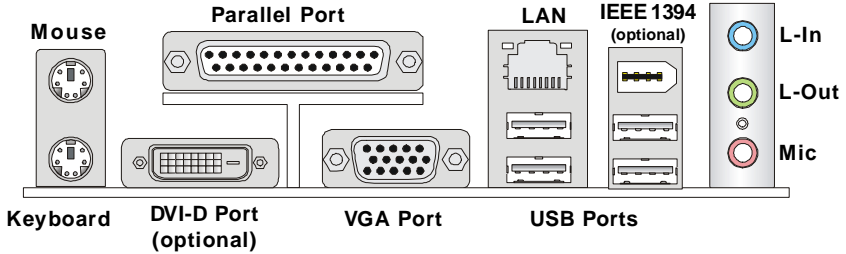
▶ **Mouse/Keyboard Connector**
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

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

▶ **VGA Port Connector**
The DB 15-pin female connector which allows you to connect a VGA monitor.

▶ **DVI-D connector** (for K9NGM2 only)
The DVI-D (Digital Visual Interface-Digital) connector which allows you to connect an LCD monitor. The DVI-D connector provides a high-speed digital interconnection between the computer and its display device. To connect a LCD monitor, simply plug your monitor cable into the DVI-D connector, and make sure that the other end of the cable is properly connected to your monitor. (refer to your monitor manual for more information.) *Please note that the DVI-D connector doesn't support to connect the DVI to D-sub converter.*

▶ **IEEE 1394 Port (optional)**
The 1394 port on the back panel provides connection to 1394 devices.

▶ **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 ———— Link Indicator

LED	Color	LED State	condition
Left	Orange	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.

However, there is an advanced audio application provided by Realtek ALC883 to offer support for **7.1-channel audio operation**. You can use the external audio cable and the rear audio connectors to function the 2-/4-/5.1-/7.1- channel audio.

- **Blue audio jack** - Line In, is used for external CD player, tapeplayer or other audio devices.
- **Green audio jack** - Line Out, is a connector for speakers or headphones.
- **Pink audio jack** - Mic In, is a connector for microphones.

Rear Out

Center and Subwoofer Out

Side Surround Out

Coaxial S/PDIF connector

Audio-Out / SPDIF Bracket (optional)

2-11
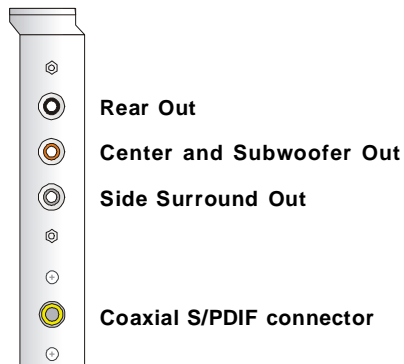
Connectors

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/ IDE2

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)
The first hard drive should always be connected to IDE1. 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/ IDE2

IDE2 (Secondary IDE Connector)
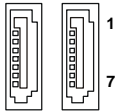IDE2 can also connect a Master and a Slave drive.

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. (The K9NGM series support only two SATAII (SATA1/2) connectors.)

SATA3 SATA4

1

7
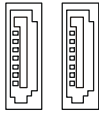
SATA1 SATA2

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
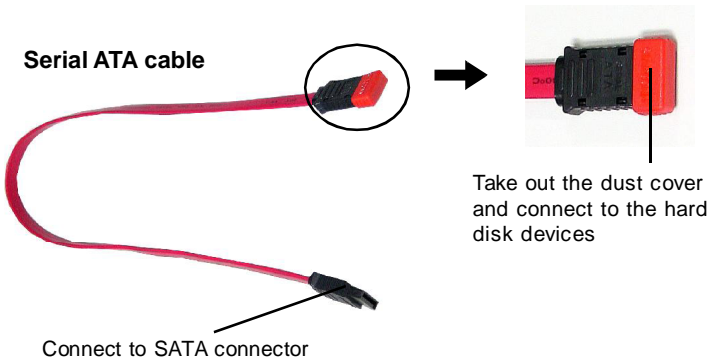
Important

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

Fan Power Connectors: CPUFAN1 & SYSFAN1

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.

+12V SENSOR

GND   Control

CPUFAN1

GND
+12V
SENSOR
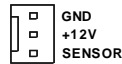
SYSFAN1

> **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.
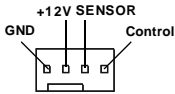
Chassis Intrusion Switch Connector: JCI1

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.

1   CINTRU
2   GND

JCI1

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**
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	ConnectorKey
9	PORT 2L	Analog Port 2 - Left channel
10	SENSE2_RETIRN	Jack detection return from front panel JACK2

CD-In Connector: JCD1

This connector is provided for CD-ROM audio.

JCD1

R GND L
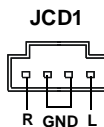
Front USB Connectors: JUSB1 & JUSB2

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**.

JUSB1

```
 9 □□□□□ 1
10 □□□□□ 2
```

JUSB2

```
 2 □□□□□ 10
 1 □□□□□  9
```
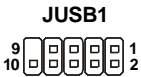
Pin Definition

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 (Yellow)

Important

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

IEEE 1394 Connectors: J1394_1 (optional)

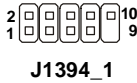The mainboard provides IEEE1394 pinheader that allow you to connect IEEE 1394 ports via an external IEEE1394 bracket (optional).

Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	TPA+	2	TPA-
3	Ground	4	Ground
5	TPB+	6	TPB-
7	Cable power	8	Cable power
9	Key (no pin)	10	Ground

J1394_1

Connected to 1394 connector (Green)

IEEE1394 Bracket (Optional)

Foolproof design

Serial Port Header: JCOM1 (optional)

The mainboard offers one 9-pin header as serial port. The port is a 16550A high speed communication port that sends/receives 16 bytes FIFOs. You can attach a serial mouse or other serial device directly to it.
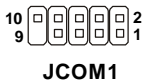
Pin Definition

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready)
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

JCOM1

2-17

SPDIF-Out/ SPDIF-In Connector: JSPDO1/ JSPDI1 (SPDIF-In is optional)

These connectors are used to connect SPDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission. The JSPDO1 is for SPDIF-Out and the JSPDI1 is for SPDIF-In.

NC
GND
SPDIF-Out

JSPDO1

NC
GND
SPDIF-In

JSPDI1

Connected to JSPDO1 or JSPDI1 is at your desire.

Audio-out/ SPDIF Bracket (Optional)

Audio-out Connector: J1

The mainboard optionally provides a audio-out connector for you to attach a Audio-Out bracket. The Audio-Out bracket offers three audio-out jacks. Select the appropriate one to connect to the proper speaker.

J1

2
1
14
13

Connected to J1

Audio-out/ SPDIF Bracket (Optional)
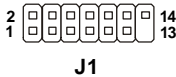
Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	LEFOut	2	SURROutR
3	CENTEROut	4	SURROutL
5	SURRBackR	6	SURRJD
7	SURRBackL	8	CENJD
9	SURRBackJD	10	Ground
11	Ground	12	Ground
13	NC	14	Ground
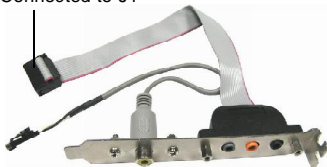
TV-Out Connector: JTV1 (Optional)

The mainboard optionally provides a TV-Out connector for you to attach a TV-Out bracket that integrated HDTV-out. The TV-Out bracket offers two types of TV-Out connectors: S-Video and RCA Composite connectors. Select the appropriate one to connect to the standard television or the HDTV (High-Definition TeleVision) and it will be able to display PC's information.

JTV1
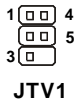
Pin Definition

Pin	Description	Pin	Description
1	GND	4	COMP
2	Yout	5	GND
3	Cout		

TV-Out Bracket (Optional)

Connected to JTV1

TV-Out Connector *(HDTV)*　　TV-Out Connector *(S-Video)*
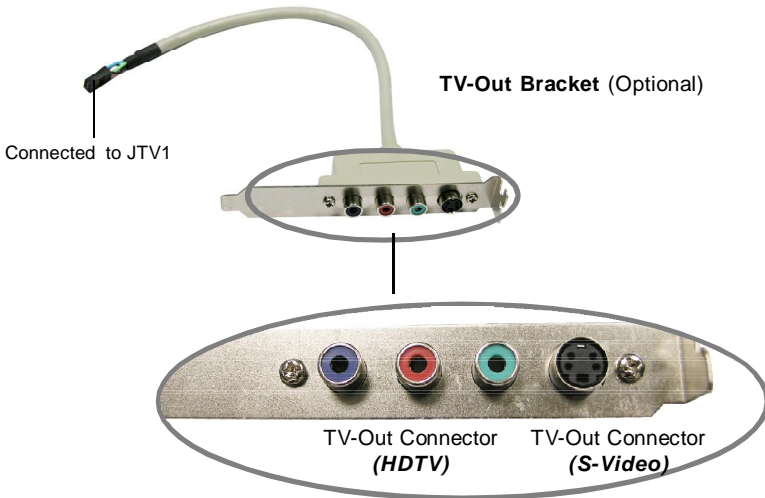
Important

1. Please note that the TV-Out bracket supports to connect one TV only. Meanwhile you can not connect two TVs to this bracket. Otherwise, the TVs will not be functional.

2. Please refer to Appendix B: Using the TV-Out Function for details.

2-19

Front Panel Connectors: JFP1/JFP2

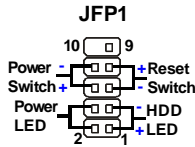The mainboard provides two front panel connectors for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

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.
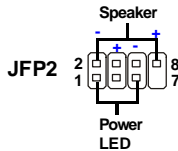
JFP2

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+

Jumpers

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 JBAT1 (Clear CMOS Jumper) to clear data.

JBAT1

Keep Data   Clear Data
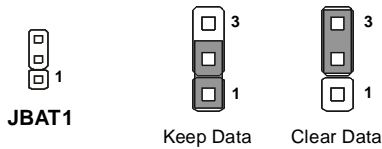
Important

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.
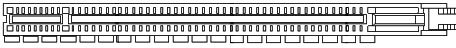
PCI Express x16 Slot
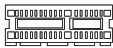
PCI Express x1 Slot

Important

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
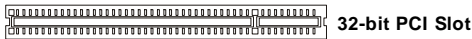
PCI Interrupt Request Routing

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#

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:

² An error message appears on the screen during the system booting up, and requests you to run SETUP.

² 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:

A7252NMS 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

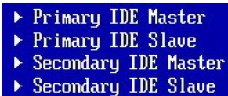|	
<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load Optimized Defaults
<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 highlight the field and press

▶ Primary IDE Master
▶ Primary IDE Slave
▶ Secondary IDE Master
▶ Secondary IDE Slave

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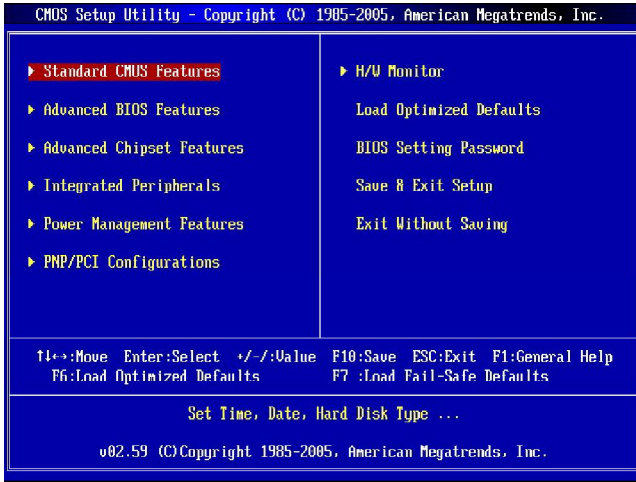
► Standard CMOS Features
Use this menu for basic system configurations, such as time, date etc.

► 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.

► 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
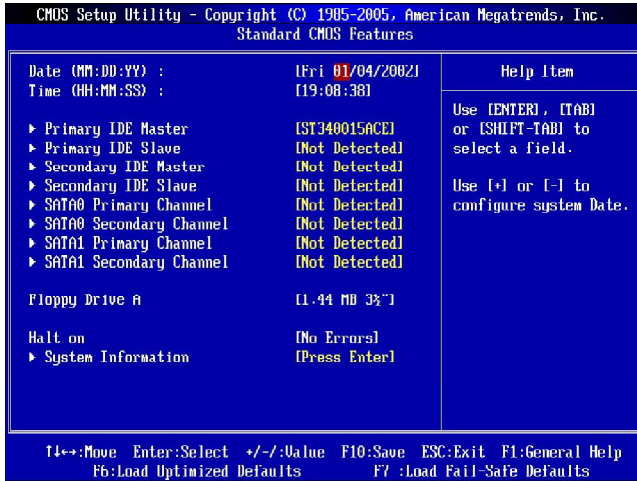Use this menu to set the password for BIOS.

▶ 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.

► **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>.

► **Primary/ Secondary IDE 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.

▶ **Type**
Select the type of IDE device. Setting options: [Not Installed], [Auto], [CD/DVD], [ARMD].

▶ **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

Primary/ Secondary IDE 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.
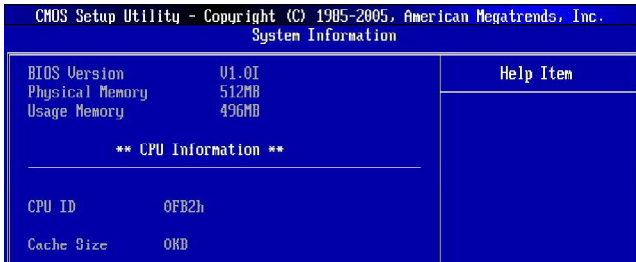
► **BIOS Version/ Physical Memory/ Usage Memory/ CPU Information**

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

Advanced BIOS Features

```
      CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                            Advanced BIOS Features
  Quick Boot                         [Enabled]            Help Item
  Boot Up Num-Lock LED               [On]
  Boot to OS/2                       [No]            Allows BIOS to skip
  IOAPIC Function                    [Enabled]       certain tests while
  MPS Table Version                  [1.4]           booting. This will
  ► Boot Sequence                    [Press Enter]   decrease the time
                                                     needed to boot the
                                                     system.




  ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
            F6:Load Optimized Defaults      F7 :Load Fail-Safe Defaults
```
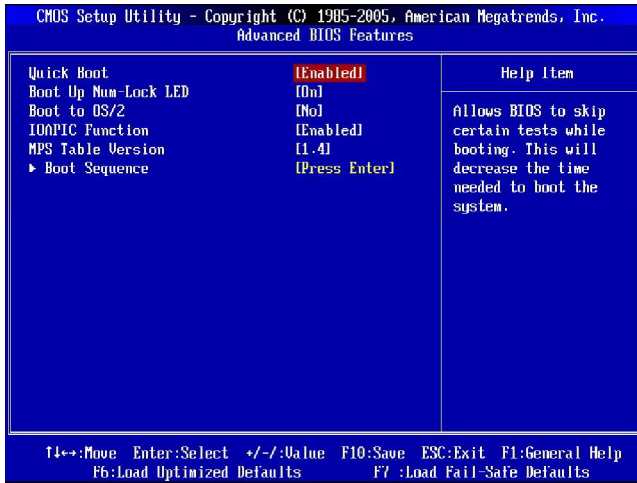
► Quick Boot

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

► Boot Up Num-Lock 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.

▶ Boot From Other Device
Setting the option to [Yes] allows the system to try to boot from other device if the system fails to boot from the 1st/2nd/3rd boot device.

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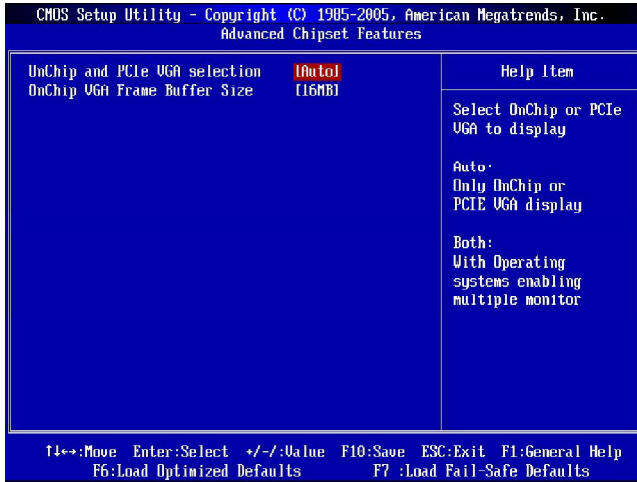This feature allows you to specify the hard disk boot priority.

▶ 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.

Advanced Chipset Features

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

 UnChip and PCIe VGA selection    [Auto]              Help Item
 OnChip VGA Frame Buffer Size     [16MB]
                                              Select OnChip or PCIe
                                              VGA to display

                                              Auto:
                                              Only OnChip or
                                              PCIE VGA display

                                              Both:
                                              With Operating
                                              systems enabling
                                              multiple monitor




 ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
         F6:Load Optimized Defaults        F7 :Load Fail-Safe Defaults
```
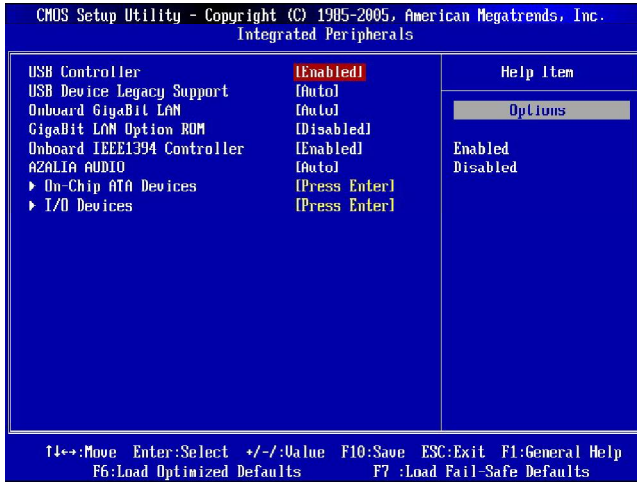
▶ **OnChip and PCIe VGA selection**
Setting "Auto" to auto detect the graphics card. Or you can set to both to enable both OnChip VGA and PCIe VGA.

▶ **On-Chip VGA Frame Buffer Size**
The field specifies the size of system memory allocated for video memory.

Integrated Peripherals

► **USB 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 GigaBit LAN**
This setting allows you to enable/disable the onboard gigabit LAN controller.

► **GigaBit LAN Option ROM**
This item is used to decide whether to invoke the Boot ROM of the Onboard GigaBit LAN Chip.
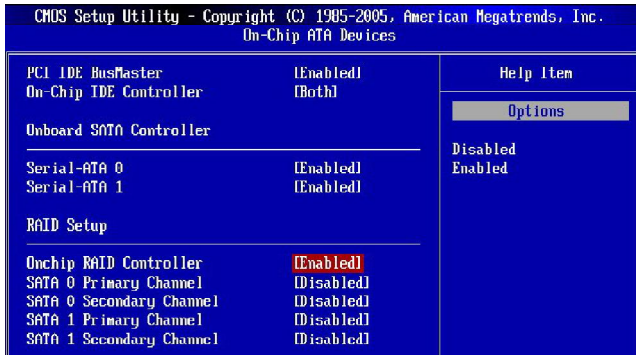
► **Onboard IEEE1394 Controller**
This setting allows you to enable/disable the onboard IEEE 1394 controller.

► **AZALIA AUDIO**
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       [Both]
                                                          Options
   Onboard SATA Controller
                                                       Disabled
   Serial-ATA 0                 [Enabled]              Enabled
   Serial-ATA 1                 [Enabled]

   RAID Setup

   Onchip RAID Controller       [Enabled]
   SATA 0 Primary Channel       [Disabled]
   SATA 0 Secondary Channel     [Disabled]
   SATA 1 Primary Channel       [Disabled]
   SATA 1 Secondary Channel     [Disabled]
```

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

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

▶ **Serial-ATA 0/1**
These items allow users to enable or disable the SATA channel 0/1.

▶ **Onchip RAID Controller**
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.

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

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

   Onboard Floppy Controller   [Enabled]              Help Item
   COM Port 1                  [3F8/IRQ4]
   IR Function                 [Disabled]          Allows BIOS to Enable
   Parallel Port               [378]               or Disable Floppy
   Parallel Port Mode          [Bi-Directional]    Controller.
   Parallel Port IRQ           [IRQ7]
```

▶ **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.

3-13

▶ COM Port 1
Select an address and corresponding interrupt for the first serial port.

▶ IR Function
This setting allows you to specify the operation mode for serial port. Settings are:

        [Disabled]   Disable IrDA function
        [Enabled]   IrDA-compliant Serial 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.

Power Management Setup

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

 ACPI Function               [Enabled]          Help Item
 ACPI Standby State          [S3/STR]
 Re-call VGA BIOS from S3     [Disabled]           Options
 Power Button Function       [On/Off]
 Restore on AC Power Loss    [Power Off]        S1/POS
 ► Wakeup Event Setup         [Press Enter]      S3/STR
                                                Auto




 ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
         F6:Load Optimized Defaults       F7 :Load Fail-Safe Defaults
```

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 2000/ XP , 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]

3-15

▶ Re-call VGA BIOS from S3

Selecting [Enabled] allows BIOS to call VGA BIOS to initialize the VGA card when system wakes up (resumes) from S3 sleep state. The system resume time is short-ened when you disable the function, but system will need an AGP driver to initialize the VGA card. Therefore, if the AGP driver of the card does not support the initializa-tion feature, the display may work abnormally or not function after resuming from S3.

▶ 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.
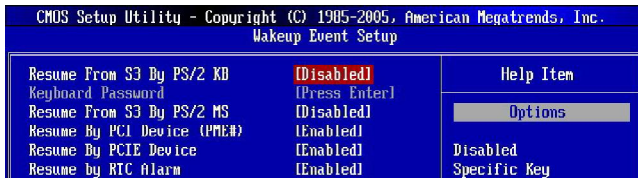
▶ Resume From S3 by PS/2 KB

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 From S3 by PS/2 MS

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 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.

▶ **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 -> PCI Exp]        Help Item

    PCI Latency Timer             [64]                    Options
    PCI Slot1 IRQ                 [Auto]
    PCI Slot2 IRQ                 [Auto]              PCI -> PCI Express ->
    ▶ IRQ Resource Setup          [Press Enter]      IGP -> PCI Express ->
    ▶ DMA Resource Setup          [Press Enter]




    ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
            F6:Load Optimized Defaults       F7 :Load Fail-Safe Defaults
```

▶ **Primary Graphics Adapter**
This setting specifies which graphics card is your primary graphics adapter.

▶ **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 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.

CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.		
IRQ Resource Setup		
IRQ3	[Available]	Help Item
IRQ4	[Available]	
IRQ5	[Available]	Options
IRQ7	[Available]	
IRQ9	[Available]	Available
IRQ10	[Available]	Reserved
IRQ11	[Available]	
IRQ14	[Available]	
IRQ15	[Available]	

▶ 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.

CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.		
DMA Resource Setup		
DMA Channel 0	[Available]	Help Item
DMA Channel 1	[Available]	
DMA Channel 3	[Available]	Options
DMA Channel 5	[Available]	
DMA Channel 6	[Available]	Available
DMA Channel 7	[Available]	Reserved

▶ 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
─────────────────────────────────────────────────────────────────────────
▶ Spread Spectrum                    [Press Enter]        Help Item
  Auto Disable PCI Clock             [Enabled]
  Chassis Intrusion                  [Disabled]
  Cool'n'Quiet                       [Enabled]

  Smart FAN Target                   [Disabled]

        ---- PC Health Status ----
  CPU Temperature               : 47°C/116°F
  System Temperature            : 28°C/82°F
  CPU FAN Speed                 : 4017 RPM
  CPU Vcore                     : 1.360 V
  +3.3V                         : 3.376 V
  +5.0V                         : 5.120 V
  +12.0V                        : 11.880 V



─────────────────────────────────────────────────────────────────────────
  ↑↓←→:Move  Enter:Select  +/-/:Value  F10:Save  ESC:Exit  F1:General Help
         F6:Load Optimized Defaults        F7 :Load Fail-Safe Defaults
```

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

```
CMOS Setup Utility - Copyright (C) 1985-2005, American Megatrends, Inc.
                            Spread Spectrum
─────────────────────────────────────────────────────────────────────────
  CPU Spread Spectrum               [Center Spread]       Help Item
  C51 PCIE Spread Spectrum          [Enabled]
  CPU/LDT Spread Spectrum           [Center Spread]          Options
  SATA Spread Spectrum              [Enabled]
```
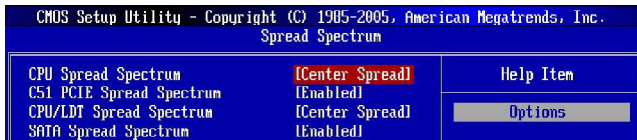
► CPU Spread Spectrum
This setting is used to enable or disable the CPU Spread Spectrum feature.
When overclocking the CPU, always set it to [Disabled].

► C51 PCIE Spread Spectrum
This setting is used to enable or disable the C51 PCIE Spread Spectrum feature.

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

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

▶ Auto Disable PCI Clk
This item is used to auto detect the PCI slots. When set to [Enabled], the system will remove (turn off) clocks from empty PCI slots to minimize the electromagnetic interference (EMI).

▶ 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.

▶ 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.

▶ Smart FAN Target
The mainboard provides the Smart Fan function which can control the fan speed automatically depending on the current temperature to keep it with in a specific range. You can select a fan target value here. If the current CPU fan temperature reaches to the target value, the smart fan function will be activated. It provides 5 sections to speed up for cooling down automaticlly .

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

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

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 si-
multaneously supports 7.1 sound playback and 2 chan-
nels 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**.
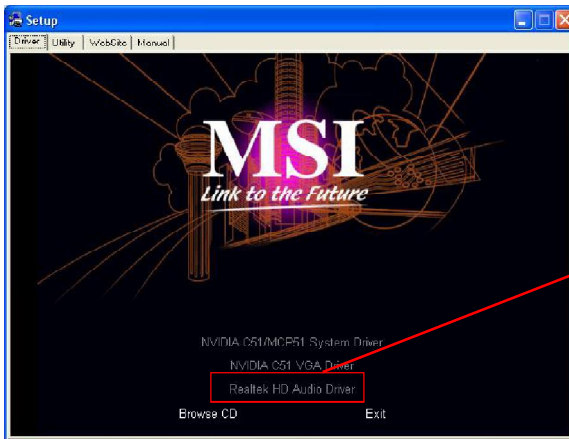
Click here

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.
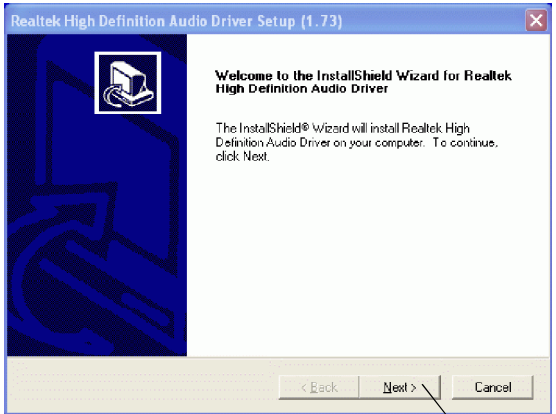
Click here

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
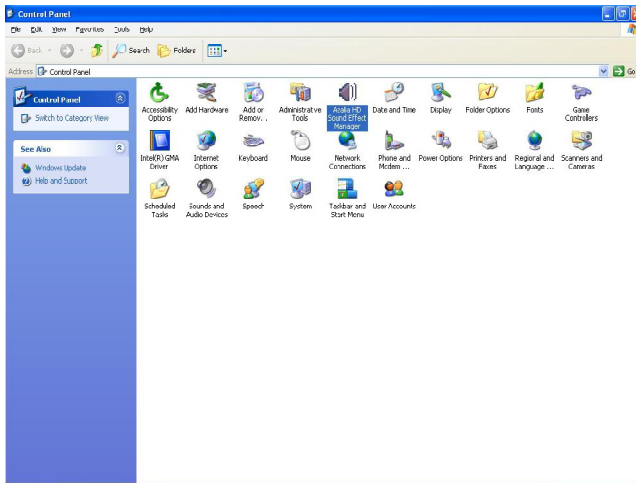
Sound Effect

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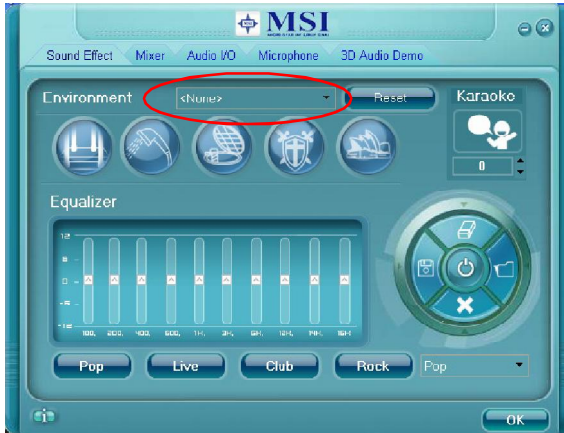
Environment Simulation

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.

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.
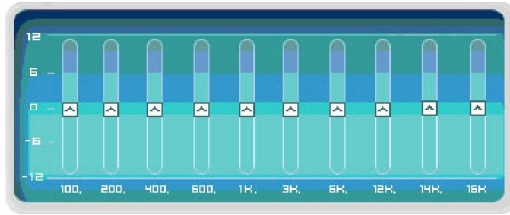
Save
The settings are saved permanently for future use

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
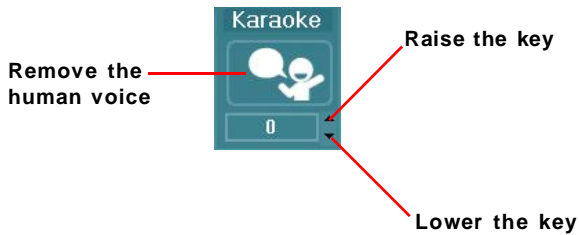
Mixer

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.

Important

Before set up, please make sure the playback devices are well plugged in the jacks on the rear or 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

You have to plug the device into the jacks on the rear and front panel first before enable the multi-stream function.

A-8
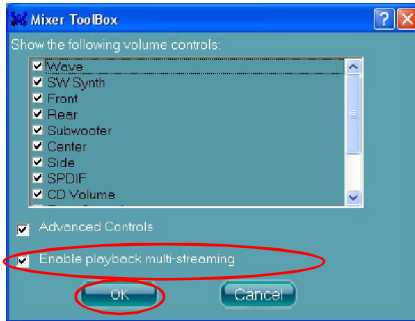
When you are playing the first audio source (for example: use Windows Media Player to play DVD/VCD), the output will be played from the rear panel, which is the default setting.

Then you **must** to select the **Realtek HD Audio 2nd 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.

3. Playback control

Tool   *Mute*

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.
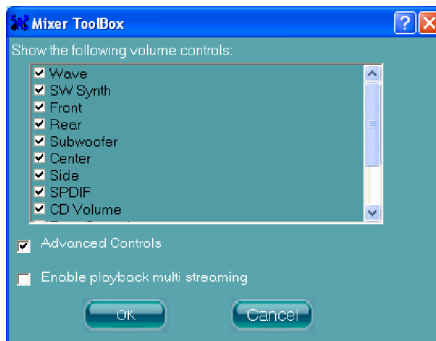
4. Recording control

Tool   Mute

Recording device
-Realtek HD Digital input
-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
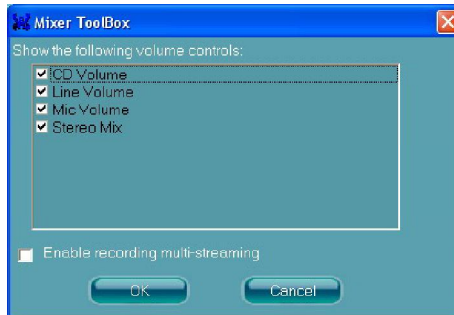
Important

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)
Jack detection function only works with HD audio front panel.

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.

S/PDIF

Short for Sony/Philips Digital Interface, a standard audio file transfer format. S/PDIF allows the transfer of digital audio signals from one device to another without having to be converted first to an analog format. Maintaining the viability of a digital signal prevents the quality of the signal from degrading when it is converted to analog.
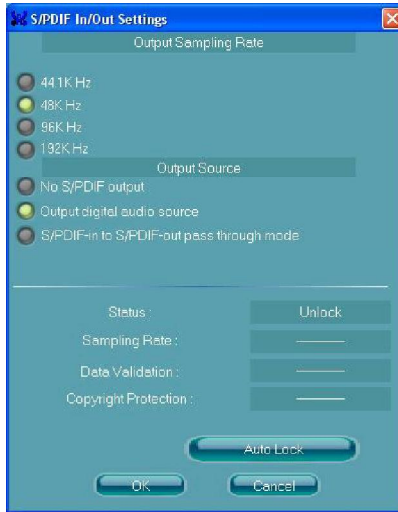
Output Sampling Rate

44.1KHz: This is recommend while playing CD.

48KHz: This is recommended while playing DVD or Dolby.

96KHz: This is recommended while playing DVD-Audio.

192KHz: This is recommended while playing High quality Audio.

Output Source

No S/PDIF out: There will no S/PDIF out.

Output digital audio source: The digital audio format (such as .wav, .mp3,.midi etc) will come out through S/PDIF-Out.

S/PDIF-in to S/PDIF -out pass though mode: The data from S/PDIF-In can be real-time played from S/PDIF-Out.

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.

Center

Front Left

Front Right

Side Right

Side Left

Subwoofer

Rear Left

Rear Right

A-15
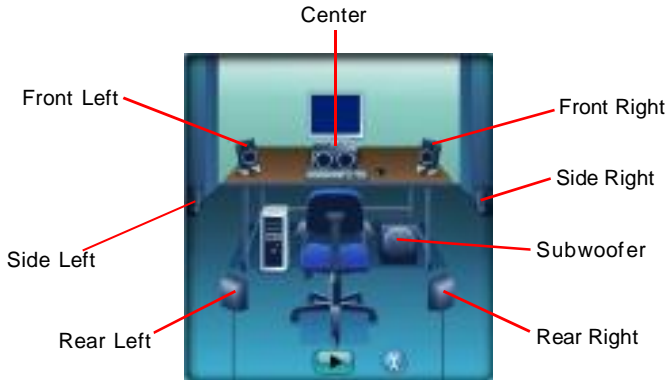
Microphone

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.
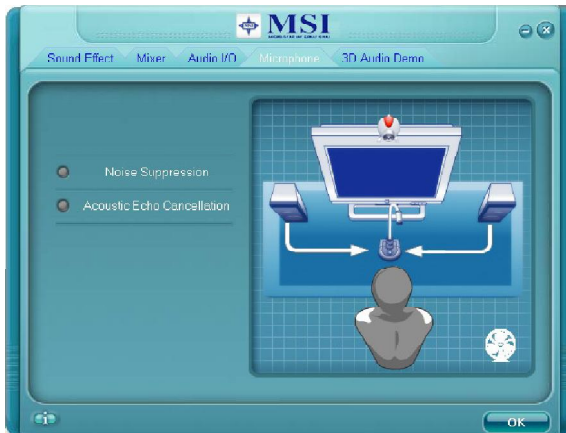
3D Audio Demo

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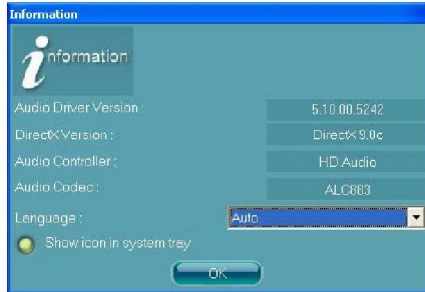
Also there is a selection **Show icon in system tray**. Switch it on and an icon will show in the system tray. Right-click on the icon and the **Audio Accessories** dialogue box will appear which provides several multimedia features for you to take advantage of.

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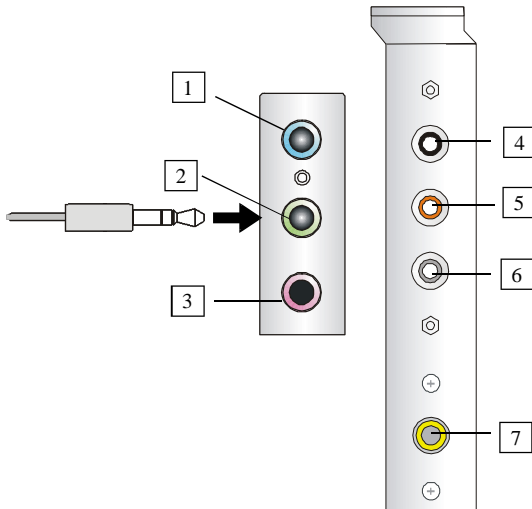
1 Line In
2 Line Out *(Front channels)*
3 MIC
4 Line Out *(Rear surround channels, but no functioning in this mode)*
5 Line Out *(Center and Subwoofer channel, but no functioning in this mode)*
6 Line Out *(Side surround channels, but no functioning in this mode)*
7 *S/PDIF In/Out - Coaxial*

n 4-Channel Mode for 4-Speaker Output
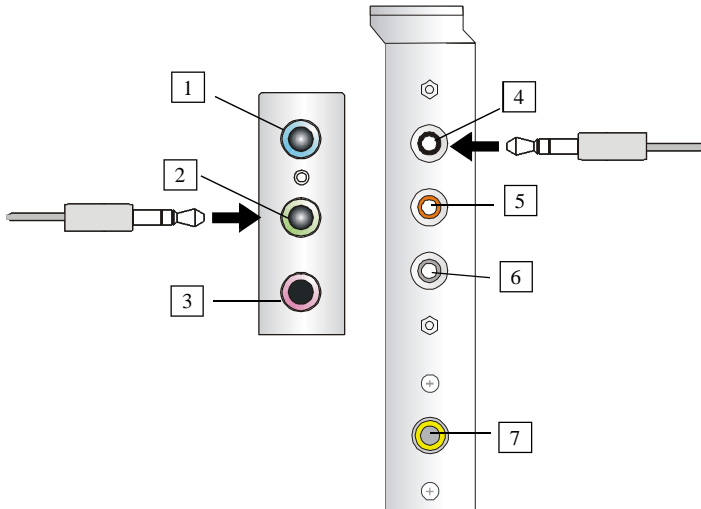
Description:
Connect two speakers to back panel's Line Out connector and two speakers to the Rear-channel Line Out connector.

4-Channel Analog Audio Output

1	Line In

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)*
7 *S/PDIF In/Out-Coaxial*

n **6-Channel Mode for 6-Speaker Output**
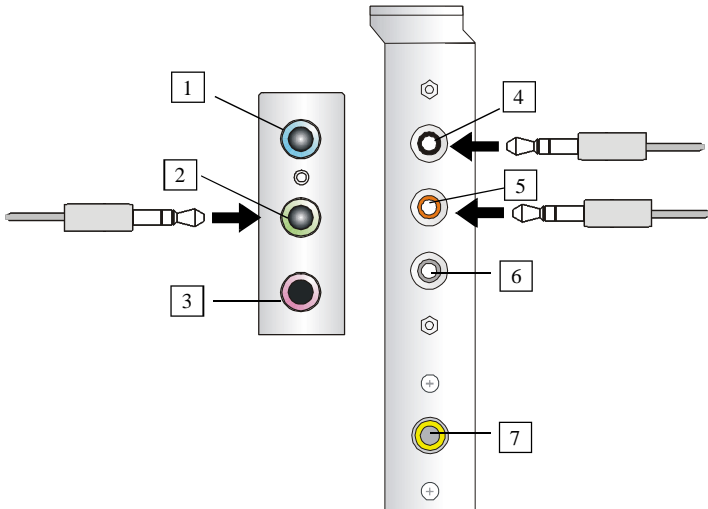
Description:
Connect two speakers to back panel's Line Out connector, two speakers to the rear-channel Line out connector and two speakers to the center/subwoofer-channel Line Out connector.

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)*
7 *S/PDIF In/Out-Coaxial*

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.
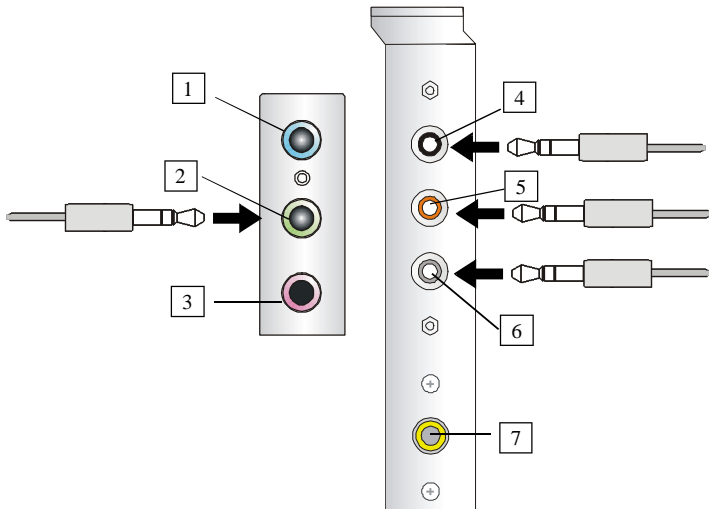
8-Channel Analog Audio Output

1 Line In
2 Line Out *(Front channels)*
3 MIC
4 Line Out *(Rear channels)*
5 Line Out *(Center and Subwoofer channel)*
6 Line Out *(Side surround channels)*
7 *S/PDIF In/Out-Coaxial*

Appendix B
TV-Out Function

You need to install the TV-Out bracket before you can get access to the TV-out function. Follow the procedures described later to set up the TV-Out bracket and configure the display settings.

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Installing the TV-Out Bracket

1. Take out the TV-Out bracket.

TV-Out Bracket

Foolproof design

TV-Out Connector *(HDTV)*   TV-Out Connector *(S-Video)*
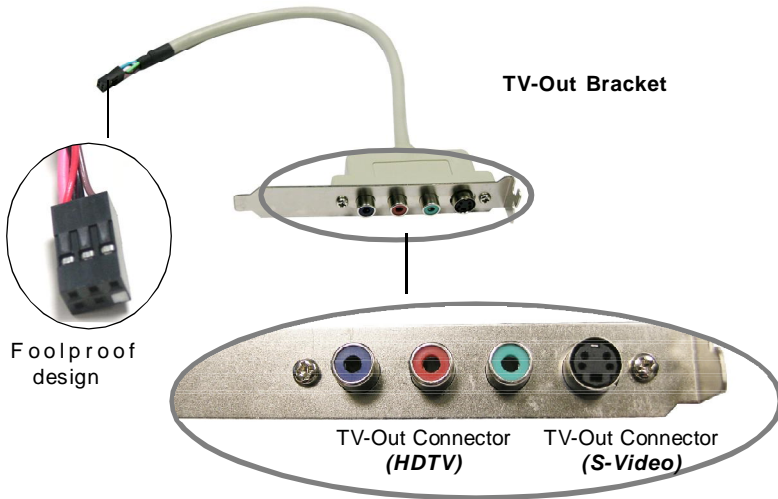
2. Locate the TV-out connector (JTV1) on the mainboard.

3. Connect the TV-Out bracket to the connector. Align the foolproof design with the pin layout of the connector to avoid mis-inserting.

4. Place the TV-Out bracket into the slot of your system case.

Important

If you intend to use the TV-out function, please note that the TV-Out bracket supports to connect one TV only. Meanwhile you can not connect two TVs to this bracket. Select one type of the TV-out connector to connect to appropriate TV.

Connecting S-Video & HDTV Cables

Connecting S-Video cable

1. Connect one end of the S-Video cable to the TV-Out(S) connector.
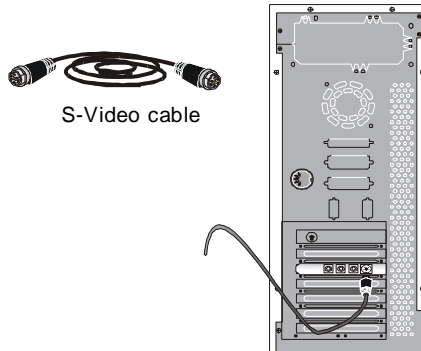
S-Video cable

2. Connect the other end of the S-Video cable to the TV.
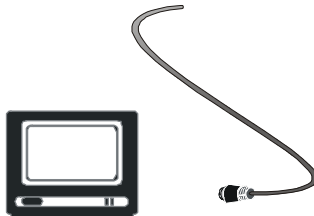
Connecting HDTV cable

1. Connect one end of the HDTV cable to the TV-Out(C) connectors. The HDTV cable usually comes with three connecotrs on both ends.

HDTV cable

Green
Red
Blue

Blue   Green

Red
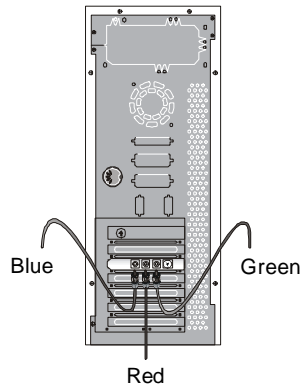
2. Connect the other end of the HDTV cable to the HDTV.
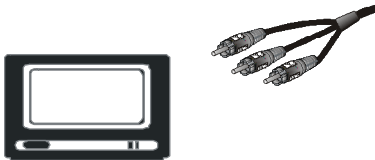
Display Setup

The following procedures describe display setup using Windows XP. Windows 2000 screens are slightly different but the procedures are the same as described.

To enable the TV-Out function, follow this procedure:

click here

1. Restart the computer. After entering the Windows OS, left-click in the window and the screen will pop up a menu. Click **Properties**.

2. In the **Display Properties** dialog box, click the **Settings** tab.
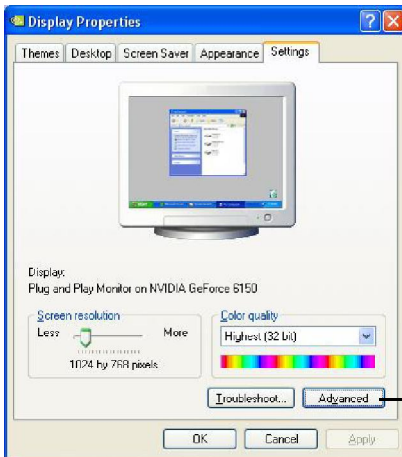
click here

3. Click **Advanced** to continue.

4. In the **nView Display Settings** field, choose the current display and display
   mode.
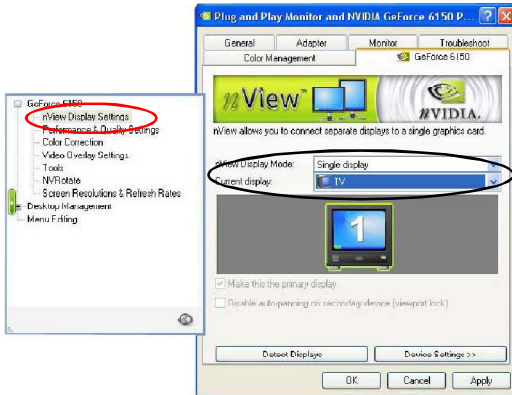
5. In the **Device Settings**, select the TV format.
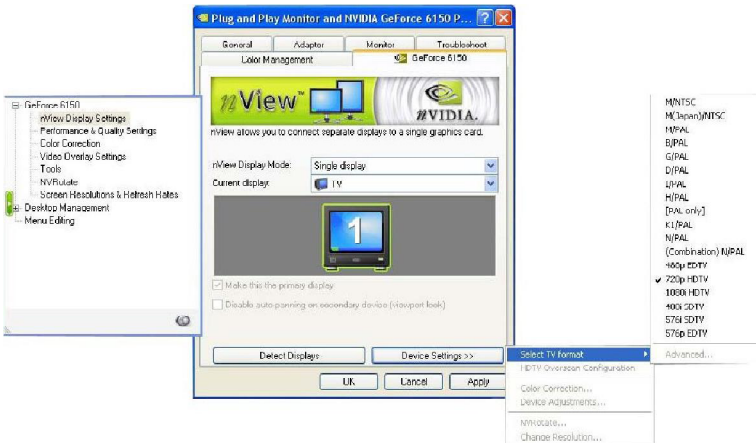
If you have a TV connected and it is not being detected, you can check the "**Force TV detection**" box in the Tools field.
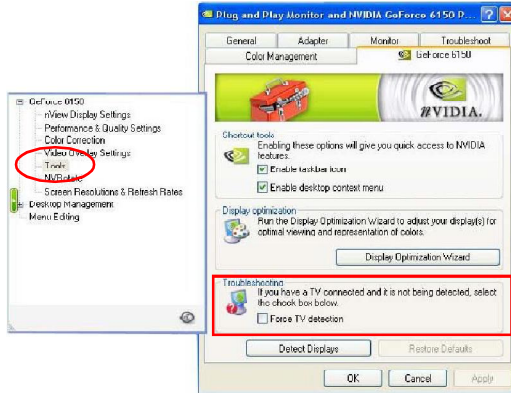
Important

Please note that the TV-out function can not work with the onboard D-Sub out function that is to say, you can not use the TV-out function and the onboard D-Sub out function simultaneously.

Appendix C
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.

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Introduct ion

System Requirement

Operating System Support
NVRAID supports the following operating systems:
Windows XP/ 2000

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.
RAID 5: RAID 5 defines techniques for parity data.
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
RAID 5	Critical data and reasonable level of performance.	Fault tolerance and better utilization of disk space.	Decreased write performance due to parity calculations. Requires at least three drives.	3+	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 **On-Chip ATA Devices** of **Integrated Peripherals** in BIOS.)
2. Specify the RAID level, either Mirroring (RAID 1), Striping (RAID 0), Striping and Mirroring (RAID 0+1), RAID 5 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 **On-Chip ATA Devices** of **Integrated Peripherals** in BIOS.)
2. Specify the RAID level, either Mirroring (RAID 1), Striping (RAID 0), Striping and Mirroring (RAID 0+1), RAID 5 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 **On-Chip ATA Device** 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*.
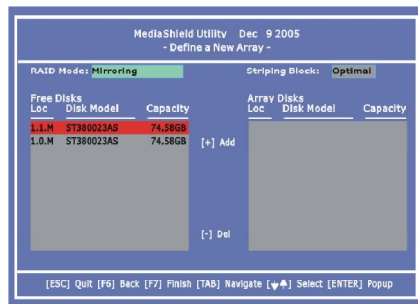
Understanding the "Define a New Array" Window

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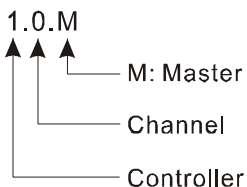
In the example above, 1.0.M means the hard drive is attached to Channel 2, Controller 0, and the drive is set to Master. The following is a list of all possible combinations:

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], [RAID5], [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.
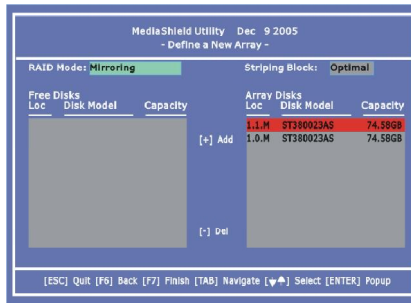
It shows that two disks have been assigned as RAID1 array disks in the figure above.

Completing the RAID BIOS Setup

1. After assigning your RAID array disks, press **F7.** The Clear disk data prompt appears.
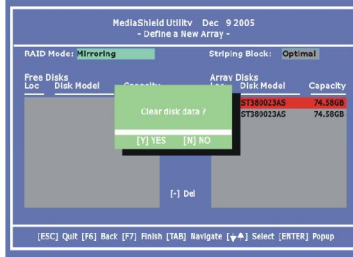
2. Press **Y** if you want to wipe out all the data from the RAID array, otherwise press **N**. You must choose **Yes** if the drives were previously used as RAID drives.
The **Array List** window appears, where you can review the RAID arrays that you have set up.
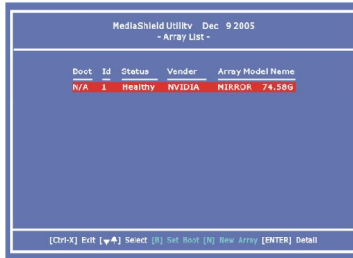
3. Use the arrow keys to select the array that you want to set up, then press **Enter.** The **Array Detail** window appears.

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.
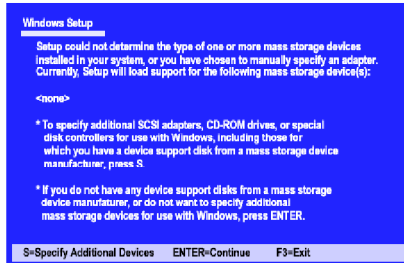
3. Specify the NVIDIA drivers:
   (1) Insert the floppy that has the RAID driver, press S, then press Enter. The Windows Setup screen appears as below:
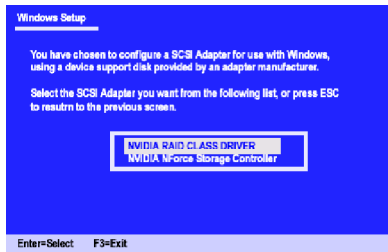
> **Important**
>
> *Please follow the instruction below to make an nVIDIA Serial ATA RAID driver for yourself.*
> 1. *Insert the MSI CD into the CD-ROM drive.*
> 2. *Click the "Browse CD" on the Setup screen.*
> 3. *Copy all the contents in the :\\nVidia \System \C51+MCP51 \IDE \Win XP or Win2K \sataraid 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:

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```
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 Driver/ 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.
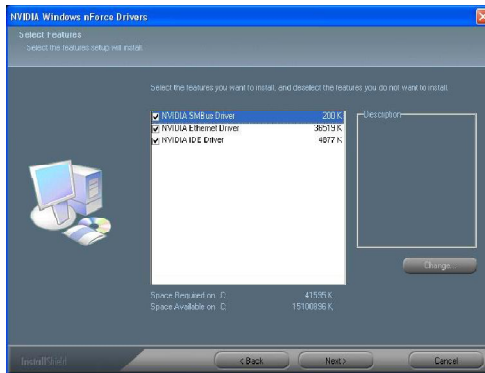
2. Select the modules that you want to install. Make sure that the "NVIDIA IDE Driver" is selected.

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 worked.

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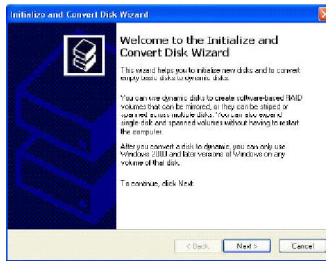
3. Click **Next**. The Select Disks to Initialize window appears. The disks listed depend on how many arrays you have configured.
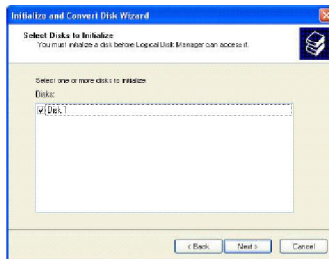
4. Click **Next**. The Select Disks to Convert window appears.
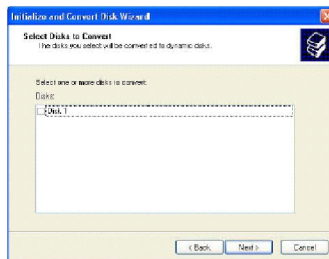
5. Check the disk in the list if you want to make the array a dynamic disk, then click **Next**. The Completing the Initialize and Convert Disk Wizard window appears.
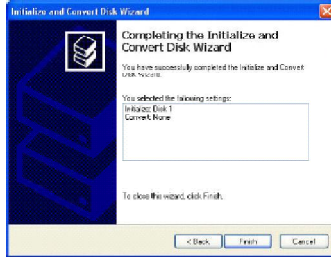
6. Click **Finish**. The "Computer Management" window appears.
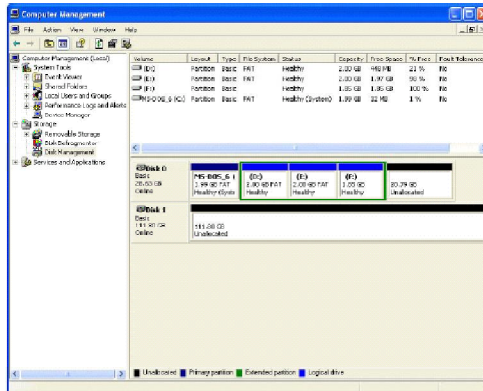
The actual disks listed will depend on your system, and the unallocated partition is the total combined storage of two hard disks. You must format the unallocated disk space in order to use it.

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, RAID 0+1, and RAID 5 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)

  • Rebuild the parity in RAID 5 arrays

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\C51+MCP51\IDE\Win XP or 2k\raidtool\ of the setup CD accompanied with your mainboard).

The RAID configuration information appears in the right-side pane, as shown below.
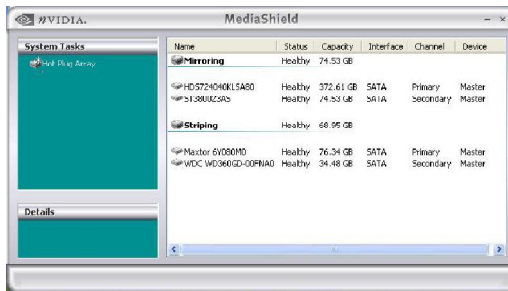
> **Important**
>
> *The information in the figures in this part may very from what it is shown in your system.*

Setting Up a Spare RAID Disk

You can designate a hard drive to be used as a spare drive for a RAID 1, RAID 0+1 or RAID 5 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, RAID 0+1 or RAID 5 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, RAID 0+1 or RAID 5 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.
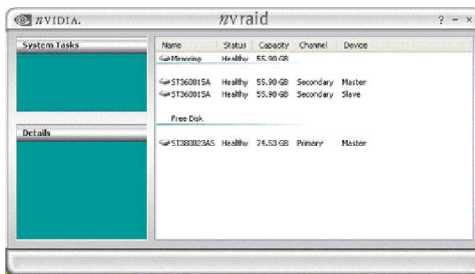
Assigning a Dedicated Disk
To mark a disk as dedicated, or reserve it for use by a specific array,

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.
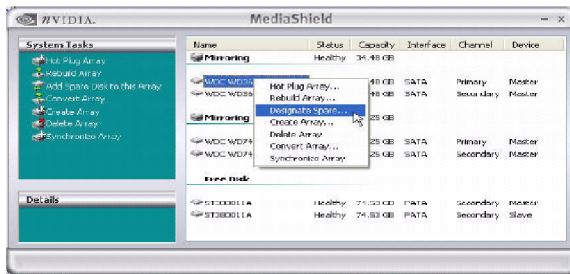
2. Select **Designate Spare** from the menu to launch the Spare Disk Allocation Wizard.

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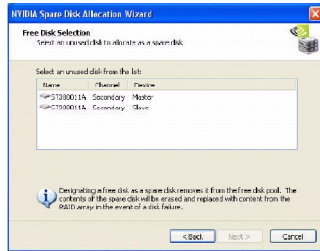
4. From the Free Disk Selection page, select one of the two free disks available.
This would be the disk that will be designated to the mirror array.

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.
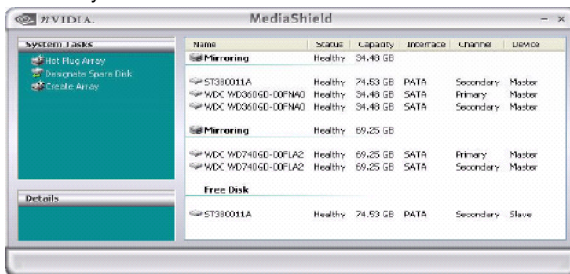
Removing a Dedicated Disk

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:
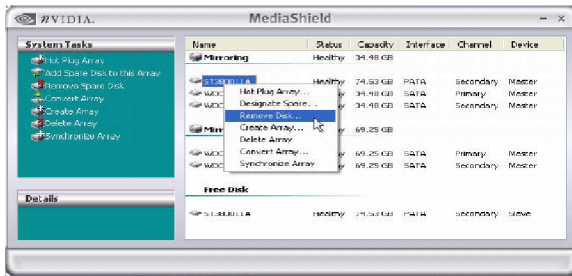
Morphing From One RAID Array to Another

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
   - From RAID 5 to 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.
	RAID5	$m >= n+1$
RAID 1	RAID 0	No additional restrictions.
	RAID 1	** Not a valid combination **
	RAID 0+1	No additional restrictions.
	RAID 5	$m >= 3$

From	To	New Array Disk Requirements
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	** Not a valid combination **
	RAID 5	m >= (n/2 + 1)
RAID 5	RAID 0	m >= n - 1
	RAID 1	** Not a valid combination **
	RAID 0+1	m >= 2 x (n -1) ; where m is an even number of disks.
	RAID 5	m >= n

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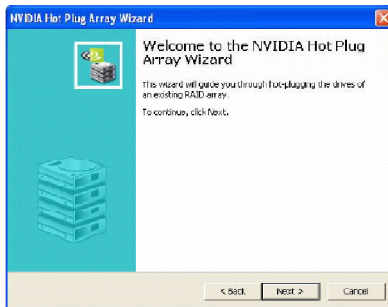
2 Click **Nex**t and the following screen shot will appear:
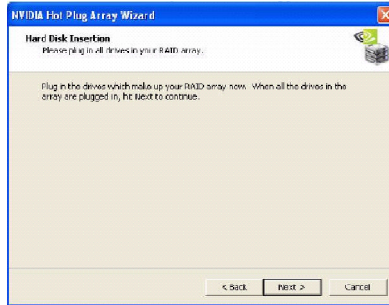
3 Connect the RAID disk that you want to use with any given RAID array.
4 Click **Next** and the following screen shot will appear:

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 asRAID 5, 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.
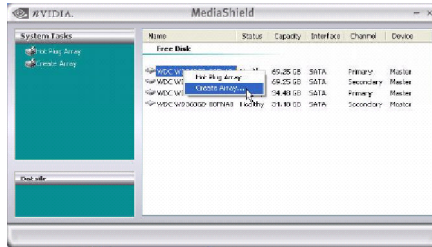
2 The Create Array Wizard opens. Follow the Wizard to create a Mirror array.
3 At the Create Array Wizard Welcome screen, click **Next**.
4 At the RAID Array Selection page, make sure that RAID Mode is set to "**Mirroring**" and Stripe Size is set to its default value of 64K, then click **Next**.
5 At 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:
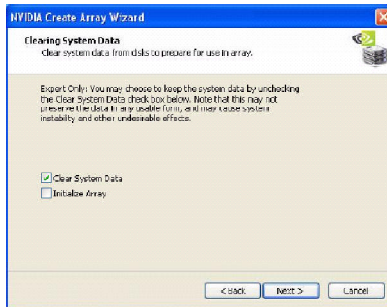
7 Check "Intialize Array" and then click **Next**. The Initialization Warning dialog appears.
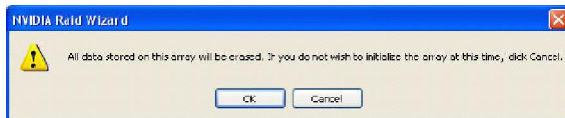
8 Click **OK**. The Clearing System Data screen appears again with the Initialize Array check box checked as shown below.
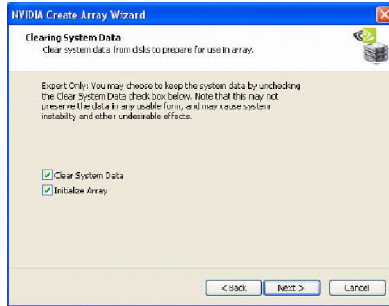
9 Click **Next**, then click **Finish** at the Completing the NVIDIA Create Array Wizard screen. The NVRAIDMAN windows shows the created RAID array as shown below.
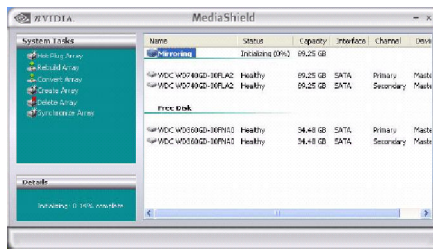
The Initialization Process
As you can see from the screen shot above, the initialization process has started and it will be completed in a short period of time. As soon as the Initialization process starts, a popup window similar to the following will appear:

followed by the following pop-up window:

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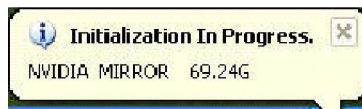
Rebuilding a RAID Array

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, RAID 0+1, as well as a RAID 5. For example, assuming you have a three disk RAID 5 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.
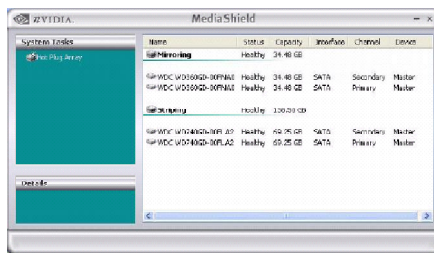
2. Right-click on Mirroring. The popup menu appears.
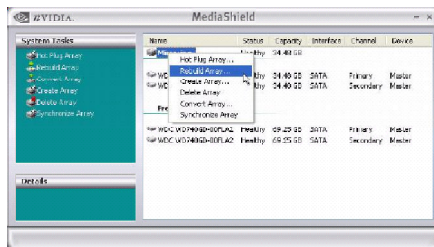
3. From the popup menu, click **Rebuild Array**. The NVIDIA Rebuild Array Wizard appears.
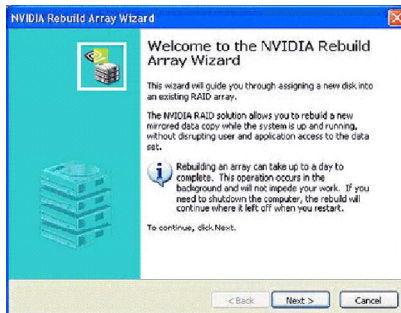
4. Click **Next.** The Disk Selection page appears.
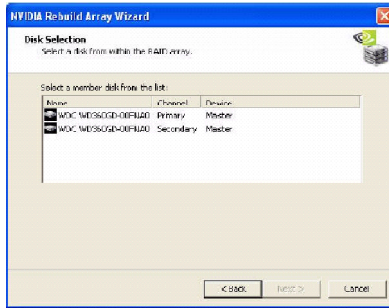
5. Select the drive that you want to rebuild by clicking it from the list, then click **Next**. The Completing the NVIDIA Rebuild Array page appears.
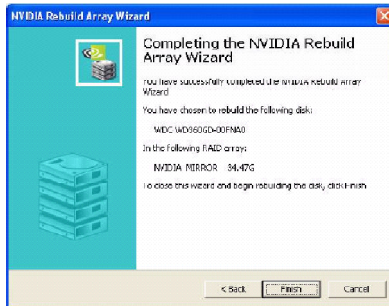
6. Click **Finish**. The array rebuilding starts after a few seconds, and a small pop-up message appears towards the bottom right corner of the screen as shown in the figure below.

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

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During the rebuilding process, the NVRAID Management utility screen shows the status under the System Tasks and Details sections.
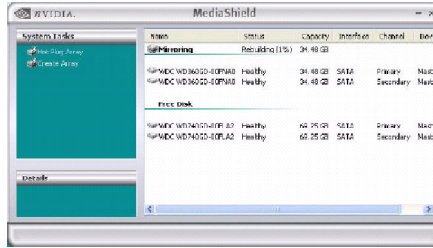
More About Rebuilding Arrays
• *Rebuilding Occurs in the Background*
The rebuilding process is very slow (it can take up to a day) and occurs in the background so as not to affect the performance of the system.
• *Rebuilding Applies Only to RAID 1/ RAID 0+1 or RAID 5 Arrays*
Rebuilding an array works only when using RAID 1 , RAID 0+1, or RAID 5. 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.
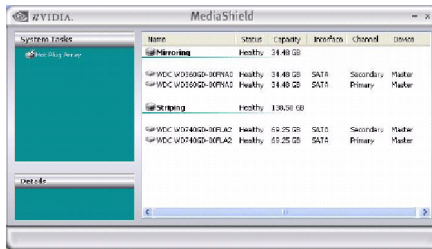
To use one of these available free disks to rebuild your array, follow the same steps as explained in "Rebuilding a RAID Array" on D-22, except when prompted to select a disk, choose one of the two available free disks.
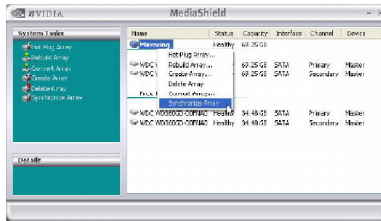
Synchronizing a RAID Array

Synchronizing an array will force a rebuild of redundancy or parity. The operation is applicable to any fault tolerant array such as RAID 1, 0+1 and RAID 5.
• For RAID1 and RAID 0+1, "sync" results in copying the data to the redundancy disk,
• For RAID 5, "sync" results in rebuilding the parity

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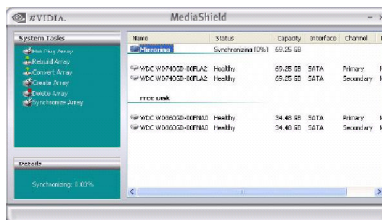1. Right click on "Mirroring" and select **Synchronize Array** as shown in Figure below.

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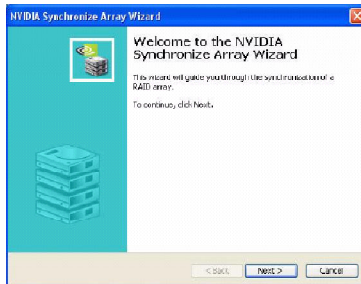
3. Click on **Next** and then click **Finish** at the Wizard Completion screen. The NVRAIDMAN window indicates that the array is synchronizing, as shown in Figure below.

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.

Appendix D
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.
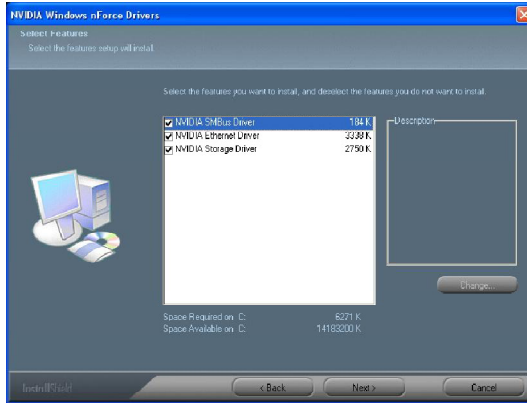

NVIDIA System Driver

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 C51/MCP51 System Driver** button to install the NVIDIA System Drivers for your Windows OS. Then the welcome dialogue will display. Click **Next** to continue.
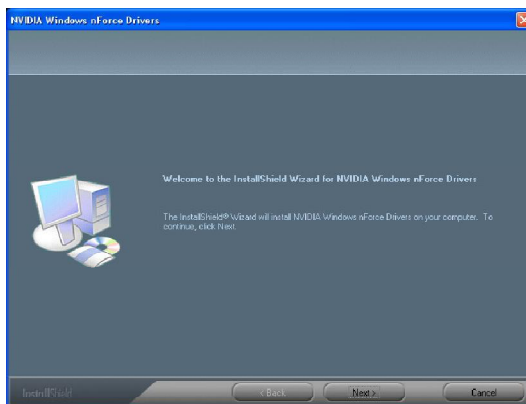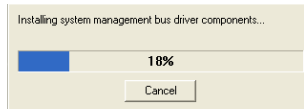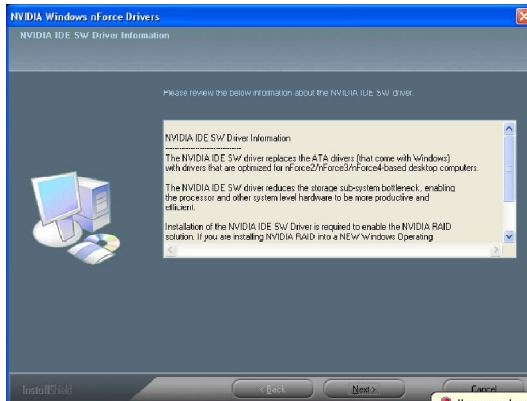
2. Then the following screen displays the available components to install. All the components shown here will be selected to be installed by default. Then click **Next**.


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.

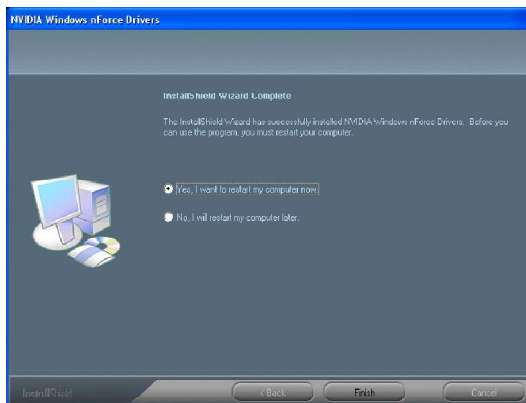5. Then the following screen displays the installation of NVIDIA IDE SW Driver. Click **Yes** to continue.

Install NVIDIA IDE SW driver?

Do you want to install the NVIDIA IDE SW driver?

Yes   No
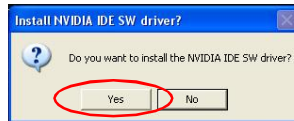
MSI Reminds You...

The installation of NVIDIA Firewall and ForceWare Network Access Manager. It is a software firewall to protect the softwares from hacking. However, it is strongly suggested that you do not install this component. *Please follow the instruction below to make a software firewall CD for yourself.*

1. *Insert the MSI CD into the CD-ROM drive.*
2. *Ignore the Setup screen and use "Explorer" to browse the CD.*
3. *In the \nVidia\Firewall , double clicking the "NAMSetup" file to install the software.*
4. *The driver disk for software firewall CD is done.*

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

NVIDIA Windows nForce Drivers

InstallShield Wizard Complete

The InstallShield Wizard has successfully installed NVIDIA Windows nForce Drivers. Before you can use the program, you must restart your computer.

○ Yes, I want to restart my computer now.

● No, I will restart my computer later.
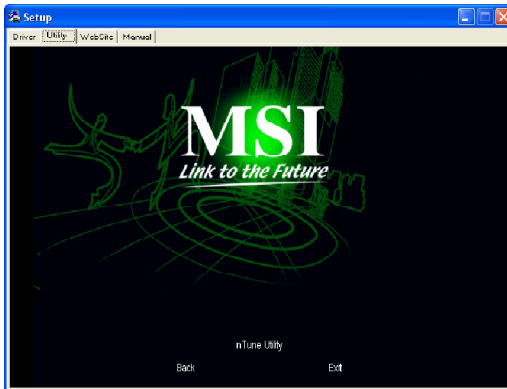
< Back   Finish   Cancel

nVidia Utility Installation

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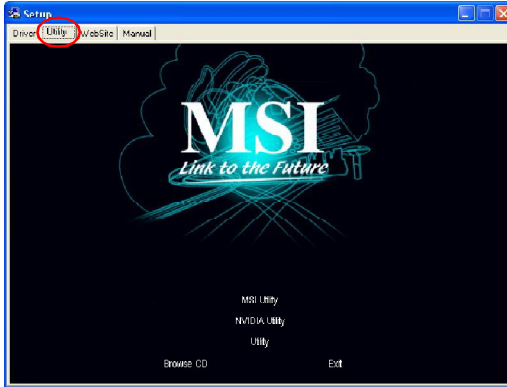
2. Then click on the **NVIDIA Utility** tab and the screen below will display.

3. Click the nTune Utility icon to install it.

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