MSI
MICRO-STAR INTERNATIONAL

K9N4 SLI Series

MS-7325 (V1.X) Mainboard

G52-73251X1

Copyright Notice

Trademarks

Revision History

Revision	Revision History	Date
V1.0	First release for PCB 1.X	October 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 service personnel:
    - † The power cord or plug is damaged.
    - † Liquid has penetrated into the equipment.
    - † The equipment has been exposed to moisture.
    - † The equipment does 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 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.

CE N1996

- † 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-7325

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

WEEE (Waste Electrical and Electronic Equipment) Statement

ENGLISH

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

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

DEUTSCH

Hinweis von MSI zur Erhaltung und Schutz unserer Umwelt

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

FRANÇAIS

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

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

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 elektroniczne " 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.

CONTENTS

Chapter 1
Getting Started

Thank you for choosing the K9N4 SLI Series (MS-7325 v1.X) ATX mainboard. The K9N4 SLI Series mainboards are based on **nVidia® nForce500 SLI** chipsets for optimal system efficiency. Designed to fit the advanced **AMD® Athlon 64 X2/ Athlon 64 & Sempron** processor, the K9N4 SLI Series deliver a high performance and professional desktop platform solution.

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Mainboard Specifications

Processor Support

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

Supported FSB

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

Chipset

- nVidia® nForce500 SLI chipset

Memory Support

- DDRII 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 Giga LAN 10/100/1000 Fast Ethernet by Vitesse VSC8601

Audio

- Controlled by Realtek ALC850
- Supports 7.1 channels audio out
- Compliant with AC'97 Rev 2.3 Spec

IDE

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

SATA

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

RAID

- SATA1~4 supports RAID 0/ 1/ 0+1/ 5 or JBOD mode

Floppy

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

Connectors

- **Back panel**
  - 1 PS/2 mouse port
  - 1 PS/2 keyboard port.
  - 1 Serial port
  - 1 Parallel port supporting SPP/EPP/ECP mode
  - 4 USB 2.0 Ports.
  - 1 LAN jack
  - 6 audio jacks

- **On-Board Pinheaders**
  - 1 D-Bracket 2 pinheader
  - 1 IrDA pinheader
  - 3 USB 2.0 pinheaders
  - 1 SPDIF-Out pinheader

Slots

- 2 PCI Express x 16 slots, compatible with PCI Express x 8 speed (Support SLI technology)
- 2 PCI Express x 1 slots
- 2 PCI slots, support 3.3V/ 5V PCI bus Interface

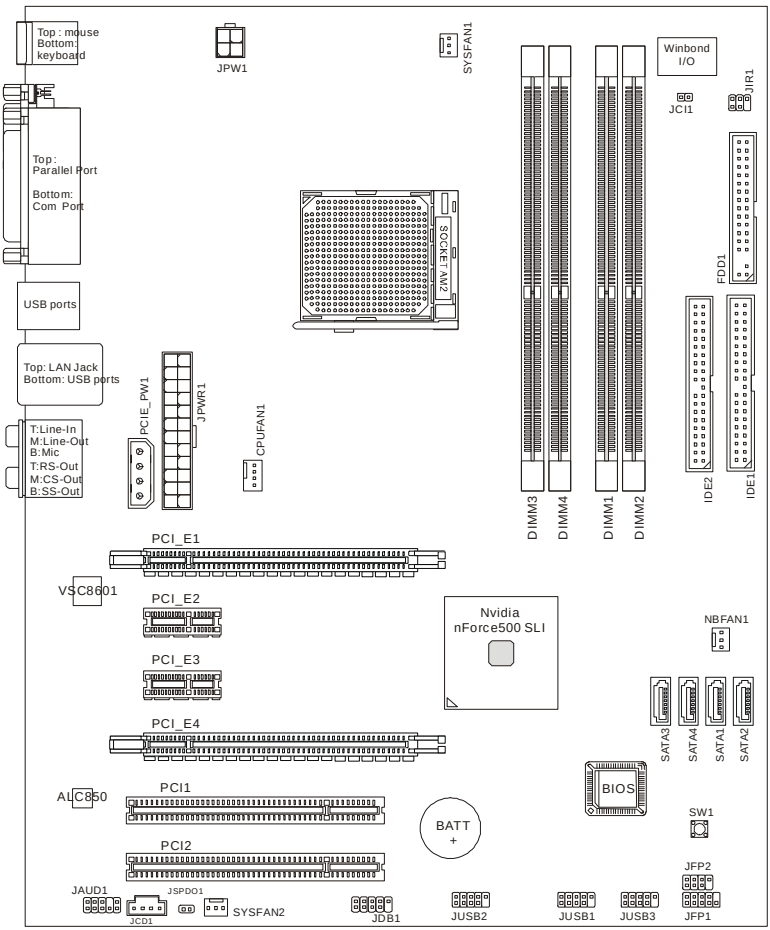
Form Factor

- ATX (30.5 cm X 24.5 cm)

Mounting

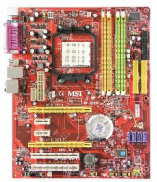
- 9 mounting holes

Mainboard Layout

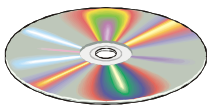


K9N4 SLI Series
(MS-7325 v1.X) ATX Mainboard

Packing Checklist



MSI motherboard



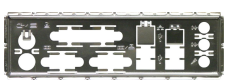
MSI Driver/Utility CD

SLI Video Link Card

Power Cable

SATA Cable

Standard Cable for IDE Devices (Optional)



Back IO Shield

D-Bracket 2 (Optional)

User's Guide

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

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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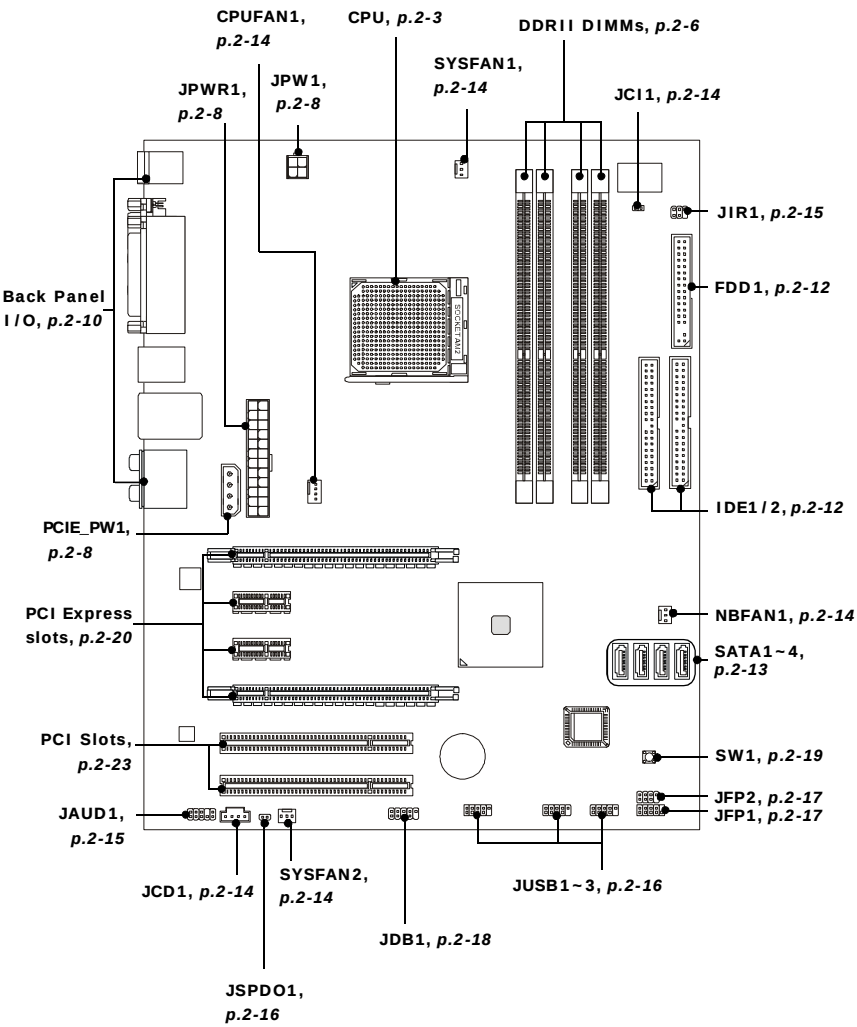
Quick Components Guide



CPU (Central Processing Unit)

The mainboard supports AMD® Athlon64/ X2 & Sempron processors. The mainboard uses a CPU socket called Socket AM2 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

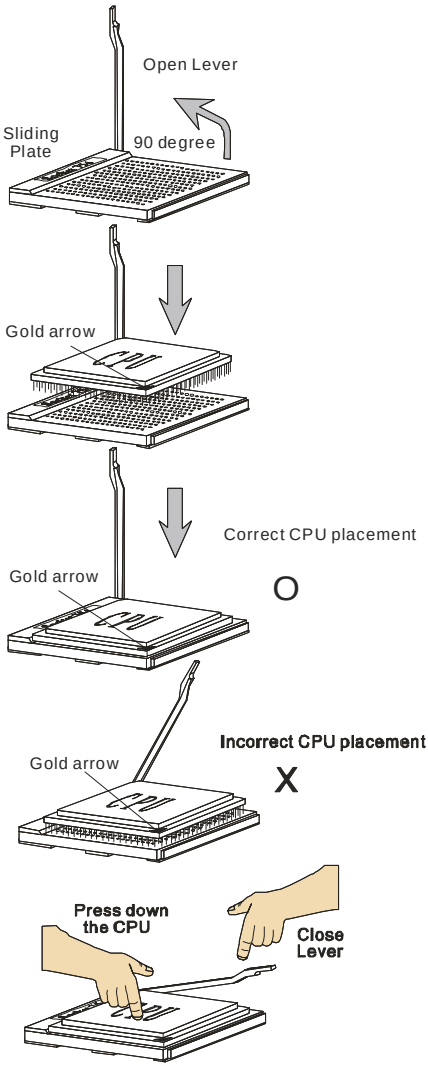
1. Please turn off the power and unplug the power cord before installing the CPU.

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.



Installing AMD Socket AM2 CPU Cooler Set

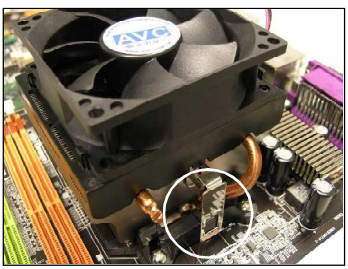
When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

Important

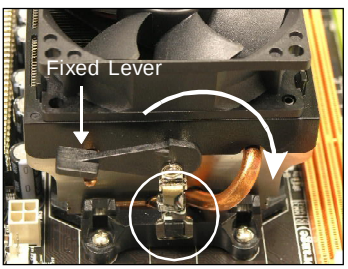
Mainboard photos shown in this section are for demonstration of the cooler installation for Socket AM2 CPUs only. The appearance of your mainboard may vary depending on the model you purchase.

1. Position the cooling set onto the retention mechanism.

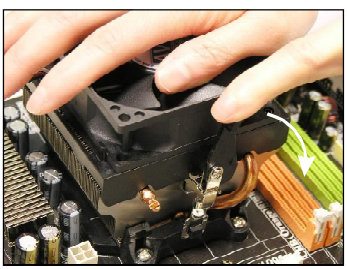
   Hook one end of the clip to hook first.



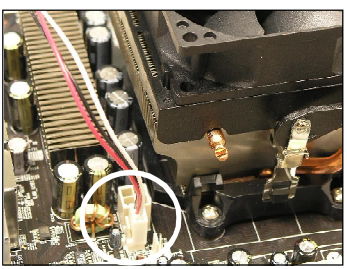
2. Then press down the other end of the clip to fasten the cooling set on the top of the retention mechanism. Locate the Fix Lever and lift up it .



3. Fasten down the lever.



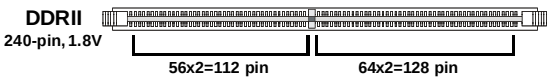
4. Attach the CPU Fan cable to the CPU fan connector on the mainboard.



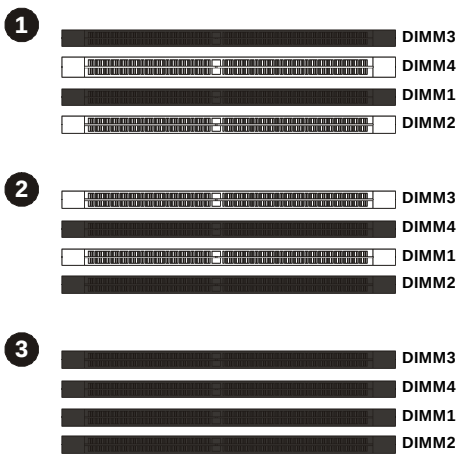
Memory

The mainboard provides four 240-pin non-ECC **DDRII** DIMMs and supports up to 8GB system memory.

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



Dual-Channel Memory Population Rules



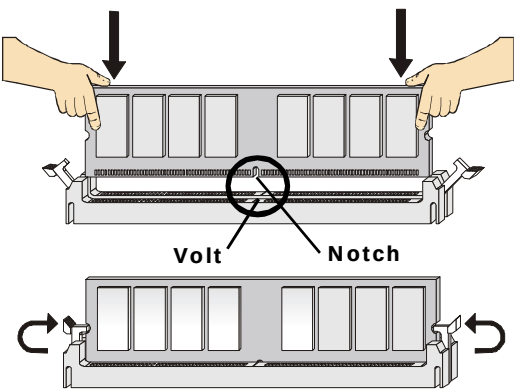
Installing DDRII Modules

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.



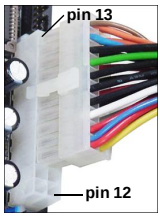
Important

- *DDRII modules are not interchangeable with DDR and the DDRII standard is not backwards compatible. You should always install DDRII memory modules in the DDRII DIMMs and DDR memory modules in the DDR DIMMs.*
- *In dual-channel mode, make sure that you install memory modules of **the same type and density** in different channel DDR DIMMs.*
- *To enable successful system boot-up, always insert the memory modules into the **DIMM1 first.***
- *Due to the chipset resource deployment, the system density will only be detected up to 7+GB (not full 8GB) when each DIMM is installed with a 2GB memory module.*

Power Supply

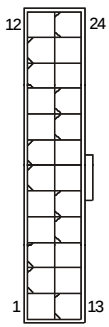
ATX 24-Pin Power Connector: JPWR1

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.

JPWR1



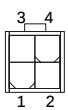
Pin Definition

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

ATX 12V Power Connector: JPW1/ PCIE_PW1

This 12V power connector JPW1 is used to provide power to the CPU. This 12V power connector PCIE_PW1 is used to provide power to stable the operation of graphics card.

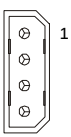
JPW1



JPW1 Pin Definition

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

PCIE_PW1



PCIE_PW1 Pin Definition

PIN	SIGNAL
1	5V
2	GND
3	GND
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 450 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/ PCIE_PW1 & JPW1 power connectors (shown in figure 2 & figure 3) before the 1st installation or during system upgrade procedure.

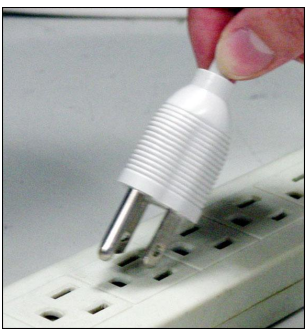


Figure 1:
Unplug the AC power cable

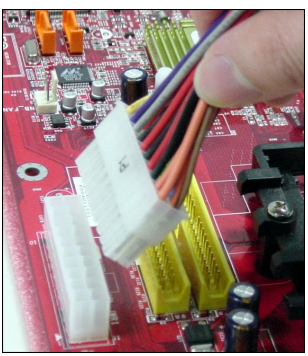


Figure 2:
Unplug the JPWR1 power conn.

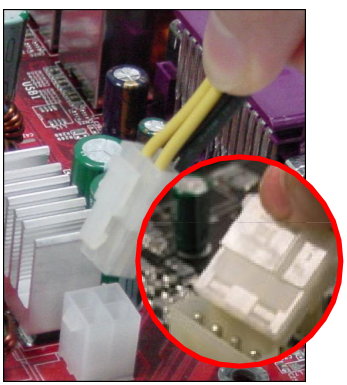
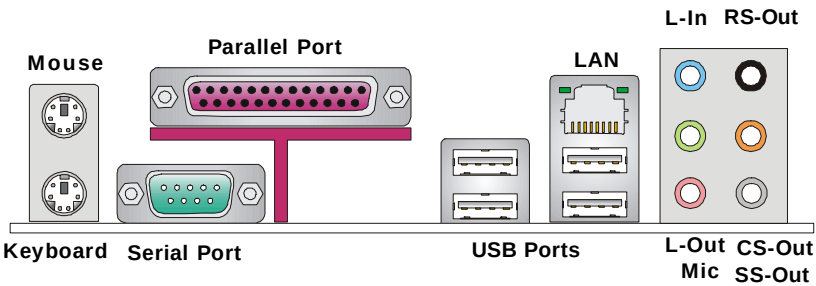


Figure 3:
Unplug the JPW1/ PCIE_PW1 power connectors

Back Panel

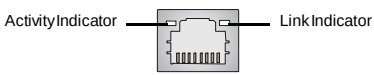


▶ Mouse/Keyboard Connector
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

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

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

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



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

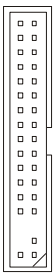
These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.

- **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.
- **Black audio jack** - Rear-Surround Out in 4/ 5.1/ 7.1 channel mode.
- **Orange audio jack** - Center/ Subwoofer Out in 5.1/ 7.1 channel mode.
- **Gray audio jack** - Side-Surround Out in 7.1 channel mode.

Connectors

Floppy Disk Drive Connector: FDD1

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



FDD1

ATA133 Hard Disk Connectors: IDE1/ 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.

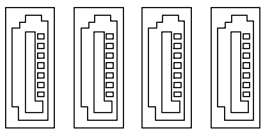
IDE2 (Secondary IDE Connector)
IDE2 can also connect a Master and a Slave drive.

Important

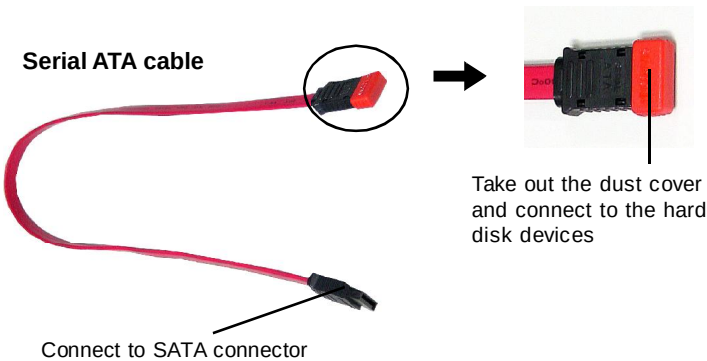
If you install two hard disks on IDE cable, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Serial ATA 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.



SATA3 SATA4 SATA1 SATA2



Important

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

Fan Power Connectors: CPUFAN1, SYSFAN1, NBFAN1 & SYSFAN2

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.

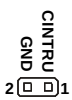
CPUFAN1 SYSFAN1 **SYSFAN2** NBFAN1

Important

1. Please refer to the recommended CPU fans at AMD® official website or consult the vendors for proper CPU cooling fan.
2. Always consult the vendors for proper CPU cooling fan.
3. Fan/heatsink with 3 or 4 pins are both available for CPUFAN1.
4. CPUFAN1 supports fan control. You can setup it in H/W Monitor of BIOS Setup.

Chassis Intrusion Switch Connector: JCI1

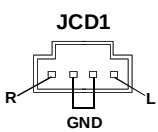
This connector connects to a 2-pin chassis switch. If the chassis is opened, the switch will be short. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.



JCI1

Aux Line-In Connector: JCD1

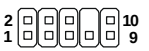
The connector is for TV/ DVD add-on card with Line-in connector.



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.

JAUD1

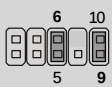


Pin Definition

PIN	SIGNAL	DESCRIPTION
1	AUD_MIC	Front panel microphone input signal
2	AUD_GND	Ground used by analog audio circuits
3	AUD_MIC_BIAS	Microphone power
4	AUD_VCC	Filtered +5V used by analog audio circuits
5	AUD_FPOUT_R	Right channel audio signal to front panel
6	AUD_RET_R	Right channel audio signal return from front panel
7	HP_ON	Reserved for future use to control headphone amplifier
8	KEY	No pin
9	AUD_FPOUT_L	Left channel audio signal to front panel
10	AUD_RET_L	Left channel audio signal return from front panel

Important

If you don't want to connect to the front audio header, pins 5 & 6, 9 & 10 have to be jumpered in order to have signal output directed to the rear audio ports. Otherwise, the Line-Out connector on the back panel will not function.



IrDA Infrared Module Header: JIR1

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

JIR1

Pin Definition

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

Front USB Connectors: JUSB1, JUSB2 & JUSB3

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

JUSB1/2/3

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)

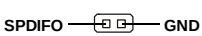
Connected to USB connector

Important

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

SPDIF-Out Connector: JSPDO1 (Optional, for HDMI graphics card only)

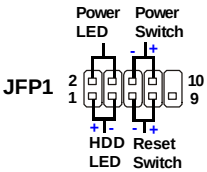
This connector is used to connect SPDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission **to the HDMI graphics card**.



JSPDO1

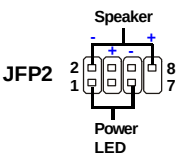
Front Panel Connectors: JFP1/ JFP2

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 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-down to GND
7	RST_SW +	Reset Switch high reference pull-up
8	PWR_SW +	Power Switch low reference pull-up
9	RSVD_DNU	Reserved. Do not use.

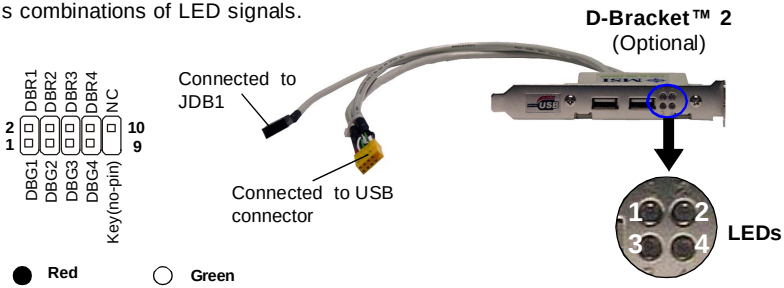


JFP2 Pin Definition

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+

D-Bracket™ 2 Connector: JDB1

The mainboard comes with a JDB1 connector for you to connect to D-Bracket™ 2. D-Bracket™ 2 is an external USB Bracket that supports both USB1.1 & 2.0 specs. It integrates four LEDs and allows users to identify system problems through 16 various combinations of LED signals.



● Red ○ Green

LED Signal	Description	LED Signal	Description
1 ● ● 2 3 ● ● 4	System Power ON The D-LED will hang here if the processor is damaged or not installed properly.	1 ● ● 2 3 ● ○ 4	Initializing Video Interface This will start detecting CPU clock, checking type of video onboard. Then, detect and initialize the video adapter.
1 ○ ● 2 3 ● ● 4	Early Chipset Initialization	1 ○ ● 2 3 ● ○ 4	BIOS Sign On This will start showing information about logo, processor brand name, etc...
1 ● ○ 2 3 ● ● 4	Memory Detection Test Testing onboard memory size. The D-LED will hang if the memory module is damaged or not installed properly.	1 ● ○ 2 3 ● ○ 4	Testing Base and Extended Memory Testing base memory from 240K to 640K and extended memory above 1MB using various patterns.
1 ○ ○ 2 3 ● ● 4	Decompressing BIOS image to RAM for fast booting.	1 ○ ○ 2 3 ● ○ 4	Assign Resources to all ISA.
1 ● ● 2 3 ○ ● 4	Initializing Keyboard Controller.	1 ● ● 2 3 ○ ○ 4	Initializing Hard Drive Controller This will initialize IDE drive and controller.
1 ○ ● 2 3 ○ ● 4	Testing VGA BIOS This will start writing VGA sign-on message to the screen.	1 ○ ● 2 3 ○ ○ 4	Initializing Floppy Drive Controller This will initialize Floppy Drive and controller.
1 ● ○ 2 3 ○ ● 4	Processor Initialization This will show information regarding the processor (like brand name, system bus, etc...)	1 ● ○ 2 3 ○ ○ 4	BootAttempt This will set low stack and boot via INT 19h.
1 ○ ○ 2 3 ○ ● 4	Testing RTC (Real Time Clock)	1 ○ ○ 2 3 ○ ○ 4	Operating System Booting

Button

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

Clear CMOS Button : SW1

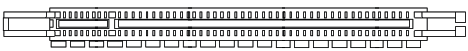
There is a CMOS RAM on board that has a power supply from external battery to keep the system configuration data. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, use the SW1 (Clear CMOS Button) to clear data. Press the button to clear the data.

SW1

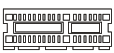
Slots

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 (compatible with PCIExpress x 8 speed only)



PCI Express x1 Slot

Important

1. *When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the ex pansion card, such as jumpers, switches or BIOS configuration.*
2. *The mainboard supports SLI technology with two PCI Express X 16 slots.*

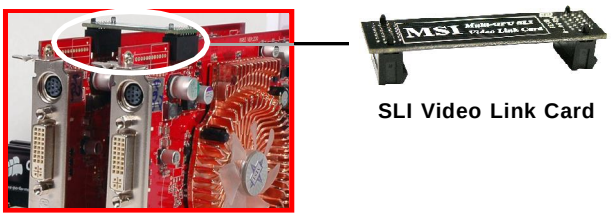
NV SLI Technology

NVIDIA SLI (Scalable Link Interface) technology allows two GPUs to run in tandem within a system to achieve up to twice the performance of a single graphics card. To utilize this technology, the two GPU cards must be connected by an *SLI Video Link card*.

SLI Video Link Card

If you intend to use the SLI mode for better graphics performance, please refer to the following instructions.

1.Install two graphics cards on PCI Express x16 slots. With two cards installed, an SLI bridge card is required to connect the atop golden fingers of these two graphics cards (refer to the picture below). Please note that although you have installed two graphics cards, only the video outputs on the first card will work. Hence, you only need to connect a monitor to the first PCI Express card.

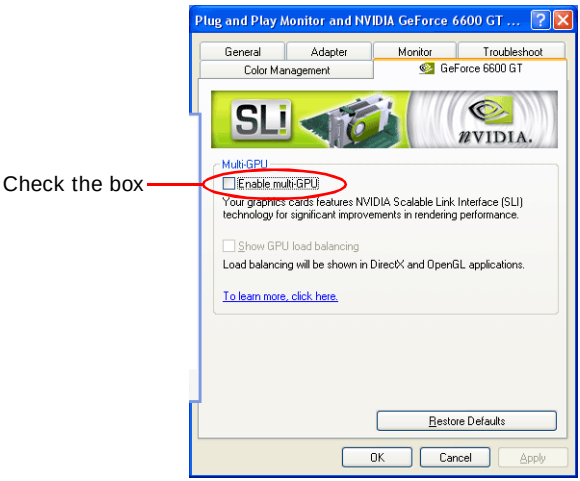


SLI Video Link Card

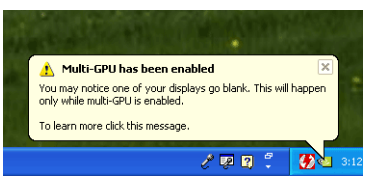
Important

1. *Mainboard photos shown in this section are for demonstration only. The appearance of your mainboard may vary depending on the model you purchase.*
2. *If you intend to install **TWO** x16 graphics cards for SLI, make sure that, these two graphics cards are of the same brand and specifications.*
3. *If you intend to install one PCIE x16 graphics card, please always install it into the PCI_E1 slot to ensure the performance of graphics card*
4. *Make sure that you connect an adequate power supply to the PCIE_PW1 connector (or to the power connection on the graphics card) to ensure stable operation of the graphics card.*

2. After the hardware installation is completed, restart the system and install the NV SLI driver/utility. A configuration panel will be provided for Multi-GPU control. Check the ***Enable multi-GPU*** box to enable the SLI function for the onboard graphics cards (concerning the details of multi-GPU settings, please refer to your graphics card manual) .



3. Restart your system and a pop-up will show in the system tray confirming that ***Multi-GPU has been enabled***.

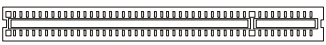


Important

If you want to remove one graphics card and quit the SLI function, make sure the "MultiGPU" function is disabled.

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 Y#	INT Z#	INT W#	INT X#
PCI Slot 2	INT Z#	INT W#	INT X#	INT Y#

Chapter 3
BIOS Setup

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

- An error message appears on the screen during the system booting up, and requests you to run SETUP.
- You want to change the default settings for customized features.

MSI
MICRO-STAR INTERNATIONAL

Entering Setup

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

Press DEL to enter SETUP

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

Important

1. *The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.*
2. *Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:*

A7325NMS V1.0 102006 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.
102006 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

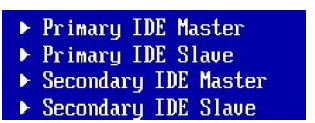
Getting Help

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

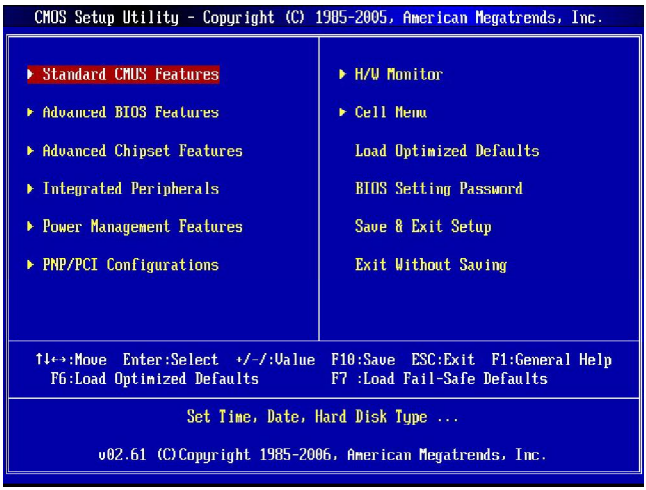


If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the 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 Features
Use this menu to specify your settings for power management.

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

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

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

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

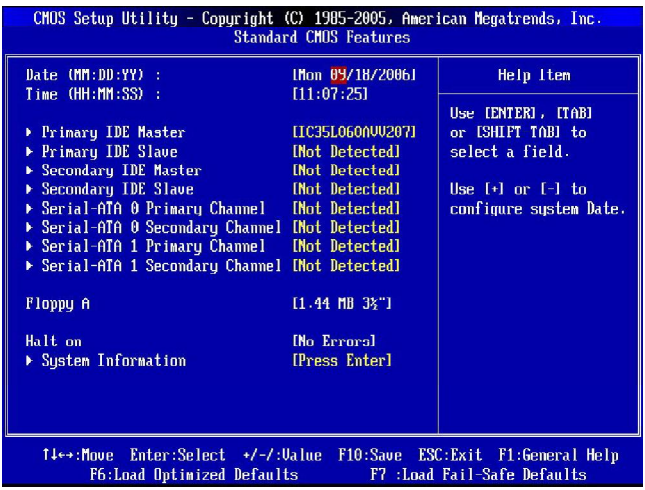
▶ BIOS Setting Password
Use this menu to set the password for BIOS.

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

▶ Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

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



▶ 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>.

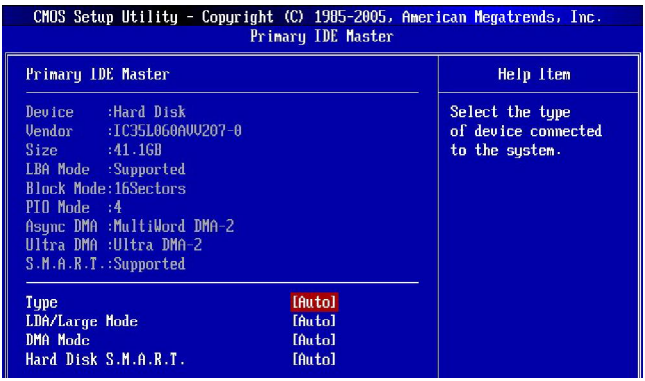
day	Day of the week, from Sun to Sat, determined by BIOS. Read-only.
month	The month from Jan. through Dec.
date	The date from 1 to 31 can be keyed by numeric function keys.
year	The year can be adjusted by users.

▶ 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
Define the HDD parameters.

▶ 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 1/ 2 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. Available options: [None], [360K, 5.25 in.], [1.2M, 5.25 in.], [720K, 3.5 in.], [1.44M, 3.5 in.], [2.88M, 3.5 in.].

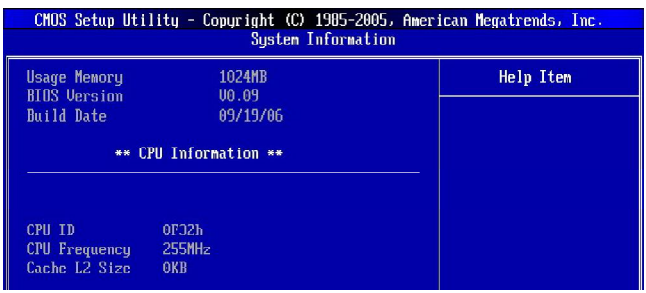
► Halt On

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.

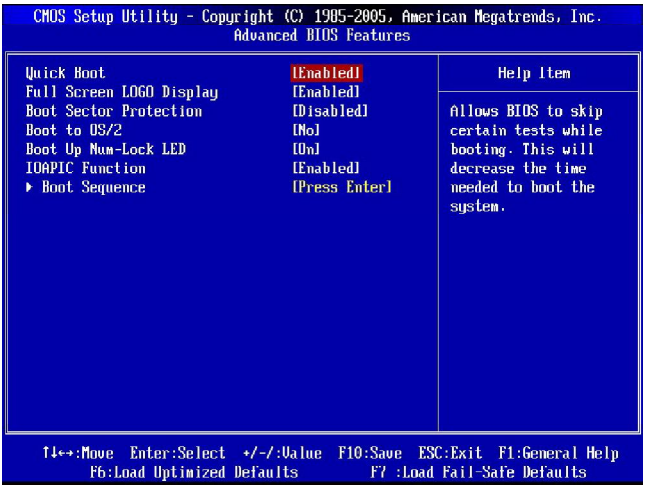
► System Information

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



This sub-menu shows the CPU information, BIOS version and memory status of your system (read only).

Advanced BIOS Features



▶ Quick Boot

Setting the item to [Enabled] allows the system to boot within 10 seconds since it will skip some check items.

▶ Full Screen LOGO Display

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

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

[Disabled] Shows the POST messages at boot.

▶ Boot Sector Protection

This item allows you to choose the virus warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write date into this area, BIOS will shows a warning message on screen and alarm beep.

▶ Boot to OS/2

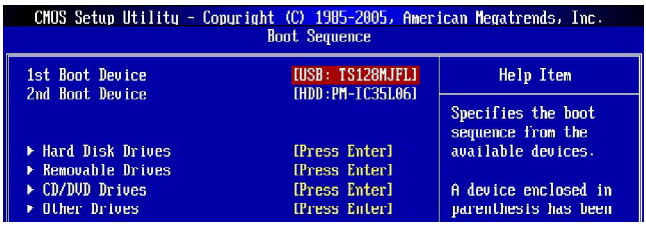
This allows you to run the OS/2 operatiing system with DRAM larger than 64MB. When you choose ***No***, you cannot run the OS/2 operating system with DRAM larger than 64MB. But it is possible if you choose ***Yes***.

▶ 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.

▶ 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.

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



▶ 1st/2nd Device
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

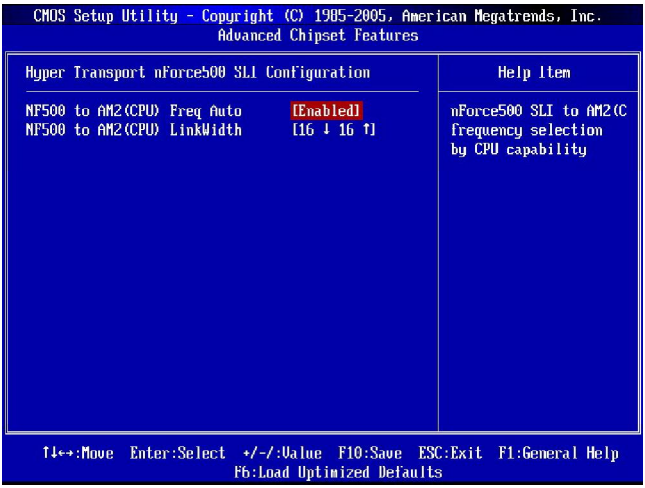
▶ Hard Disk Drives
This feature allows you to specify the hard disk boot priority.

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

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

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

Advanced Chipset Features



Hyper Transport nFocre500 SLI Configuration

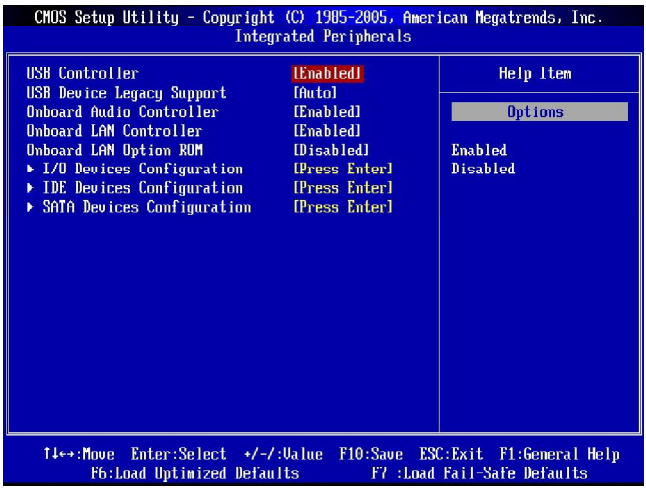
▶ NF500 to AM2 (CPU) Freq Auto

[Enabled] Auto Detect HT frequency.
[Disabled] Manual to setting HT frequency.

▶ NF500 to AM2 (CPU) LinkWidth

This item allows you to select the HT width between SB and CPU.

Integrated Peripherals



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

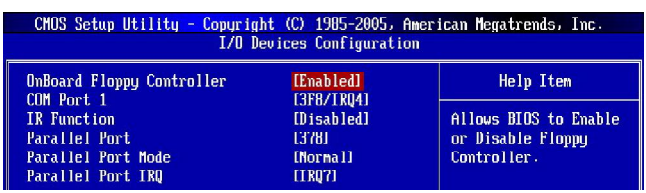
▶ USB Device Legacy Support
Select [Auto] if you need to use a USB-interfaced device in the operating system.

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

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

▶ Onboard LAN Option ROM
This item is used to decide whether to invoke the Boot ROM of the onboard LAN controller.

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



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

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

▶ IR Function
This setting allows you to enable or disable the IR function.

▶ 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

[Normal]	Stardand Parallel Port
[EPP]	Enhanced Parallel Port
[ECP]	Extended Capability Port
[ECP+EPP]	Extended Capability Port + Enhanced Parallel Port
[Bi-Directional]	

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.

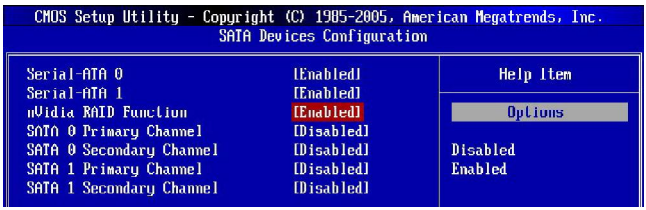
▶ Parallel Port IRQ
This item allows you to set parallel port IRQ.

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

▶ 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.

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

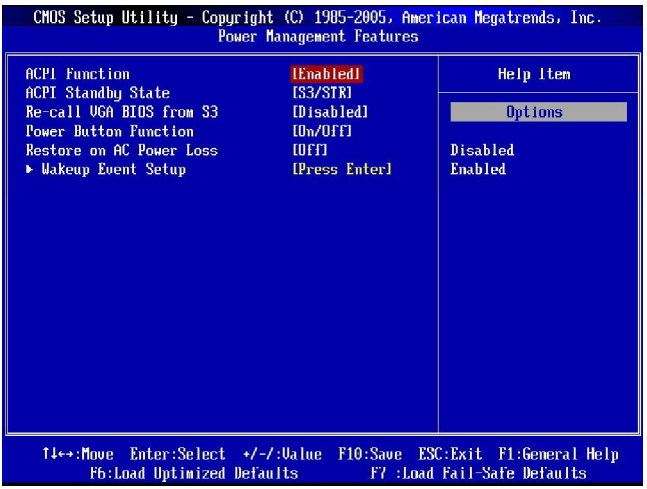


▶ Serial-ATA 0/ 1
These items allow users to enable or disable the SATA controllers. S

▶ nVidia RAID Controller
This item is used to enable/disable the nVidia RAID function for SATA devices.

▶ SATA 0/ SATA 1 Primary/ Secondary Channel
When the ***nVidia RAID Controller*** sets to "**Enable**", these items will appear. These items allow users to enable or disable the RAID function for each SATA hard disk drive.

Power Management Setup



Important

S3-related functions described in this section are available only when your BIOS supports S3 sleep mode.

▶ ACPI Function

This item is to activate the ACPI (Advanced Configuration and Power Management Interface) Function. If your operating system is ACPI-aware, such as Windows 2000/ XP, 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.

▶ Re-Call VGA BIOS From S3
When ***ACPI Standby State*** is set to [S3/STR], users can select the options in this field. Selecting [Yes] allows BIOS to call VGABIOS to initialize the VGA card when system wakes up (resumes) from S3 sleep state. The system resume time is shortened when you disable the function, but system will need an VGA driver to initialize the VGA card. Therefore, if the VGA driver of the card does not support the initialization 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:

[Power Off]	Always leaves the computer in the power off state.
[Power 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 setting determines whether the system will be awakened from what power saving modes when input signal of the PS/2 keyboard is detected.

▶ 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.

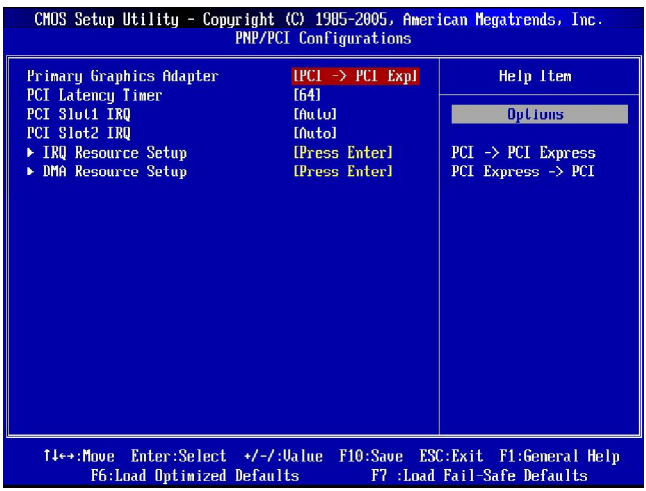
▶ Resume by PCI Device (PME#)
When set to [Enabled], the feature allows your system to be awakened from the power saving modes through any event on PME (Power Management Event).

▶ **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.



▶ 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.

► IRQ 3/4/5/7/9/10/11/14/15

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

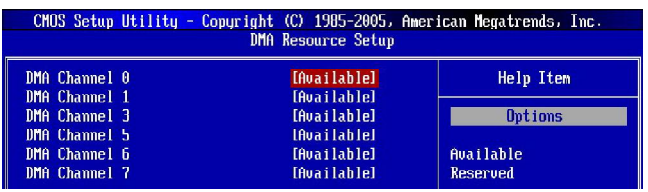
The settings determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the IRQ pool, the end user can use these settings to reserve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

Important

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

► DMA Resource Setup

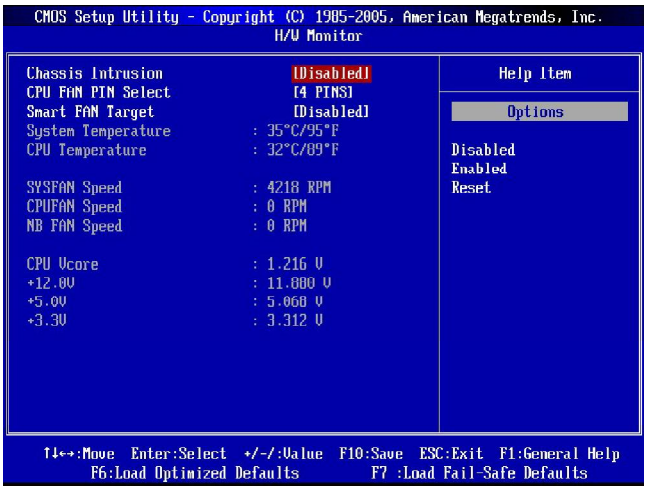
Press <Enter> to enter the sub-menu and the following screen appears.



► DMA Channel 0/1/3/5/6/7

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

H/W Monitor



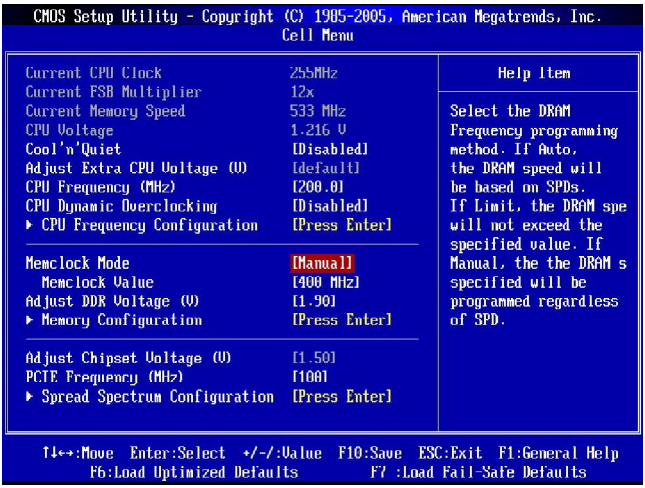
▶ Chassis Intrusion
The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear the warning message, set the field to [Reset]. The setting of the field will automatically return to [Enabled] later.

▶ CPU FAN PIN Select
This item is available for you to choose the CPU fan pin number of your system. ***Be sure to select the correct pin number identical to the pin of the CPU fan you purchase.***

▶ 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 several sections to speed up for cooling down automaticlly .

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

Cell Menu



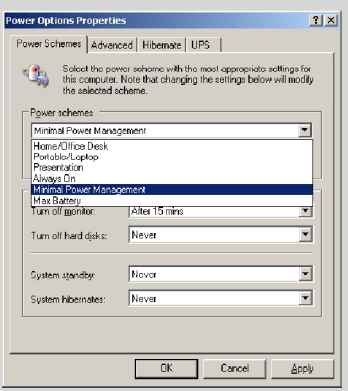
▶ Cool'n'Quiet

The Cool'n' Quiet technology can effectively and dynamically lower CPU speed and power consumption.

Important

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

1. *Run BIOS Setup, and select **Cell Menu**. Under **Cell Menu**, find **Cool'n'Quiet**, and set this item to "Enable."*
2. *Enter Windows, and select [Start]->[Settings]->[Control Pannel]->[Power Options]. Enter **Power Options Properties** tag, and select **Minimal Power Management** under **Power schemes**.*



Important

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

► Current CPU Clock/ FSB Multiplier/ Memory Speed/ CPU Voltage
These items show the current CPU Clock/ FSB Multiplier/ Memory Speed/ CPU Voltage. Read-only.

► Adjust Extra CPU Voltage (V)
This item allows you to overclock the CPU voltage.

► CPU Frequency (MHz)
This item allows you to select the CPU Front Side Bus clock frequency (in MHz).

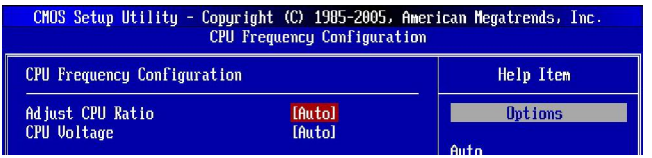
► CPU Dynamic OverClocking
Dynamic Overclocking Technology is the automatic overclocking function, included in the MSI™'s newly developed CoreCell™ Technology. It is designed to detect the load balance of CPU while running programs, and to adjust the best CPU frequency automatically. When the motherboard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

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

Important

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

▶ CPU Frequency Configuration
Press <Enter> to enter the sub-menu and the following screen appears.



▶ Adjust CPU Ratio
This item allows you to set the CPU ratio.

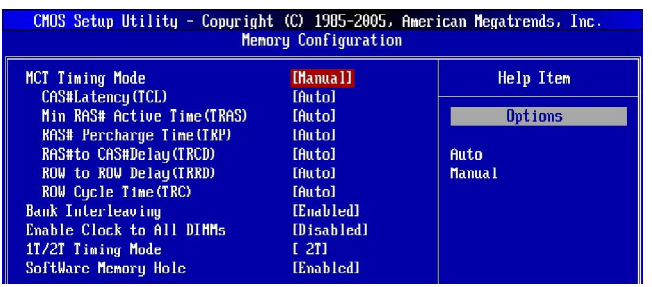
▶ CPU Voltage
This item allows you to set the CPU voltage.

▶ Memclock Mode
Setting to ***Auto***, the system will auto detect the memory clock. Setting to ***Manual***, the "Memory Value" item will appear and allows you to select the memory clock.

▶ Memory Value
This item allows you to select the memory clock.

▶ Adjust DDR Voltage (V)
Adjusting the DDR2 voltage can increase the DDR speed.

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



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

▶ CAS# Latency (TCL)
When the ***MCT Timing Mode*** sets to [Manual], the field is adjustable.This controls the CAS latency, which determines the timing delay (in clock cycles) before SDRAM starts a read command after receiving it.

▶ **Min RAS# Active Time (TRAS)**
When the ***MCT Timing Mode*** sets to [Manual], the field is adjustable. This setting determines the time RAS takes to read from and write to a memory cell.

▶ **RAS# Precharge Time (TRP)**
When the ***MCT Timing Mode*** sets to [Manual], the field is adjustable. This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refreshing may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system.

▶ **RAS# to CAS# Delay (TRCD)**
When the ***MCT Timing Mode*** sets to [Manual], the field is adjustable. When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles, the faster the DRAM performance.

▶ **ROW to ROW Delay (TRRD)**
When the ***MCT Timing Mode*** sets to [Manual], the field is adjustable. Specifies the active-to-active delay of different banks.

▶ **ROW Cycle Time (TRC)**
When the ***MCT Timing Mode*** sets to [Manual], the field is adjustable. The row cycle time determines the minimum number of clock cycles a memory row takes to complete a full cycle, from row activation up to the precharging of the active row.

▶ **Bank Interleaveing**
This field selects 2-bank or 4-bank interleave for the installed SDRAM. Disable the function if 16MB SDRAM is installed.

▶ **Enable Clock to All DIMMs**
Enable unused clocks to all DIMMs even memory DIMMs are not populated.

▶ **1T/2T Timing Mode**
This field controls the SDRAM command rate. Selecting [1T] makes SDRAM signal controller to run at 1T (T=clock cycles) rate. Selecting [2T] makes SDRAM signal controller run at 2T rate.

▶ **SoftWare Memory hole**
Enable Memory Remapping Around Memory Hole.

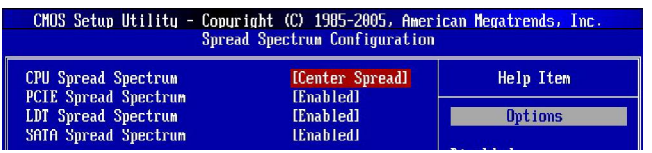
▶ **Adjust Chipset Voltage**
Allows to adjust the chipset voltage.

Important

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

▶ PCIE Frequency (MHz)
This item allows you to select the PCIE frequency (in MHz).

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



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

▶ PCIE / LDT / SATA Spread Spectrum
These settings are used to enable or disable the PCIE/ LDT (HT Bus multiplier)/ SATA Spread Spectrum feature.

Important

1. *If you do not have any EMI problem, leave the setting at [Disabled] for optimal system stability and performance. But if you are plagued by EMI, select the value of Spread Spectrum for EMI reduction.*
2. *The greater the Spread Spectrum value is, the greater the EMI is reduced, and the system will become less stable. For the most suitable Spread Spectrum value, please consult your local EMI regulation.*
3. *Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clock speed which may just cause your overclocked processor to lock up.*

CPU and Memory Clock Overclocking

The **CPU Frequency / CPU Dynamic OverClocking / Adjust CPU Ratio/ Memory Clock** are the items for you to overclock the CPU and the Memory. Please refer to the descriptions of these fields for more information.

Important

1. *CPU Speed = CPU Frequency * CPU Ratio*
2. *This motherboard supports overclocking greatly. However, please make sure your peripherals and components are bearable for some special settings. Any operation that exceeds product specification is not recommended. Any risk or damge resulting from improper operation will not be under our product warranty.*

Two ways to save your system from failed overclocking...

Reboot

1. Press the Power button to reboot the system three times. Please note that, to avoid electric current to affect other devices or components, we suggest an interval of more than 10 seconds among the reboot actions.

2. At the fourth reboot, BIOS will determine that the previous overclocking is failed and restore the default settings automatically. Please press any key to boot the system normally when the following message appears on screen.

```
Warning !!! The previous performance of overclocking is failed,
and the system is restored to the defaults setting.
Please press any key to continue...
```

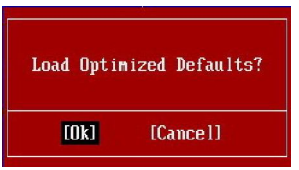
Clear CMOS

- Please refer to “chapter 2” for more information about how to clear CMOS data.

Load Optimized Defaults

The option on the main menu allow 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:



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:

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 ALC850 Audio

The Realtek ALC850 supports 8-channel audio output, including 2 Front, 2 Rear, 1 Center and 1 Subwoofer channel. It enables connection to 2, 4, 6 or 8 speakers for better surround sound effect. This section tells you how to install and use 2-, 4-, 6- or 8-channel audio function on the board.

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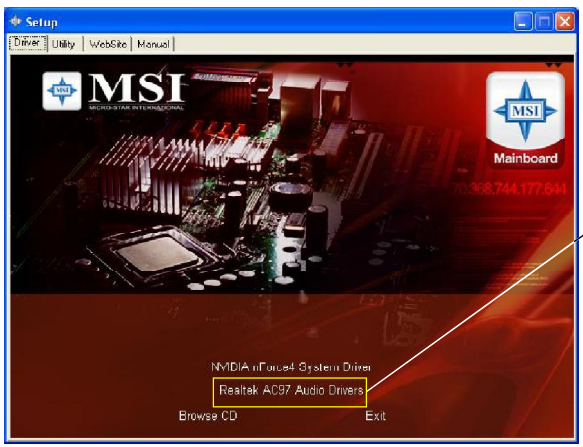
Installing the Audio Driver

You need to install the driver for Realtek ALC850 codec to function properly before you can get access to 2-, 4-, 6- or 8- 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 Pack2 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.

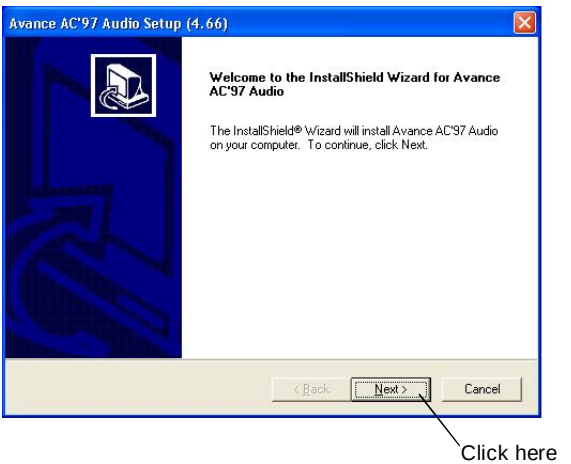
1. Insert the application CD into the CD-ROM drive. The setup screen will automatically appear.
2. Click **Realtek AC97 Audio Drivers**.



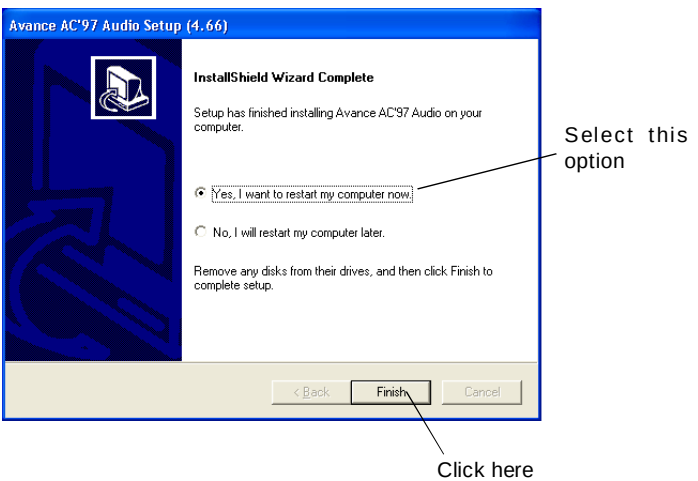
Important

*The **AC97 Audio Configuration** software utility is under continuous update to enhance audio applications. Hence, the program screens shown here in this appendix may be slightly different from the latest software utility and shall be held for reference only.*

3. Click **Next** to install the AC'97 Audio software.

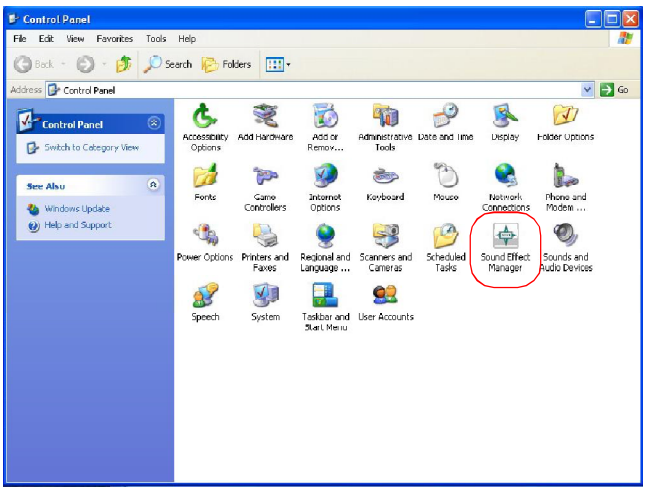


4. Click **Finish** to restart the system.



Software Configuration

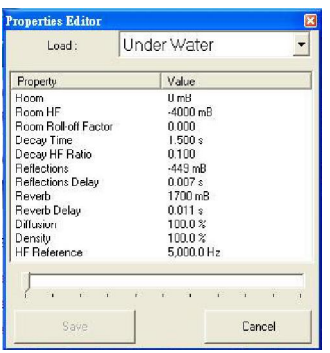
After installing the audio driver, you are able to use the 2-, 4-, 6- or 8- channel audio feature now. Click the audio icon from the system tray at the lower-right corner of the screen to activate the **AC97 Audio Configuration**. It is also available to enable the audio driver by clicking the **Sound Effect Manager** from the **Control Panel**.



Sound Effect

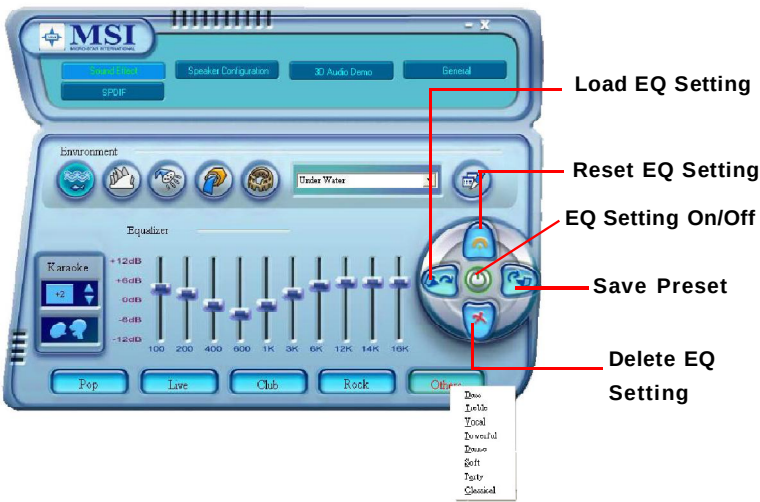
Here you can select a sound effect you like from the **Environment** list.

You may also edit the properties for an environment as you wish by clicking the "**Edit**" button, then just scroll the bar in the bottom for each property to adjust.



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.

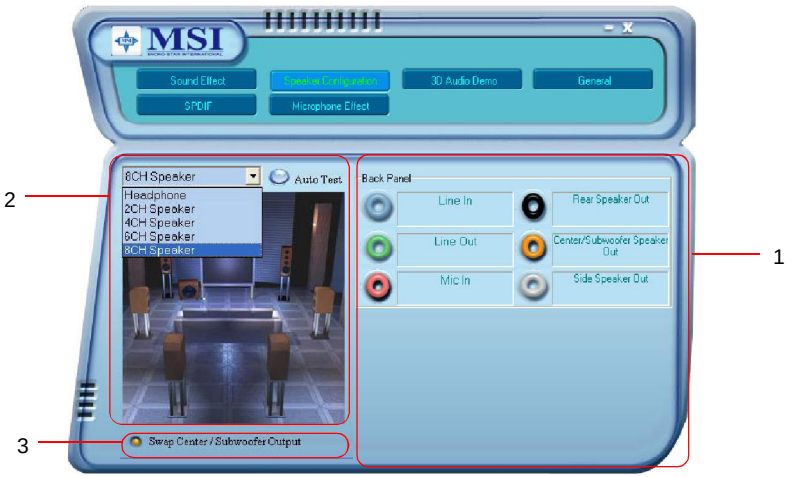


Here it provides the Karaoke function which will automatically remove human voice (lyrics) and leave melody for you to sing the song. You may use the "up arrow" and "down arrow" button to raise/lower the key, and press the lower button to remove the human voice.

Speaker Configuration

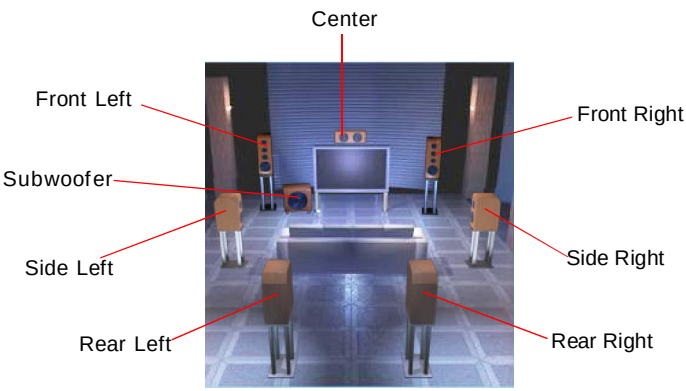
In this tab, you can easily configure your multi-channel audio function and speakers.

1. First you have to select the audio configuration below which is identical to the audio jack on your mainboard. In this model it uses Realtek ALC850 codec which supports 8-channel, therefore you should choose **8CH audio out.**



2. Select 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 8-Speaker Output

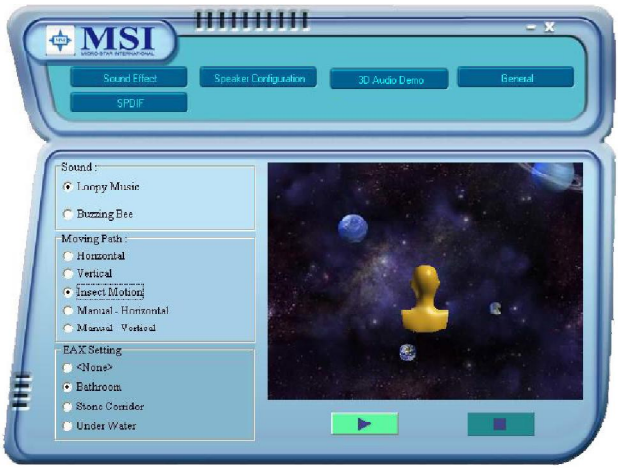
Select the speaker by clicking it to test its functionality. The one you select will light up and make testing sound. If any speaker fails to make sound, then check whether the cable is inserted firmly to the connector or replace the bad speakers with good ones. Or you may click the **"Auto Test"** button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



3. While you are testing the speakers in 8-Channel / 6-Channel Mode, if the sound coming from the center speaker and subwoofer is swapped, you should select **Swap Center/Subwoofer Output** to readjust these two channels**.**

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.



General

In this tab it provides some information about this AC97 Audio Configuration utility, including Audio Driver Version, DirectX Version, Audio Controller & AC97 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.

SPDIF

In this tab it provides options about SPDIF-Out for you to configure.

† **No Output:** With this option, there is no S/PDIF output signal while playing analog and digital audio.

† **Output digital only:** With this option, only digital audio will be allowed to play via SPDIF out while playing analog and digital audio.

† **Output digital and analog:** With this option, both digital and analog audio will be allowed to play via SPDIF out while playing analog and digital audio.

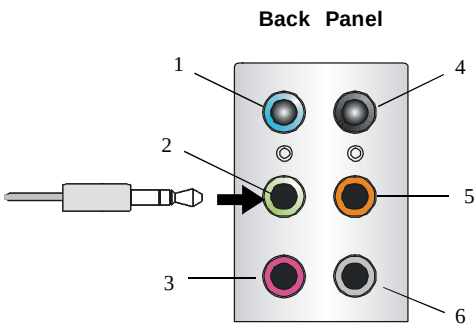
Hardware Setup

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

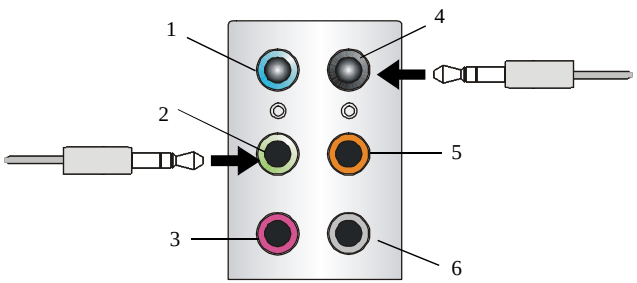
Refer to the following diagram and caption for the function of each phone jack on the back panel when 2-Channel Mode is selected.



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)*

n 4-Channel Mode for 4-Speaker Output

Back Panel



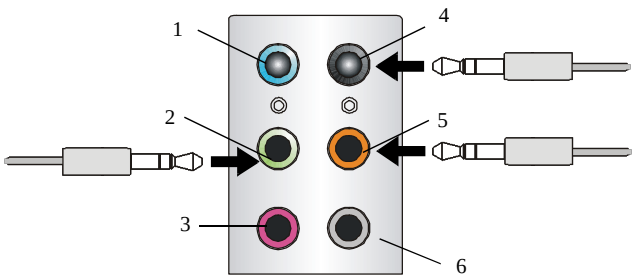
Description:
Connect two speakers to back panel's front-channel Line Out connector and two speakers to the real-channel Line Out connector.

4-Channel Analog Audio Output

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

n 6-Channel Mode for 6-Speaker Output

Back Panel

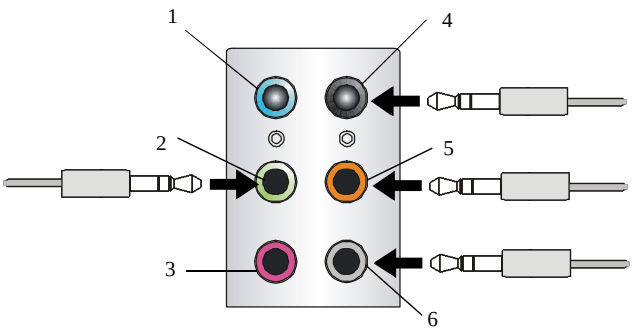


Description:
Connect two speakers to back panel's Line Out connector, two speakers to the rear-channel Line out connector and two speakers to the center/ subwoofer-channel Line Out connector.

6-Channel Analog Audio Output

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

n 8-Channel Mode for 8-Speaker Output



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

8-Channel Analog Audio Output

1. 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 channels)*

Appendix B
Dual Core Center

Dual CoreCenter, the most useful and powerful utility that MSI has spent much research and efforts to develop, helps users to monitor or configure the hardware status of MSI Mainboard & MSI Graphics card in windows, such as CPU/GPU clock, voltage, fan speed and temperature.
Before you install the Dual CoreCenter, please make sure the system has meet the following requirements:

1. Intel Pentium4 / Celeron, AMD Athlon XP/ Sempron or compatible CPU with PCI Express slot.
2. 256MB system memory.
3. CD-ROM drive for software installation.
4. Operation system: Windows XP.
5. DotNet Frame Work 2.0

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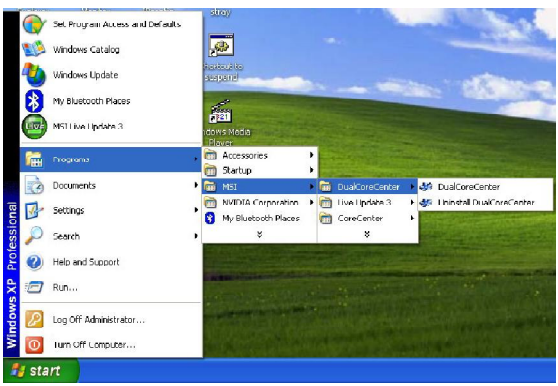
Activating Dual Core Center

Once you have your Dual Core Center installed (locate the setup source file in the setup CD accompanying with your mainboard, path: **Utility --> MSI Utility --> Dual Core Center**), it will have an icon in the system tray, a short cut icon on the desktop, and a short cut path in your "Start-up" menu. You may double-click on each icon to enable Dual Core Center.

short-cut icon in the system tray



short-cut path in the start-up menu (path: Start-->Programs-->MSI--> DualCoreCenter-->DualCoreCenter)

Main

Before using this utility, we have to remind you: only when installing the MSI V044 (V044 has to install with the version 8.26 or newer driver)/ V046 or V060 graphics card can activate the full function of this utility. If you install a graphics card of other brand, only hardware status of the MSI mainboard would be available.

Introduction:

Click each button appearing above to enter sub-menu to make further configuration or to execute the function.

MB

Click MB button to read current CPU temperature, FSB and CPU clock of mainboard will show below.

VGA

Click VGA button to read current GPU temperature, GPU clock and memory clock of graphics card will show below.

DOT

Click DOT button to enable or disable the Dynamic Overclocking Technology.

AV/ Game/ Office/ Silence/ Cool

MSI provides five common settings for different environments. The settings had been set to optimal values to reach better performance in each environment. Click the button you need.

Important

Before clicking the AV/ Game/ Office/ Silence or Cool button, select Smooth mode or Sharp mode to decide whether you want the system to reach the optimal values smoothly or quickly.

Sharp mode  ***Smooth mode***

Clock

In this sub-menu, you can adjust and monitor the clocks of MB and graphics card.

Voltage

In this sub-menu, you can adjust and monitor the voltages of MB and graphics card.

FAN Speed

In this sub-menu, you can adjust and monitor the fan speeds of MB and graphics card.

Temperature

In this sub-menu, you can monitor the temperatures of MB and graphics card.

User Profile

In this sub-menu, you can set the values of clock, voltage and fan speed by your need and save them in a profile. You can save 3 profiles for further use.

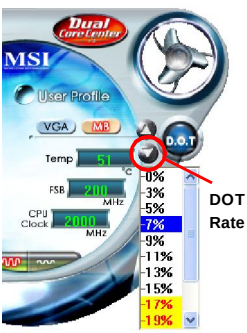
Important

Click on the icon , the clock, voltage, fan, and temperature buttons will appear beside the icon.

DOT (Dynamic OverClocking)

Dynamic Overclocking Technology is an automatic overclocking function, included in the MSI™'s newly developed Dual CoreCenter Technology. It is designed to detect the loading of CPU/ GPU while running programs, and to over-clock automatically. When the motherboard detects that the loading of CPU is exceed the default threshold for a time, it will speed up the CPU and fan automatically to make the system run smoother and faster. When the graphics card detects that the loading of GPU is exceed the default threshold for a time, it will speed up the GPU, memory, fan and voltage automatically to make the system run smoother and faster. When the CPU/ GPU is temporarily suspending or staying in low loading balance, it will restore the default settings instead. Usually the Dynamic Overclocking Technology will be powered only when users' PC runs huge amount of data, like 3D games or video process, and the motherboard/ graphicd card need to be boosted up to enhance the overall performance. There will be several selections when you click the DOT rate button (include increase rate  and decrease  rate buttons), to select the DOT level, then you have to click the DOT button  to apply the DOT function.

DOT FSB-UP Rate button



DOT FSB-DOWN Rate button

Important

Even though the Dynamic Overclocking Technology is more stable than manual overclocking, basically, it is still risky. We suggest user to make sure that your CPU can afford to overclock regularly first. If you find the PC appears to be unstable or reboot incidentally, it's better to lower the level of overclocking options. By the way, if you need to conduct overclocking manually, please do not to apply the DOT function.

Clock

In the **Clock** sub-menu, you can see clock status (including FSB/ CPU clock of mainboard and GPU/ memory clock of graphics card) of your system. And you can select desired value for overclocking. There will be several items for you to select for overclocking after you click button. You can click the plus sign button to increase the clock, or click the minus sign button to decrease the clock. And finally, click the Apply button to apply the values adjusted. If you do not want to apply the adjustments, click the Cancel button to cancel. Or click the Default button to restore the default values.

On the underside, it shows the graphs of the clocks. Only the curves of the item which the button is lit up with red color will be shown.

Important

*In the user profile, clicking the **Save** button can save the changes to it. In the default profile, the Save button is not available.*

Voltage

In the **Voltage** sub-menu, you can see voltage status (including Vcore, memory, GPU voltage... etc.) of your system, and you can select desired value for overclocking. It will show several items to select for overclocking after you click the button. You can click the plus sign button to increase the voltage, or click the minus sign button to decrease. And finally, click the Apply button to apply the adjustments. If you do not want to apply the adjustments, click the Cancel button to cancel. Or click the Default button to restore the default values.

On the underside, it shows the graphs of the voltages. Only the curves of the item which the button is lit up with red color will be shown.

Important

*In the user profile, clicking the **Save** button can save the changes to it. In the default profile, the Save button is not available.*

FAN Speed

In the **FAN Speed** sub-menu, you can read fan status of your system. Select higher speed for better cooling effect. There are several sections for you to change the fan speed to a section after clicking button. Click the plus sign button to increase the fan speed to a section, or click the minus sign button to decrease. Or click the Default button to restore the default values.

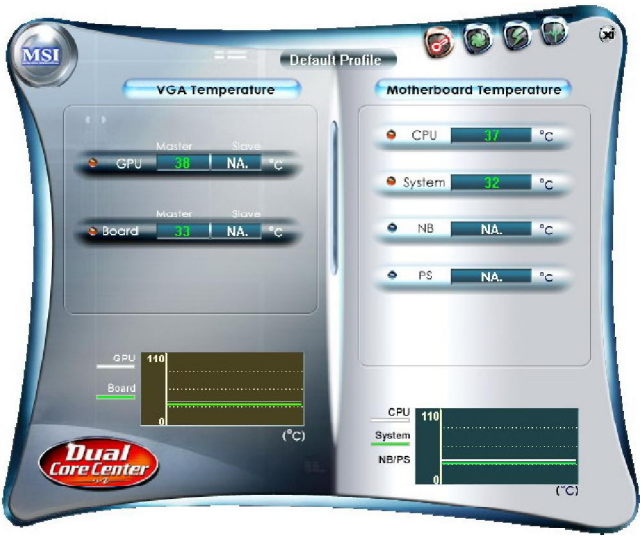
On the underside, it shows the graphs of the fan speed. Only the curves of the item which the button is lit up with red color will be shown.

Important

1. *When you set the fan speed manually, please make sure to disabled the "Smart FAN Target" item in the BIOS.*
2. *In the user profile, clicking the **Save** button can save the changes to it. In the default profile, the Save button is not available.*

Temperature

In the **Temperature** sub-menu, you can see temperature status of your system.



On the underside, it shows the graphs of the temperatures. Only the curves of the item which the button is lit up with red color will be shown.

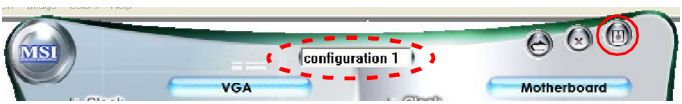
User Profile

In the **User Profile** sub-menu, click the setting button that besides the user profile bar, and the next screen will appear.

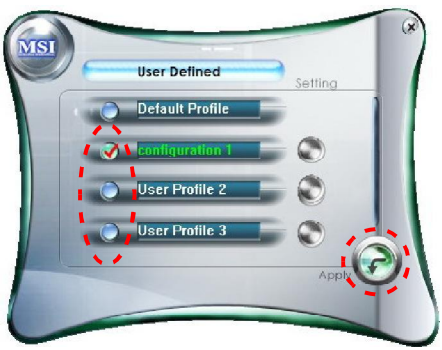
Here you can define the clock/ fan speed/ voltage by your need, click the button to choose a value quickly, or click the plus / minus sign button to increase/ decrease the value.

Use the draw bar to set the max system temperature. When the system temperature exceeds the threshold you defined, the system will pop up a warning message and shut down the system.
Use the draw bar to set the minimal fan speed. When the fan speed is lower than the threshold you defined, the system will pop up a warning message.

After setting all values you need, you can change the user profile name in the box then click the save button  to save all changes in a profile.



Finally, you can choose the user profile by click the button in the left side and click the Apply button to load the user profile.



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

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 ***OnChip RAID Controller and SATA0/ SATA1 Primary/ Secondary Channel*** in **SATA Devices Configuration** 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 ***OnChip RAID Controller and SATA0/ SATA1 Primary/ Secondary Channel*** in **SATA Devices Configuration** 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.

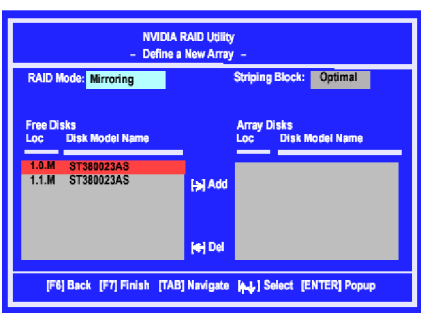
Setting Up the NVRAID BIOS

Be sure to enable the ***OnChip RAID Controller and SATA0/ SATA1 Primary/ Secondary Channel*** in **SATA Devices Configuration** 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***.



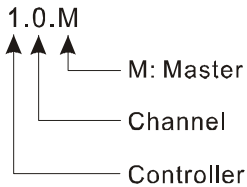
Understanding the "Define a New Array" Window

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.



In the example above, 1.0.M means the hard drive is attached to Controller 1, Channel 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.

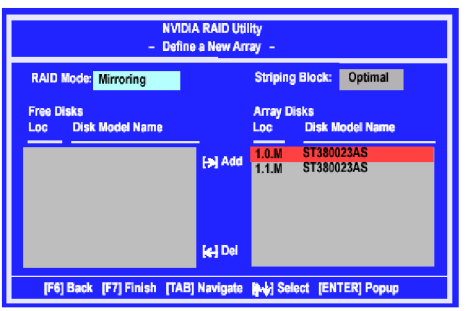
Using the Define a New Array Window
If necessary, press the tab key to move from field to field until the appropriate field is highlighted.

• 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,

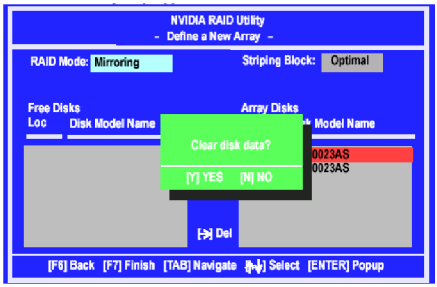
1. Tab to the **Free Disks** section. The first disk in the list is selected.
2. Move it from the Free Disks block to the Array Disks block by pressing the right arrow key (-->). The first disk in the list is moved, and the next disk in the list is selected and ready to be moved.
3. Continue pressing the right-arrow key (<--) until all the disks that you want to use as RAID array disks appear in the **Array Disks** block.



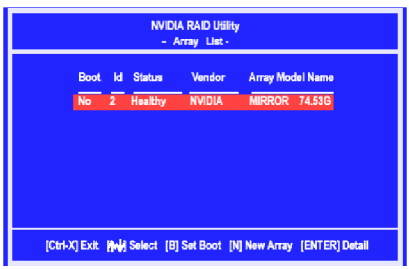
It shows that two disks have been assigned as RAID1 array disks in the figure above.

Completing the RAID BIOS Setup

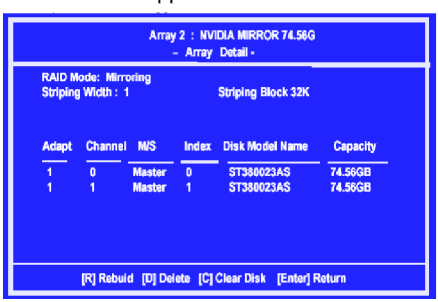
1. After assigning your RAID array disks, press **F7.** The Clear disk data prompt appears.



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.



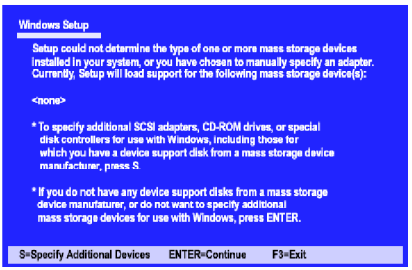
3. Use the arrow keys to select the array that you want to set up, then press **Enter.** The **Array Detail** window appears.



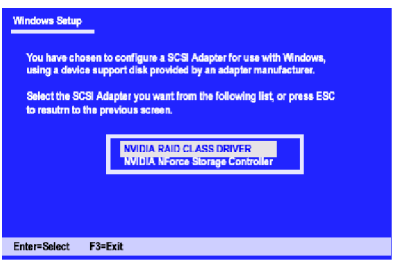
4. If you want to mark this disk as empty and wipe out all its contents then press **C**.
5. At the prompt, press **Y** to wipe out all the data, otherwise press **N**.
6. Press **Enter** again to go back to the previous window and then press **Ctrl+X** to exit the RAID setup. Now that the RAID setup 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 p.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:

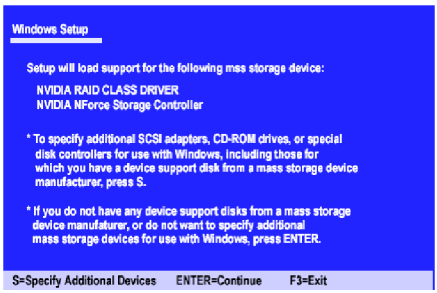


Important

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 \CK804 \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:



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.

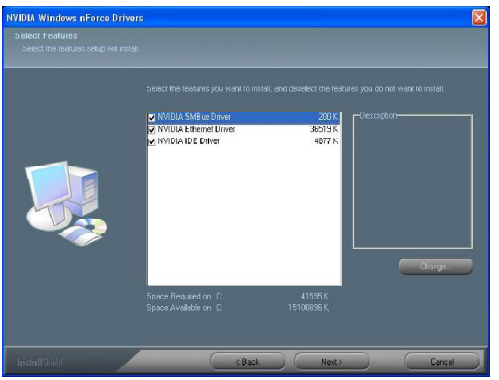
NVIDIA RAID Utility Installation

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.*

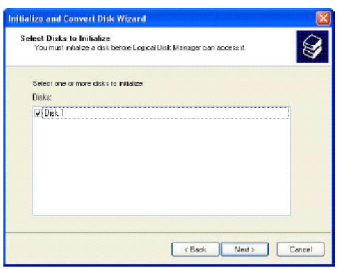
3. Click **Next** and then follow the instructions.
4. After the installation is completed, be sure to reboot the PC.
5. After the reboot, initialize the newly created array.

Initializing and Using the Disk Array

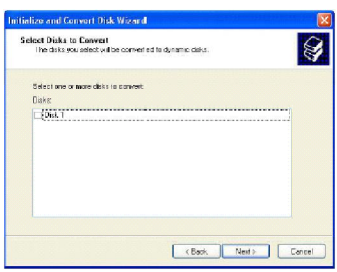
The RAID array is now ready to be initialized under Windows.

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.

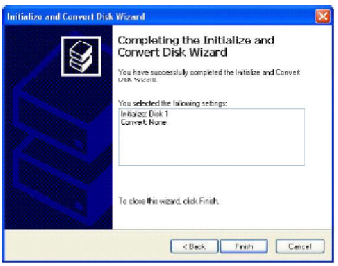
3. Click **Next**. The Select Disks to Initialize window appears. The disks listed depend on how many arrays you have configured.



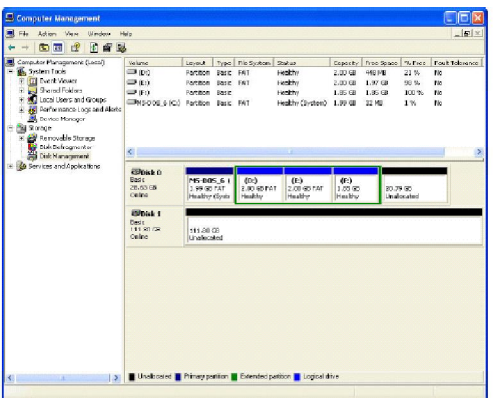
4. Click **Next**. The Select Disks to Convert window appears.



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.

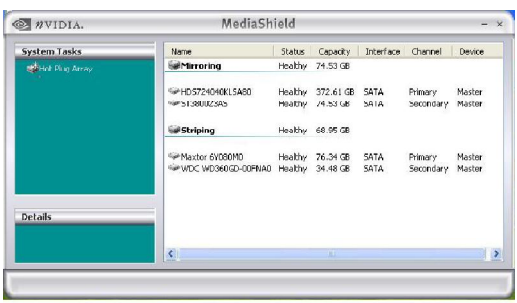
RAID Drives Management

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 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

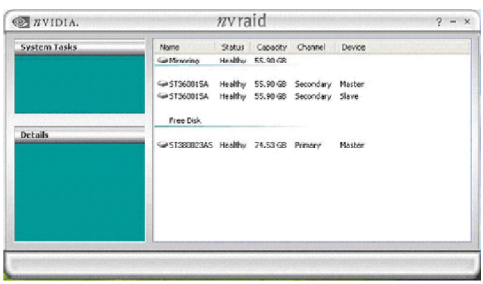
A dedicated free disk is a disk that is assigned to a RAID 1, RAID 0+1 or RAID 5 array and that disk is used by that array only when needed, for example during a system crash where a RAID mirrored drive is broken. The dedicated disk can be used only by the array that it is assigned to and not by any 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.

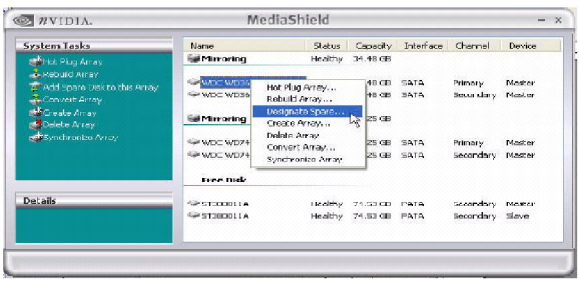


Assigning a Dedicated Disk
To mark a disk as dedicated, or reserve it for use by a specific array,

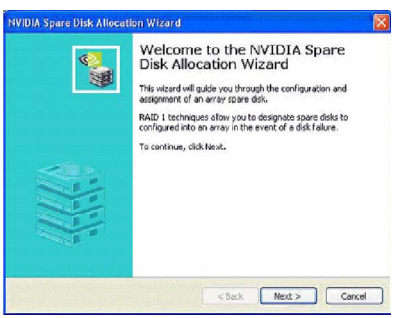
Step 1: Mark the Disk as a Free Disk
1. Enter the system BIOS setup and make sure that the drive that you want to mark as free is RAID enabled.
2. Boot into Windows and run the NVRAIDMAN program.
If the disk is not part of any RAID array, then it will appear under the Free Disk section of the RAID GUI.

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

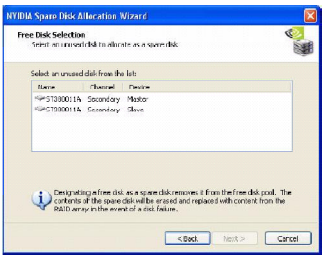
1. Right click one of the two Mirrored arrays as shown below.



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

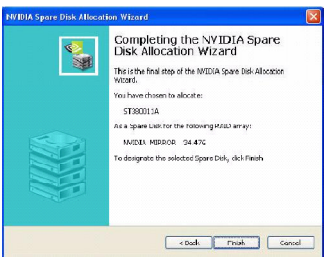


3. Click **Next**.
The RAID Array Selection page appears.

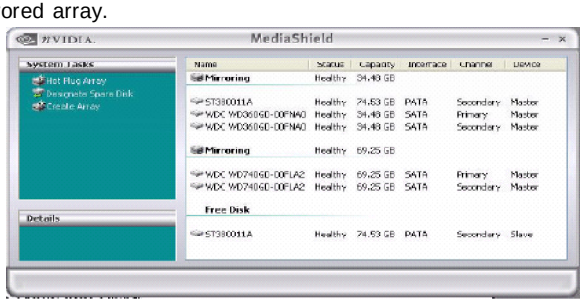


4. From the Free Disk Selection page, select one of the two free disks available. This would be the disk that will be designated to the mirror array.

5. Click **Next**.
The Completing the NVIDIA Spare Disk Allocation page appears.

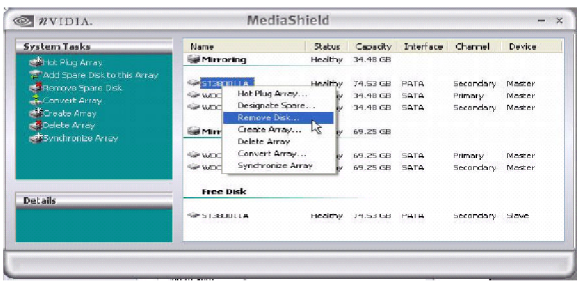


6. Click **Finish**.
As shown in figure below, the ST380011A drive is now a dedicated free disk in the mirrored array. If a system crash occurs that causes any of the two WD360GD drives to fail, the ST380011A hard drive will take over and be used in the newly formed mirrored array.



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 x 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

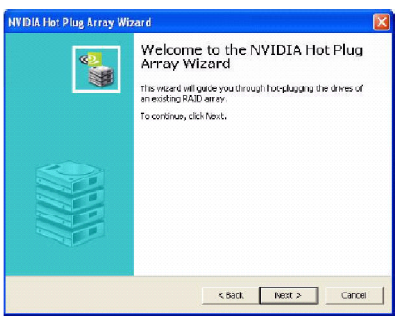
From	To	New Array Disk Requirements
RAID 0+1	RAID 0	m >= n2 Number of RAID 0 disks must be equal to or greater than half the number of RAID 0+1 disks.
	RAID 1	** Not a valid combination **
	RAID 0+1	** Not a valid combination **
	RAID 5	m >= (n/2 + 1)
RAID 5	RAID 0	m >= n - 1
	RAID 1	** Not a valid combination **
	RAID 0+1	m >= 2 x (n -1) ; where m is an even number of disks.
	RAID 5	m >= n

Hot Plug Array

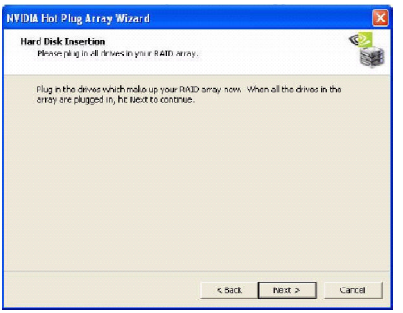
With respect to RAID, hot plugging is the ability to add a disk to a system safely and without causing problems for the RAID software. For example, when a drive in a mirrored array fails, the user can launch the Hot Plug Array Wizard which instructs the user as to when a drive can be safely added to 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:



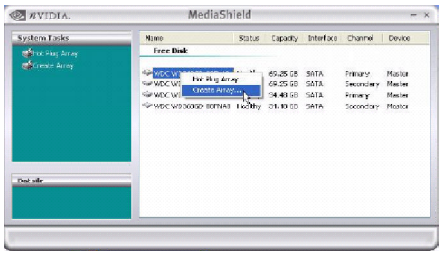
3 Connect the RAID disk that you want to use with any given RAID array.
4 Click **Next** and the following screen shot will appear:

5 Click **Finish**.

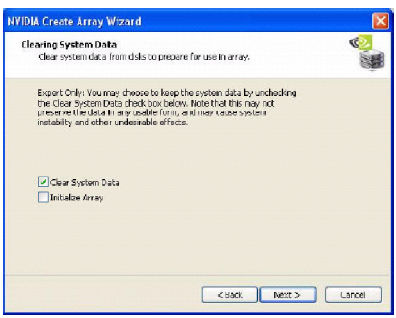
Initializing a RAID Array

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.

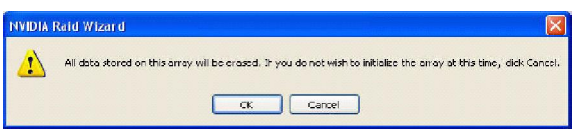
1 From the NVRAIDMAN window, right click on any available free disk and select **Create Array** as show in Figure below.



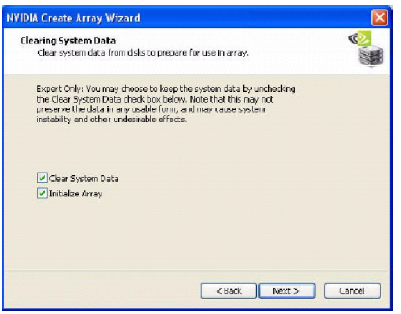
2 The Create Array Wizard opens. Follow the Wizard to create a Mirror array.
3 At the Create Array Wizard Welcome screen, click **Next**.
4 At the RAID Array Selection page, make sure that RAID Mode is set to "**Mirroring**" and Stripe Size is set to its default value of 64K, then click **Next**.
5 At 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:



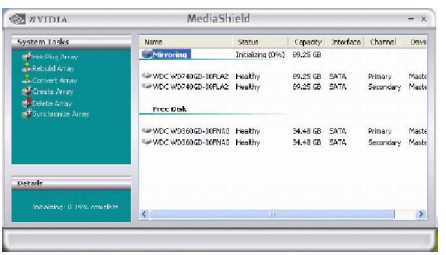
7 Check "Intialize Array" and then click **Next**. The Initialization Warning dialog appears.



8 Click **OK**. The Clearing System Data screen appears again with the Initialize Array check box checked as shown below.



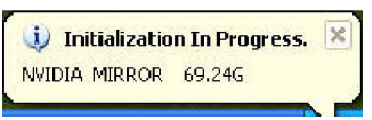
9 Click **Next**, then click **Finish** at the Completing the NVIDIA Create Array Wizard screen. The NVRAIDMAN windows shows the created RAID array as shown below.



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:

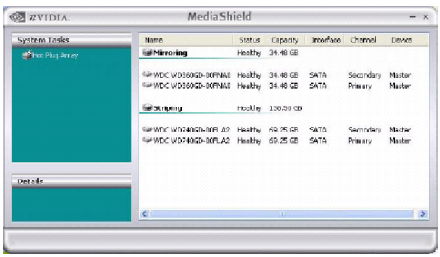


Rebuilding a RAID Array

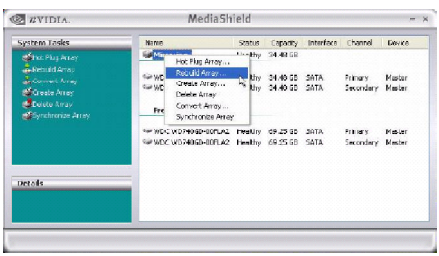
Rebuilding is the process of restoring data to a hard drive from other drives in the array. This applies only to fault tolerant arrays such as RAID 1, RAID 0+1, as well as a RAID 5. For example, assuming you have a three disk RAID 5 array, and one of the drives fail, then you need the lost data on the newly added drive.

Rebuilding Instructions

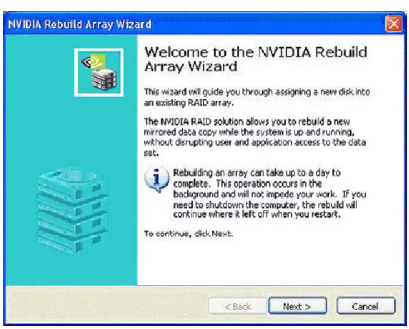
After creating a mirrored array, you can rebuild the array using the following steps:
1. Go to Windows and run the NVIDIA RAID Management utility.
The picture below shows an example of a system with one mirrored array and two free disks.



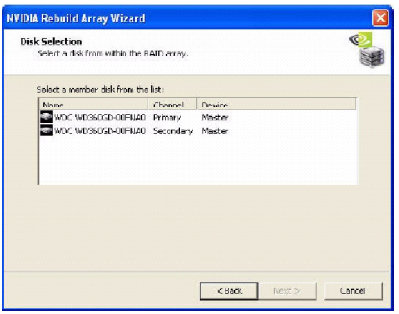
2. Right-click on Mirroring. The popup menu appears.



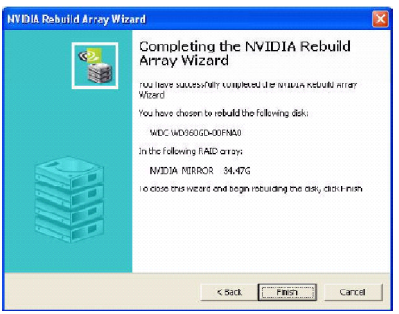
3. From the popup menu, click **Rebuild Array**. The NVIDIA Rebuild Array Wizard appears.



4. Click **Next.** The Disk Selection page appears.



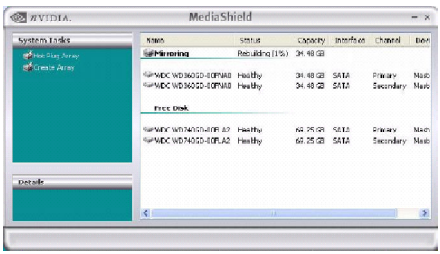
5. Select the drive that you want to rebuild by clicking it from the list, then click **Next**. The Completing the NVIDIA Rebuild Array page appears.



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.

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

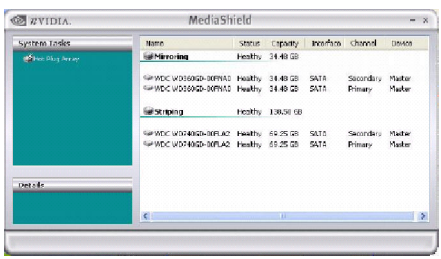
The rebuilding process is very slow (it can take up to a day) and occurs in the background so as not to affect the performance of the system.

• 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 p.C-22, except when prompted to select a disk, choose one of the two available free disks.

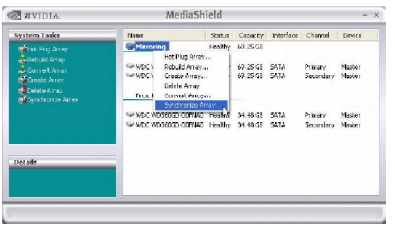
Synchronizing a RAID Array

Synchronizing an array will force a rebuild of redundancy or parity. The operation is applicable to any fault tolerant array such as RAID 1, 0+1 and RAID 5.

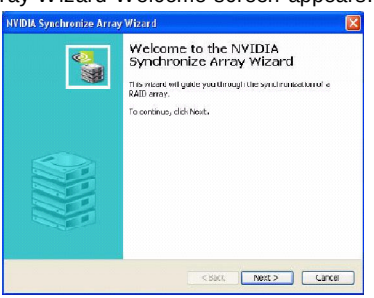
- For RAID1 and RAID 0+1, “sync” results in copying the data to the redundancy disk,
- For RAID 5, “sync” results in rebuilding the parity

To sync an array, do the following (This example assumes you have already created a fault tolerant array such as RAID 1):

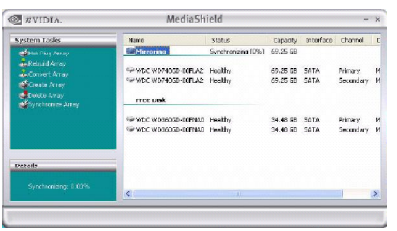
1. Right click on “Mirroring” and select **Synchronize Array** as shown in Figure below.



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

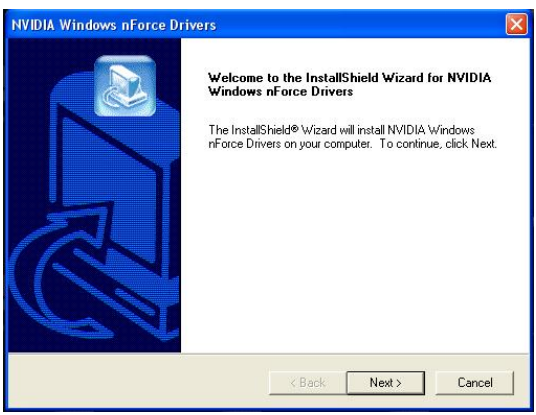
nVidia System Driver Installation

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

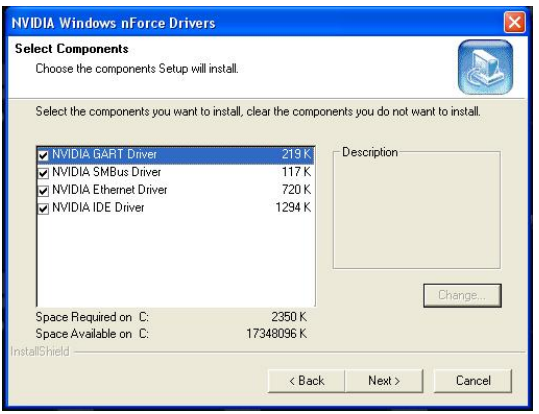
NVIDIA System Driver

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

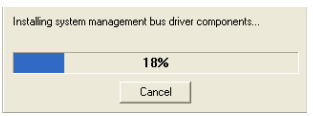
1. Click on the **NVIDIA nForce4 System Driver** button to install the NVIDIA System Drivers for your Windows OS. Then the welcome dialogue will display. Click **Next** to continue.



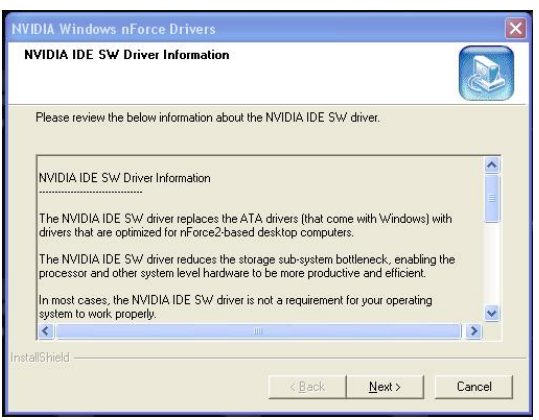
2. Then the following screen displays the available components to install. All the components shown here will be selected to be installed by default. Then click **Next**.



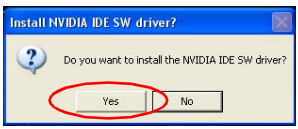
3. The system will start installing the selected driver components automatically.



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.



Important

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 Utility Installaion

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.

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