MSI
MICRO-STAR INTERNATIONAL

945GM5/ 945GCM5/ 945GZM5 Series

MS-7267 (V4.X) Mainboard

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Revision History

Revision	Revision History	Date
V4.0	First release for PCB 4.X with Intel 945G/GC/GZ & ICH7	December 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: *support@msi.com.tw*

Safety Instructions

1. Always read the safety instructions carefully.

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

3. Keep this equipment away from humidity.

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

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

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

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

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

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

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

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

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

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

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

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

廢電池請回收

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

FCC-B Radio Frequency Interference Statement

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

 † Reorient or relocate the receiving antenna.

 † Increase the separation between the equipment and receiver.

 † Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

 † Consult the dealer or an experienced radio/television technician for help.

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

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

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

Micro-Star International
MS-7267

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.

iv

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/ЕС), 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 elektronizcne " nie mogą być traktowane jako śmieci komunalne, tak więc producenci tych produktów będą zobowiązani do odbierania ich w momencie gdy produkt jest wycofywany z użycia. MSI wypełni wymagania UE, przyjmując produkty (sprzedawane na terenie Unii Europejskiej) wycofywane z użycia. Produkty MSI będzie można zwracać w wyznaczonych punktach zbiorczych.

TÜRKÇE

Çevreci özelliğiyle bilinen MSI dünyada çevreyi korumak için hatırlatır:

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

ČESKY

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

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

MAGYAR

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

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

ITALIANO

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

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

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Chapter 1
Getting Started

Thank you for choosing the **945GM5/ 945GCM5/ 945GZM5 Series** (MS-7267 v4.X) Micro-ATX mainboard. The **945GM5/ 945GCM5/ 945GZM5 Series** mainboard is based on **Intel® 945G/ 945GC/ 945GZ** and **Intel® ICH7** chipset for optimal system efficiency. Designed to fit the advanced **Intel® Pentium 4 Series LGA775** processor, the **945GM5/ 945GCM5/ 945GZM5 Series** mainboard delivers a high performance and professional desktop platform solution.

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Mainboard Specifications

Processor Support

- Intel® Core 2 Duo/ Pentium D/ Pentium 4/ Celeron Series processors in the LGA775 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

- 1066/ 800/ 533 MHz (for 945GM5 series)
- 800/ 533 MHz (for 945GCM5/ 945GZM5 series)

Chipset

- North Bridge: Intel® 945G/ 945GC/ 945GZ chipset
- South Bridge: Intel® ICH7 chipset

Memory Support

- DDRII 400/ 533/ 667 SDRAM (4 GB Max, for 945GM5 series)
- DDRII 400/ 533 SDRAM (2 GB Max, for 945GCM5/ 945GZM5 series)
- 2 DDRII DIMMs (240pin / 1.8V)

LAN (optional)

- Supports 10/100/1000 Fast Ethernet by Realtek 8111B
- Or supports 10/100 Fast Ethernet by Realtek 8101E

Audio

- High Definition link controller integrated in Intel® ICH7 chip
- 7.1 channels audio codec Realtek ALC883/ ALC888
- Compliant with Azalia 1.0 Spec

IDE

- 1 IDE port by ICH7
- Supports Ultra DMA 66/100 mode
- Supports PIO, Bus Master operation mode

SATA

- Four SATA ports by ICH7
- Supports four SATA II devices
- Supports storage and data transfers at up to 300MB/s

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
- 1 VGA port
- 4 USB 2.0 Ports
- 1 LAN jack
- 6 audio jacks

● **On-Board Pinheaders**
- 1 COM2 pinheader
- 1 case intrusion pinheader
- 2 USB 2.0 pinheaders
- 1 SPDIF-out pinheader (for HDMI Graphic card only)

Slots

- 1 PCI Express x16 slot(for 945GM5/ 945GCM5 series only)
- 1 PCI Express x1 slot
- 2 PCI slots (Support 3.3V/ 5V PCI bus Interface)

Form Factor

- Micro-ATX (24.5cm X 22.0 cm)

Mounting

- 6 mounting holes

Mainboard Layout

Top : mouse
Bottom: keyboard

CPUFAN1

DIMM1

DIMM2

Top :
Parallel Port

Bottom:
COM portA
VGA port

IDE 1

USB ports

PWRCONN1

JCOM1

Top: LAN Jack
Bottom: USB ports

JCI2

Intel
945G/ GC/ GZ

T:Line-In
M:Line-Out
B:Mic

I/O
Chip

T:RS-Out
M:CS-Out
B:SS-Out

ATX1

PCI_E1 (For 945GM5/ 945GCMG series only)

SYSFAN1

PWRFAN1

LAN Chip

PCI _E2

Intel
ICH7

BATT
+

SATA3

SATA4

PCI2

SATA1

SATA2

Codec

PCI1

JBAT1

JFP2

JFP1

JAUD1   CD_IN1

JSPD1   FDD2

JUSB2   JUSB1

945GM5/ 945GCM5/ 945GZM5
(MS-7267 V4.X) Series Micro-ATX Mainboard

Packing Checklist

MSI motherboard

MSI Driver/Utility CD

SATA Cable (optional)

Power Cable

Standard Cable for
IDE Devices (optional)

Back IO Shield

User's Guide

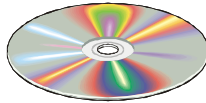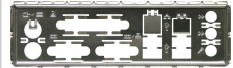* The pictures are for reference only and may vary from the packing contents of the product you purchased.

MSI Special Feature

Core Center

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

In the left side it shows the current system status including the Vcore, 3.3V, +5V and 12V. In the right side it shows the current PC hardware status such as the CPU & system temperatures and all fans speeds.

When you click the red triangles in the left and right sides, two sub-menus will open for users to adjust the thresholds of system to send out the warning messages.

Left-wing: Current system status
In the left sub-menu, you can configure the settings of FSB, Vcore, Memory Voltage and AGP Voltage by clicking the radio button next to each item and make it available (the radio button will be lighted as yellow when selected), use the "**+**" and "**-**" buttons to adjust, then click **"OK"** to apply the changes. Then you can click **"Save"** to save the values you just configured.
Also you may click **"Auto"** to start testing the maximum CPU overclocking value. The CPU FSB will automatically increase the testing value until the PC reboots. Or you may click **"Default"** to restore the default values.

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

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

PWRCONN1, p.2-9

DIMM1/2, p.2-7

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CPUFAN1, p2-14

JCOM1, p.2-18

BackPanel, p.2-10

IDE1, p.2-12

PCIE_X16, p.2-20

SYSFAN1, p.2-14

PWRFAN1, p.2-14

PCI1~3, p.2-21

SATA1~4, p.2-13

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JSPD1, p.2-16

JBAT1, p.2-19
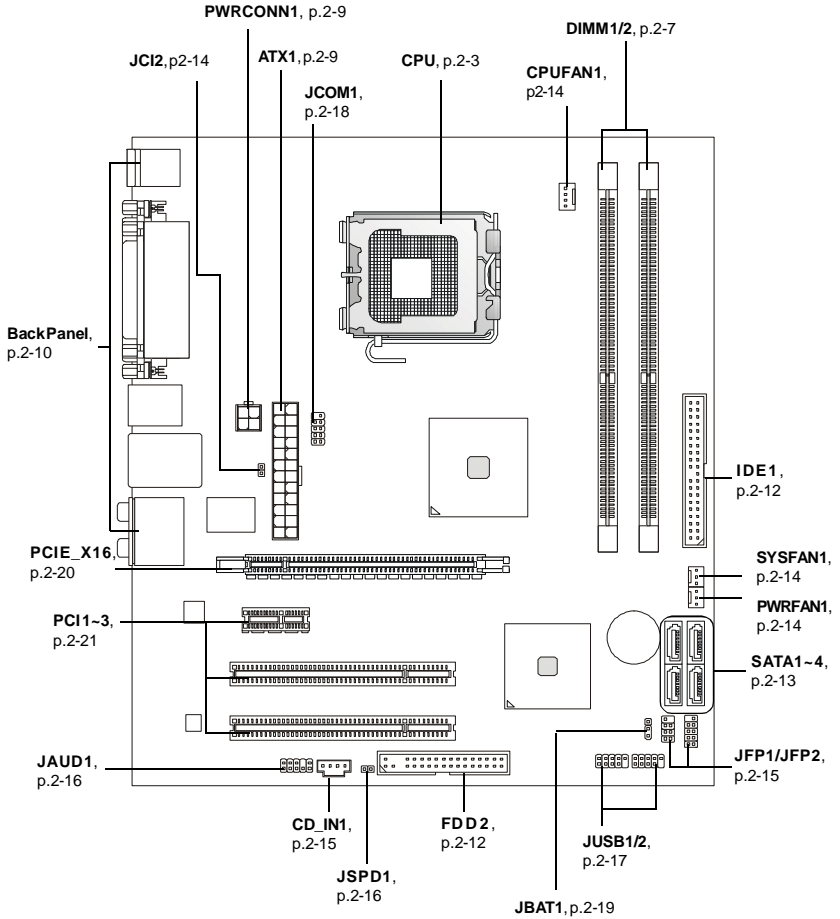
CPU (Central Processing Unit)

The mainboard supports Intel® Pentium 4 series processors. The mainboard uses a CPU socket called LGA775. When you are installing the CPU, **make sure to install the cooler to prevent overheating.** If you do not have the CPU cooler, 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.

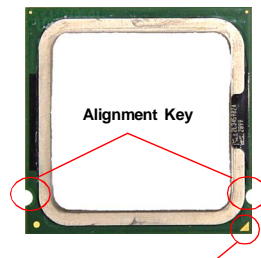### Introduction to LGA 775 CPU

The pin-pad side of LGA 775 CPU.
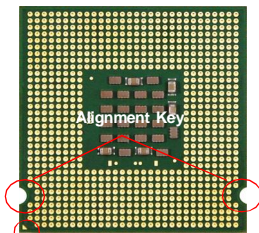
The surface of LGA 775 CPU. Remember to apply some silicone heat transfer compound on it for better heat dispersion.

Alignment Key

Alignment Key

Yellow triangle is the Pin 1 indicator

Yellow triangle is the Pin 1 indicator
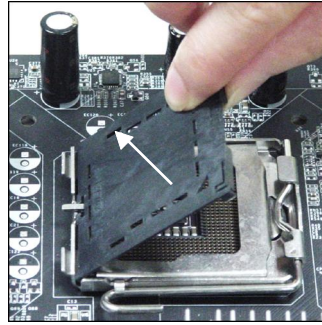
CPU & Cooler Installation

When you are installing the CPU, **make sure the CPU has a cooler attached on the top to prevent overheating.** If you do not have the cooler, contact your dealer to purchase and install them before turning on the computer. Meanwhile, do not forget to apply some silicon heat transfer compound on CPU before installing the heat sink/ cooler fan for better heat dispersion.

Follow the steps below to install the CPU & cooler correctly. Wrong installation will cause the damage of your CPU & mainboard.

1. The CPU socket has a plastic cap on it to protect the contact from damage. Before you install the CPU, always cover it to protect the socket pin.
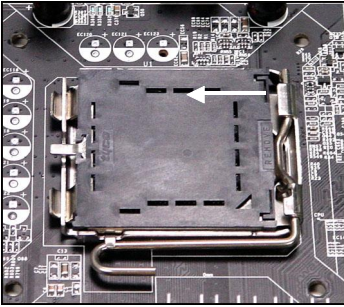
2. Remove the cap from lever hinge side (as the arrow shows).

3. The pins of socket reveal.
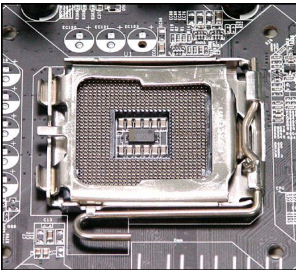
4. Open the load lever.
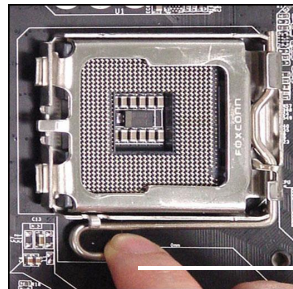
Important

1. Confirm if your CPU cooler is firmly installed before turning on your system.
2. Do not touch the CPU socket pins to avoid damaging.
3. The availability of the CPU land side cover depends on your CPU packing.

5. Lift the load lever up and open the load plate.
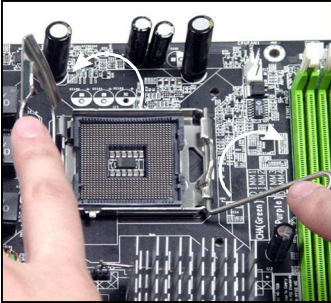
6. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.

alignment key
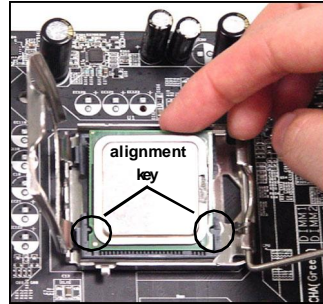
7. Visually inspect if the CPU is seated well into the socket. If not, take out the CPU with pure vertical motion and reinstall.
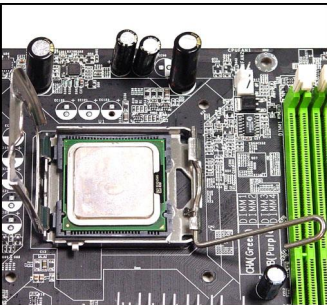
8. Cover the load plate onto the package.
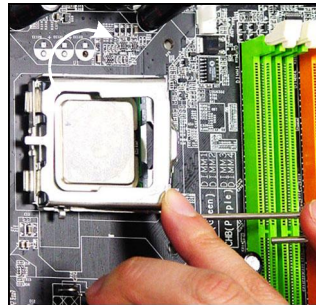
9. Press down the load lever lightly onto the load plate, and then secure the lever with the hook under retention tab.

10. Align the holes on the mainboard with the heatsink. Push down the cooler until its four clips get wedged into the holes of the mainboard.
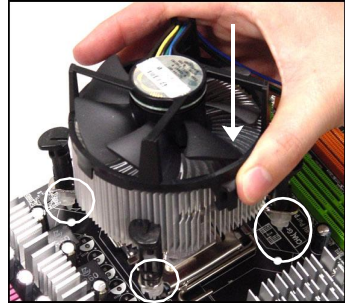
11. Press the four hooks down to fasten the cooler. Then rotate the locking switch (refer to the correct direction marked on it) to lock the hooks.
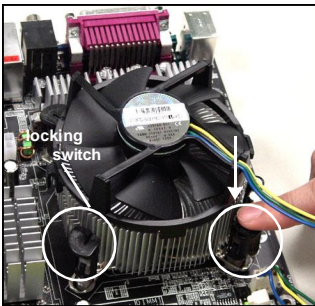
12. Turn over the mainboard to confirm that the clip-ends are correctly inserted.
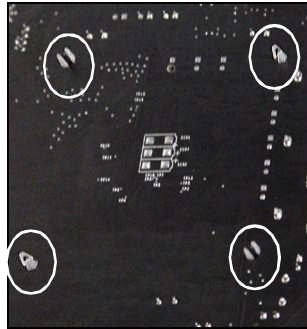
Important

1. Check the information in BIOS (Chapter 3) for the CPU temperature.
2. Whenever CPU is not installed, always protect your CPU socket pin with the plastic cap covered (shown in Figure 1) to avoid damaging.

Memory

The mainboard provides two 240-pin non-ECC DIMMs and supports dual-channel technology up to 2GB system memory.

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

DDRII
240-pin, 1.8V

56x2=112 pin   64x2=128 pin
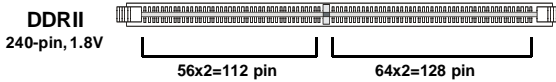
Dual-Channel: Channel A in GREEN; Channel B in ORANGE

Dual-Channel Memory Population Rules

Dual-Channel mode can enhance the performance of the system. Please refer to the following illustration for population rules under Dual-Channel mode.

DIMM1
DIMM2

Important

- *DDRII modules are not interchangeable with DDR and the DDR2 standard is not backwards compatible. You should always install DDR2 memory modules in the DDR2 DIMM slots.*
- *In dual-channel mode, make sure that you install memory modules of **the same type and density** in different channel DDR DIMM slots.*
- *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 1+GB (not full 2GB) when each DIMM is installed with a 1GB memory module.*

Installing DDR2 Modules

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

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

Important

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

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

Volt   Notch
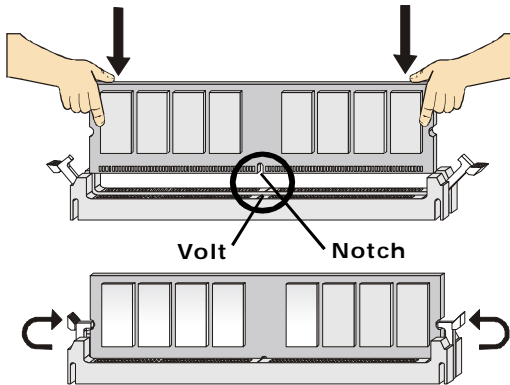
Power Supply

ATX 24-Pin Power Connector: ATX1

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

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

Pin 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	PWR OK	20	Res
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

ATX1

ATX 12V Power Connector: PWRCONN1

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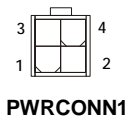
Pin Definition

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

PWRCONN1

Important

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

2-9

Back Panel

Mouse   Parallel   LAN   L-In RS-Out   L-Out CS-Out

Keyboard   Serial Port   VGA Port   USB Ports   Mic SS-Out
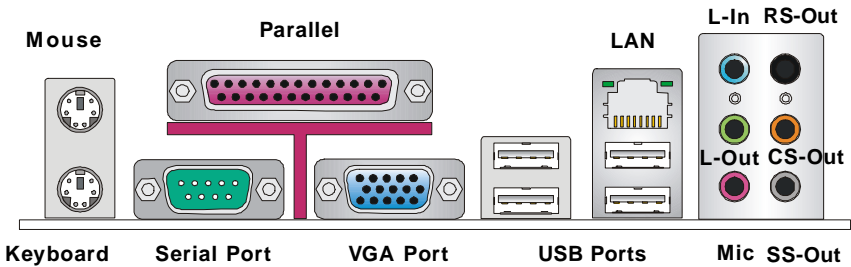
► **Mouse/Keyboard Connector**
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

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

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

► **VGA Connector**
The DB15-pin female connector is provided for VGA monitors.

► **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.

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

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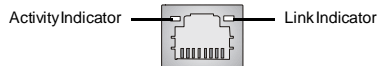
LED	Color	LED State	Condition
Left	Orange	Off	LAN link is not established.
		On (steady state)	LAN link is established.
		On (brighter & pulsing)	The computer is communicating with another computer on the LAN.
Right	Green	Off	10 Mbit/sec data rate is selected.
		On	100 Mbit/sec data rate is selected.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

► Audio Port Connectors

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

- **Green audio jack** - Line Out, is a connector for speakers or headphones.
- **Blue audio jack** - Line In, is used for external CD player, tapeplayer or other audio devices.
- **Pink audio jack** - Mic In, is a connector for microphones.
- **Orange audio jack** - Center/ Subwoofer Out in 5.1/ 7.1 channel mode.
- **Black audio jack** - Rear-Surround Out in 4/ 5.1/ 7.1 channel mode.
- **Gray audio jack** - Side-Surround Out in 7.1 channel mode.

Connectors

Floppy Disk Drive Connector: FDD2

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

FDD2 [connector illustration]
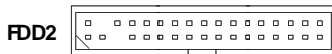
Hard Disk Connector: IDE1

The mainboard provides a one-channel Ultra ATA 100 bus Master IDE controller that supports PIO mode 0~4, Bus Master, and Ultra DMA 66/100 function. You can connect hard disk drives, CD-ROM drives and other IDE devices.

IDE1 [connector illustration]
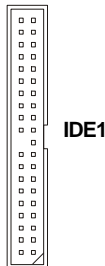
IDE1

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

Important

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

Serial ATA Connectors: SATA1~SATA4

SATA1~SATA4 are high-speed Serial ATA interface ports. Each supports serial ATA data rates of 300MB/s. Both connectors are fully compliant with Serial ATA 2.0 specifications. Each Serial ATA connector can connect to 1 hard disk device.

SATA4 SATA3

SATA1 SATA2

Serial ATAII cable

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

Connect to SATA connector
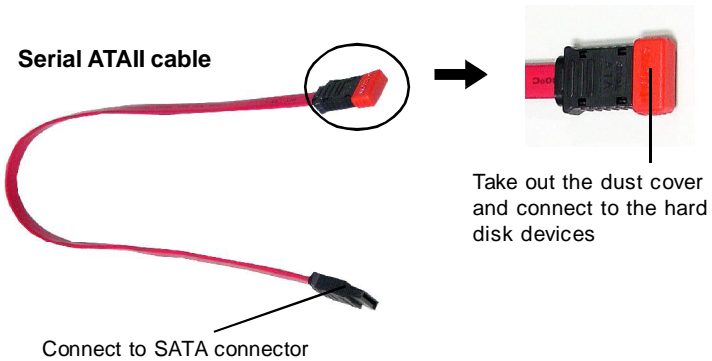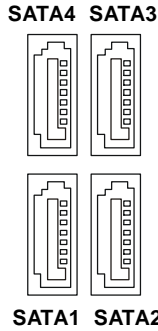
Important

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

Fan Power Connectors: CPUFAN1, SYSFAN1 & PWRFAN1

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.

CONTROL
SENSOR
+12V
GND

CPUFAN1

GND
+12V
NC

SYSFAN1

GND
+12V
NC

PWRFAN1

Important

Please refer to the recommended CPU fans at Intel® official website or consult the vendors for proper CPU cooling fan.

Chassis Intrusion Switch Connector: JCI2

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.

JCI2

GND
CINTRU   1

CD-In Connector: CD_IN1

This connector is provided for CD-ROM audio.

CD_IN1

R GND L
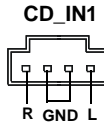
Front Panel Connectors: JFP1/JFP2

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

```
      10 □ 9
Power -  □ □ + Reset
Switch + □ □ - Switch
Power  □ □ - HDD
LED    □ □ + LED
      2    1
```

JFP2

```
      8 7
      + □ □
Speaker + □ □  Power
      + □ □    LED
      2 1
```
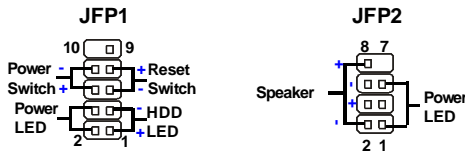
JFP1 Pin Definition

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

JFP2 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+

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

2 ☐☐☐☐☐ 10
1 ☐☐☐☐☐ 9

JAUD1 Pin Definition

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

SPDIF-Out Connector: JSPD1 (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**.

SPDF0 ⎯☐☐⎯ GND

JSPD1

Front USB Connectors: JUSB1/ JUSB2

The mainboard provides two 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

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 JUSB1/2

Important

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

Serial Port Connector: JCOM1 (optional)

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

JCOM1

9

2 1
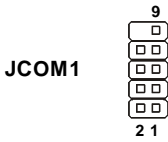
Pin Definition

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

Jumpers

Clear CMOS Jumper: JBAT1

There is a CMOS RAM onboard that has a power supply from external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the JBAT1 (Clear CMOS Jumper) to clear data.

1

JBAT1

1

3

1

3

Keep Data   Clear Data
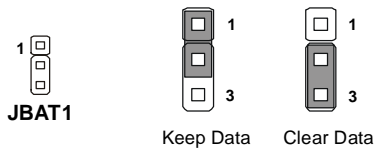
Important

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

Slots

PCI (Peripheral Component Interconnect) Express Slots

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

PCI Express x16 Slot
(For 945GM5/ 945GCM5 series only)
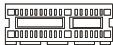
PCI Express x1 Slot

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

Important

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

PCI 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 A#	INT B#	INT C#	INT D#
PCI Slot 2	INT B#	INT C#	INT D#	INT A#

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:*

   A7267IMS V4.0 112006 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 vendors.
   7th - 8th digit refers to the customer as MS = all standard customers.
   V4.0 refers to the BIOS version.
   112006 refers to the date this BIOS was released.

Control Keys

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

Getting Help

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

Main Menu

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

Sub-Menu

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

▶ IDE Channel 0 Master   [None]
▶ IDE Channel 0 Slave
▶ IDE Channel 1 Master   [None]
▶ IDE Channel 1 Slave   [None]

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 special enhanced features.

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

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

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

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

▶ **Frequency/Voltage Control**
Use this menu to specify your settings for frequency/voltage control and overclocking.

▶ **Load Fail Safe Defaults**
Use this menu to load the default values set by the BIOS vendor for stable system performance.

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

▶ Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                        Standard CMOS Features

 Date(MM:DD:YY)              [Tue 01/01/2002]          Help Item
 Time(HH:MM:SS)              [01:41:07]
                                                  Use [ENTER], [TAB]
 ▶ IDE Primary Master        [Not Detected]       or [SHIFT-TAB] to
 ▶ IDE Primary Slave         [Not Detected]       select a field.
 ▶ IDE Third Master          [Not Detected]
 ▶ IDE Third Slave           [Not Detected]       Use [+] or [-] to
 ▶ IDE Fourth Master         [Not Detected]       configure system Date.
 ▶ IDE Fourth Slave          [Not Detected]

 Floppy Drive A              [1.44 MB 3½"]
 ▶ System Information        [Press Enter]




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

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

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

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

▶ **IDE Primary/Third/Fourth Master/ Slave**
Press <Enter> to enter the sub-menu, and the following screen appears.

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                          IDE Primary Master

 Primary IDE Master                              │    Help Item

 Device     :Not Detected                        │ Select the type
                                                 │ of device connected
 Type                        [Auto]              │ to the system.
 LBA/Large Mode              [Auto]
 Block (Multi-Sector Transfer [Auto]
 PIO Mode                    [Auto]
 DMA Mode                    [Auto]
 S.M.A.R.T.                  [Auto]
 32Bit Data Transfer         [Enabled]
```

► Type

This item allows you to select the hard disk type. Setting options: [AUTO], [Not Insatlled], [CD/DVD], [ARMD].

► LBA/Large Mode

This allows you to enable or disable the LBA Mode. Setting to Auto enables LBA mode if the device supports it and the devices is not already formatted with LBA mode disabled. Setting options: [Auto], [Disabled].

► Block (Multi-Sector Transfer)

When the setting is Auto, it will read or write more sector at every circle to enhance the hard disk performance. Setting options: [Auto], [Disabled].

► PIO Mode

The PIO (Programmed Input/Output) Mode let you set a PIO mode (0-4) for the IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device. The settings are: [Auto], [0], [1], [2], [3], [4].

► DMA Mode

This item allows you to enable or disable the DMA (Direct Memory Access) mode. Setting options: [Auto], [SWDMA0], [SWDMA1], [SWDMA2], [MWDMA0], [MWDMA1], [MWDMA2], [UDMA0], [UDMA1], [UDMA2], [UDMA3], [UDMA4], [UDMA5].

► 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. Settings: [Auto], [Disabled], [Enabled].

3-7

▶ **32Bit Data Transfer**
This allows you to activate the 32bit data transfer to enhance the IDE hard disk performance. Settings options: [Enabled], [Disabled].
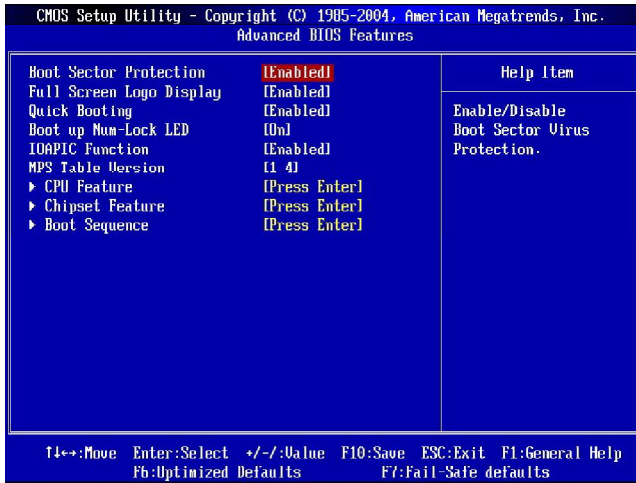
▶ **Floppy A**
This item allows you to set the type of floppy drives installed. Available options: [None], [360K, 5.25 in.], [1.2M, 5.25 in.], [720K, 3.5 in.], [1.44M, 3.5 in.], [2.88M, 3.5 in.].

▶ **System Information**

▶ **CPU Type, BIOS Version, Build Date, System Memory**
The items show the CPU information, BIOS version and memory status of your system (read only).

Advanced BIOS Features

▶ 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.

▶ Full Screen Logo Display

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

▶ Quick Booting

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

▶ Boot up Num-Lock LED

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

▶ IOAPIC Function

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

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

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

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                          CPU Feature

Hyper-Threading Function    [Enabled]        Help Item
Execute Bit Support         [Disabled]
Set Limit CPUID MaxVal to 3 [Disabled]    Enabled for Windws XP
                                          and Linux4(OS optimi
```

▶ **Hyper-Threading Function**
The processor uses Hyper-Threading technology to increase transaction rates and reduces end-user response times. The technology treats the two cores inside the processor as two logical processors that can execute instructions simultaneously. In this way, the system performance is highly improved. If you disable the function, the processor will use only one core to execute the instructions. ***Please disable this item if your operating system doesn't support HT Function, or unreliability and instability may occur.***

Important

Enabling the functionality of Hyper-Threading Technology for your computer system requires ALL of the following platform Components:
*   ***CPU:*** *An Intel® Pentium® 4 Processor with HT Technology;*
*   ***Chipset:*** *An Intel® Chipset that supports HT Technology;*
*   ***BIOS:*** *A BIOS that supports HT Technology and has it enabled;*
*   ***OS:*** *An operating system that supports HT Technology.*

For more information on Hyper-threading Technology, go to:
www.intel.com/info/hyperthreading
The information and items shown in CPU Configuration sub-menu might be different from the figure, depends on the CPU installed.

▶ **Execute Bit Support**
Execute Disable Bit allows the processor to classify areas in memory by where application code can execute and where it cannot. When a malicious worm attempts to insert code in the buffer, the processor disables code execution, preventing damage or worm propagation.

►**Set Limit CPUID MaxVal to 3**
The Max CPUID Value Limit is designed to limit the listed speed of the processor to older operating systems.

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

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                          Chipset Feature

  VGA Share Memory          [0MB]              Help Item
  PEG Force x1              [Disabled]
                                            Select the amount of
```

► **VGA Share Memory**
The system shares memory to the onboard VGA card. This setting controls the exact memory size shared to the VGA card.

►**PEG Force X1**
The field enables or disables the PEG (PCI Express Graphic) port function.

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

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                          Boot Sequence

  Boot Sequence                                Help Item

  1st Boot Device          [USB:MITSUMI USB FD]  Specifies the boot
```

► **1st Boot Device**
This item allows you to set the sequence of boot device where BIOS attempts to load the disk operating system.

Integrated Peripherals

CMOS Setup Utility - Copyright (C) 1905-2004, American Megatrends, Inc.
Integrated Peripherals

		Help Item
USB Controller	[Enabled]	
USB Device Legacy Support	[Enabled]	Options
Onboard LAN Controller	[Enabled]	
LAN Option ROM	[Disabled]	Disabled
HD Audio Controller	[Enabled]	Enabled
► On-Chip ATA Devices	[Press Enter]	
► I/O Devices	[Press Enter]	

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

► USB Controller
This setting is used to enable/disable the onboard USB host controller.

► USB Device Legacy Support
Set to [Enabled] if you need to use any USB 1.1/2.0 device in the operating system that does not support or have any USB 1.1/2.0 driver installed, such as DOS and SCO Unix. Set to [Disabled] only if you want to use any USB device other than the USB mouse.

► Onboard LAN Controller
The item enables or disables the onboard LAN controller.

► LAN Option ROM
The item enables or disables the initialization of the onboard LAN Boot ROM during bootup. Selecting [Disabled] will speed up the boot process.

► HD Audio Controller
This item is used to enable or disable the onboard Audio Codec controller. Disable the function if you want to use other controller cards to connect an audio device.
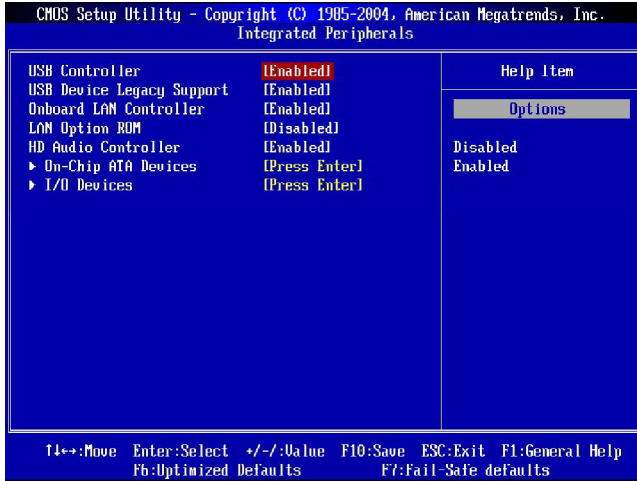
►On-Chip ATA Devices
Press <Enter> to enter the sub-menu and the following screen appears:

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                        On-Chip ATA Devices

On-Chip IDE Controller    [Enabled]           Help Item
PCI IDE BusMaster         [Disabled]
On-Chip SATA Controller   [IDE]                  Options
```

► On-Chip IDE Controller
The chipset contains a PCI IDE interface with support for one IDE channel. This item allows you to enable or disable the IDE controller.

► PCI IDE BusMaster
Set this option to [Enabled] to specify that the IDE controller on the PCI local bus has bus mastering capability.

► On-Chip SATA Controller
Set this option to define the SATA device mode.

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

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                        I/O Devices

COM Port 1          [3F8/IRQ4]            Help Item
COM Port 2          [2F8/IRQ3]
Parallel Port       [378]           Allows BIOS to Select
  Parallel Port Mode   [Bi Directional]    Serial Port1 Base
  Parallel Port IRQ    [IRQ7]              Addresses.
```

► COM Port 1/2
These items specify the base I/O port addresses of the onboard Serial Port 1 (COM A) / Serial Port 2 (COM B). Selecting [Auto] allows BIOS to automatically determine the correct base I/O port address.

► Parallel Port
This field specifies the base I/O port address of the onboard parallel port. Selecting [Auto] allows BIOS to automatically determine the correct base I/O port address.

► Parallel Port Mode
  [Normal]   Standard 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.

3-13

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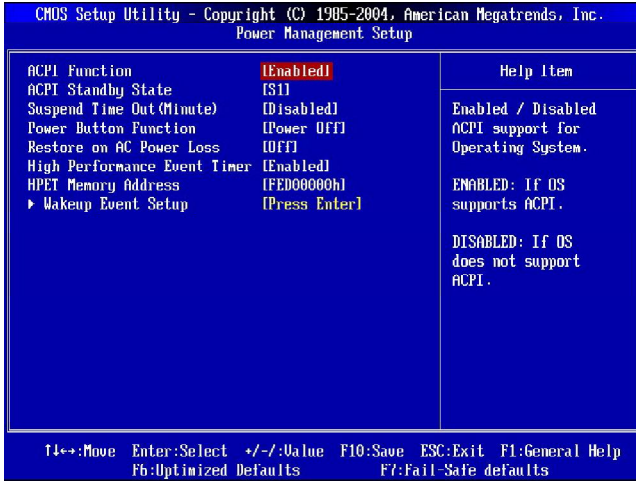
▶ **ACPI Function**
This item is to activate the ACPI (Advanced Configuration and Power Management Interface) Function. If your operating system is ACPI-aware, such as Windows 98SE/ 2000/ME, select [Enabled]. Setting options: [Enabled] and [Disabled].

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

▶ Suspend Time Out (Minute)

If system activity is not detected for the length of time specified in this field, all devices except CPU will be shut off.

▶ Power Button Function

This feature allows users to configure the Power Button function. Settings are:

        [Power On/Off]   The power button functions as a normal power-on/-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 setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

        [Off]   Leaves the computer in the power off state.

        [On]   Leaves the computer in the power on state.

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

▶ High Performance Event Timer

High Performance Event Timer (HPET) is needed to allow OS to discover event timers and establiish basic timer services for driver load.

▶ HPET Memory Address

This item allows you to allot the Event Timer Block Registers Base Address to the memory.

▶ Wakeup Event Setup

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

▶ **Resume From S3 By USB Device**
The item allows the activity of the USB device to wake up the system from S3 (Suspend to RAM) sleep state.

▶ **Resume From S3 By PS/2 Keybo**
This controls how and whether the PS/2 keyboard is able to power on the system. If you choose [Specific Key], you must type the password to power on the system. If you want to wakeup from suspend by keyboard, please set to [Any Key].

▶ **Resume From S3 By PS/2 Mouse**
The setting determines whether the system will be awakened from power saving modes when the PS/2 mouse input signal is detected.

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

▶ **Resume By PCIE Device**
When setting to [Enabled], this setting allows your system to be awakened from the power saving modes through any event on PME (Power Management Event). Setting options: [Disabled], [Enabled].

▶ **Resume By RTC Alarm**
This is used to enable or disable the feature of booting up the system on a scheduled time/date from the S3, S4, and S5 state.

PNP/PCI Configurations

▶ Primary Graphic's Adapter
This setting specifies which graphics adapter 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. Selecting [Auto] allows BIOS to automatically determine the IRQ line for each PCI slot.

▶ IRQ Resource Setup
Press <Enter> to enter sub-menu and the following screen appears.

3-17

▶ **IRQ 3/4/5/7/9/10/11/14/15**

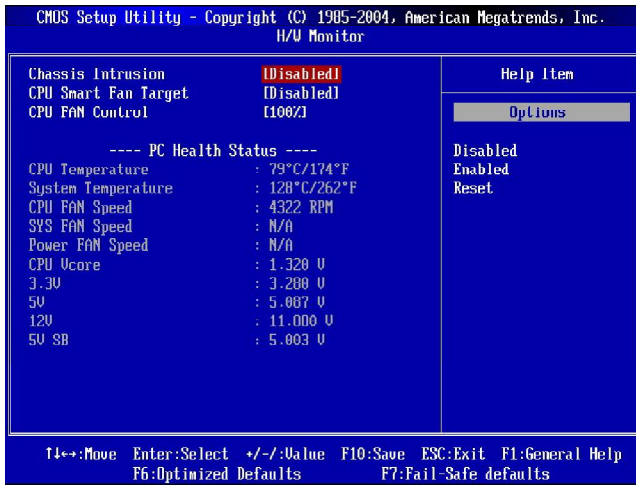These items specify the bus where the specified IRQ line is used.

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.

H/W Monitor


```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                              H/W Monitor

  Chassis Intrusion            [Disabled]              Help Item
  CPU Smart Fan Target         [Disabled]
  CPU FAN Control              [100%]                     Options

          ---- PC Health Status ----              Disabled
  CPU Temperature              : 79°C/174°F        Enabled
  System Temperature           : 128°C/262°F       Reset
  CPU FAN Speed                : 4322 RPM
  SYS FAN Speed                : N/A
  Power FAN Speed              : N/A
  CPU Vcore                    : 1.320 V
  3.3V                         : 3.200 V
  5V                           : 5.087 V
  12V                          : 11.000 V
  5V SB                        : 5.003 V




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

► 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. Setting options: [Enabled], [Reset], [Disabled].

► CPU Smart Fan Target
The mainboard provides the Smart Fan system which can control the fan speed automatically depending on the current temperature to keep it with in a specific range.
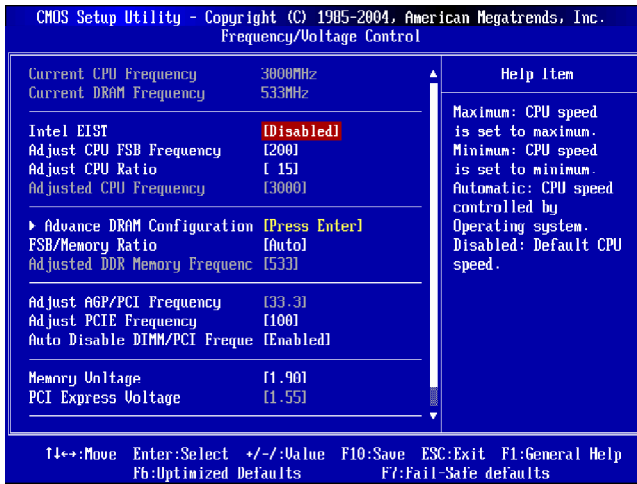
► CPU FAN Control
This item enables or disables the Smart Fan feature. Smart Fan is an excellent feature which will adjust the CPU fan speed automatically depending on the CPU current temperature, avoiding the overheating to damage your system.

► CPU/ System Temperature, CPU/SYS/Power FAN Speed, CPU Vcore, 12V, 5V, 12V, 5V SB
These items display the current status of all of the monitored hardware devices/ components such as CPU voltages, temperatures and all fans' speeds.

Frequency/ Voltage Control

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                        Frequency/Voltage Control

 Current CPU Frequency        3000MHz            │    Help Item
 Current DRAM Frequency       533MHz             │
                                                 │ Maximum: CPU speed
 Intel EIST                   [Disabled]         │ is set to maximum.
 Adjust CPU FSB Frequency     [200]              │ Minimum: CPU speed
 Adjust CPU Ratio             [ 15]              │ is set to minimum.
 Adjusted CPU Frequency       [3000]             │ Automatic: CPU speed
                                                 │ controlled by
▶ Advance DRAM Configuration [Press Enter]       │ Operating system.
 FSB/Memory Ratio             [Auto]             │ Disabled: Default CPU
 Adjusted DDR Memory Frequenc [533]              │ speed.
                                                 │
 Adjust AGP/PCI Frequency     [33.3]             │
 Adjust PCIE Frequency        [100]              │
 Auto Disable DIMM/PCI Freque [Enabled]          │
                                                 │
 Memory Valtage               [1.90]             │
 PCI Express Voltage          [1.55]             │

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

▶ **Current CPU Frequency**
This item shows the current CPU Frequency. Read only.

▶ **Current DRAM Frequency**
This item shows the current memory frequency. Read only.

▶ **Intel EIST**
The Enhanced Intel SpeedStep technology allows you to set the performance level of the microprocessor whether the computer is running on battery or AC power. This field will appear after you installed the CPU which support speedstep technology.

▶ **Adjust CPU Ratio**
When the "**Intel EIST**" sets to Disabled, this will available. This item allows you to adjust the CPU ratio.

▶ **Adjust CPU FSB Frequency**
This item allows you to select the CPU Front Side Bus clock frequency (in MHz) and overclock the processor by adjusting the FSB clock to a higher frequency.

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

```
CMOS Setup Utility - Copyright (C) 1985-2004, American Megatrends, Inc.
                    Advance DRAM Configuration

 Configure DRAM Timing by SPD [Disabled]       │     Help Item
   DRAM CAS# Latency          [5]              │
   DRAM RAS# to CAS# Delay    [6 DRAM Clocks]  │     Options
   DRAM RAS# Precharge        [6 DRAM Clocks]  │
   DRAM RAS# Activate to Prec [15 DRAM Clocks] │  Disabled
```

► Configure DRAM Timing by SPD
Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to [Auto By SPD] enables DRAM timings and the following related items to be determined by BIOS based on the configurations on the SPD. Selecting [Manual] allows users to configure the DRAM timings and the following related items manually.

► DRAM CAS# Latency
The field controls the CAS latency, which determines the timing delay before SDRAM starts a read command after receiving it. Setting options: [By SPD], [2.5T], [2T]. [2T] increases system performance while 2.5T provides more stable system performance. Setting to By SPD enables DRAM CAS# Latency automatically to be determined by BIOS based on the configurations on the SPD (Serial Presence Detect) EEPROM on the DRAM module.

► DRAM RAS# to CAS# Delay
This field allows you to set the number of cycles for a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from or refreshed. Fast speed offers faster performance while slow speed offers more stable performance.

► DRAM RAS# Precharge
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, refresh may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system.

► DRAM RAS# Activate to Prec
This setting determines the time RAS takes to read from and write to a memory cell.

► FSB/Memory Ratio
This setting controls the ratio of CPU FSB Clock & DRAM Frequency to enable the CPU & DRAM to run at different frequency combinations. Please note that the setting options vary according to the CPU FSB Clock preset.

► Adjust AGP/PCI Frequency
This item allows you to select the AGP/PCI clock frequency (in MHz) and overclock the processor by adjusting the AGP/PCI clock to a higher frequency.

► Adjust PCI Express Frequency
This item allows you to select the PCI Express clock frequency (in MHz) and overclock the processor by adjusting the PCI Express clock to a higher frequency.

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

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

▶ **PCI Express Voltage (V)**
These item adjusts the voltage of PCI Express Voltage. Any changes made to this setting may cause a stability issue, so *changing the PCIE voltage for long-term purpose is NOT recommended*.

▶ **Spread spectrum**
When the motherboard's clock generator pulses, the extreme values (spikes) of the pulses creates EMI (Electromagnetic Interference). The Spread Spectrum function reduces the EMI generated by modulating the pulses so that the spikes of the pulses are reduced to flatter curves.

> ### 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.*

Load Fail-Safe/ Optimized Defaults

The two options on the main menu allow users to restore all of the BIOS settings to the default Fail-Safe or Optimized values. The Optimized Defaults are the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard. The Fail-Safe Defaults are the default values set by the BIOS vendor for stable system performance.

When you select Load Fail-Safe Defaults, a message as below appears:

```
Load Fail-Safe Defaults?

   [Ok]      [Cancel]
```

Pressing *Y* loads the BIOS default values for the most stable, minimal system performance.

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

```
Load Optimized Defaults?

   [Ok]      [Cancel]
```

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

3-23

BIOS Setting Password

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

Enter New Password

Type the password, up to 6 characters in length, and press <Enter>. The password typed now will replace any previously set password from CMOS memory. You will be prompted to confirm the password. Retype the password and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

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

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

Appendix A
Realtek ALC883/888 Audio

The Realtek ALC883/888 provides 10-channel DAC that simultaneously supports 7.1 sound playback and 2 channels of independent stereo sound output (multiple streaming) through the Front-Out-Left and Front-Out-Right channels.

MSI
MICRO-STAR INTERNATIONAL

Installing the Realtek HD Audio Driver

You need to install the driver for Realtek ALC883/888 codec to function properly before you can get access to 2-, 4-, 6-, 8- channel or 7.1+2 channel audio operations. Follow the procedures described below to install the drivers for different operating systems.

Installation for Windows 2000/XP

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

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

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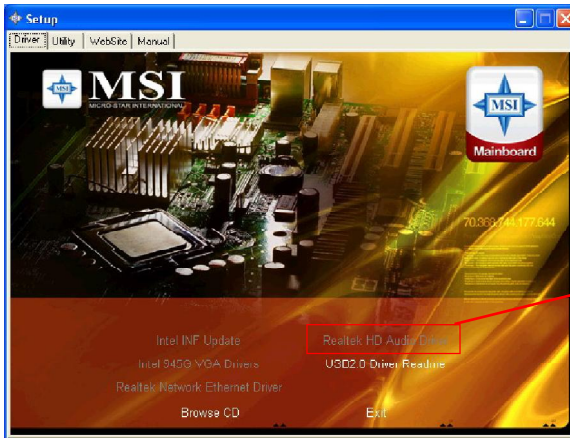
Click here

Important

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

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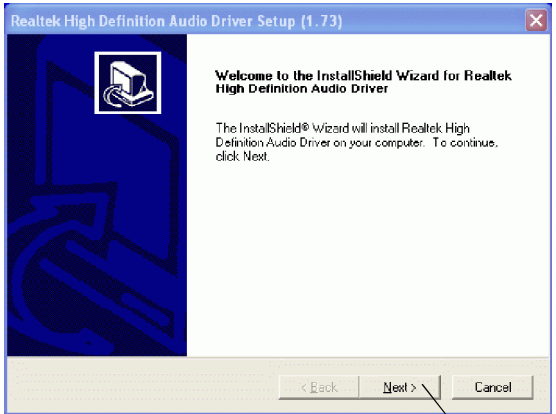
Click here

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

Select this option

Click here

Software Configuration

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

Double click
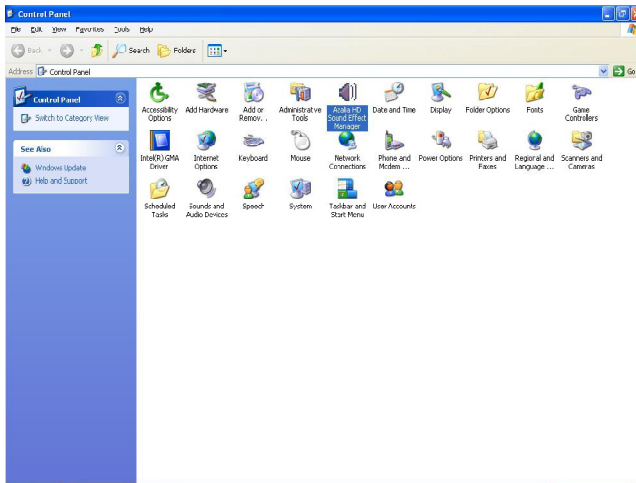
Sound Effect

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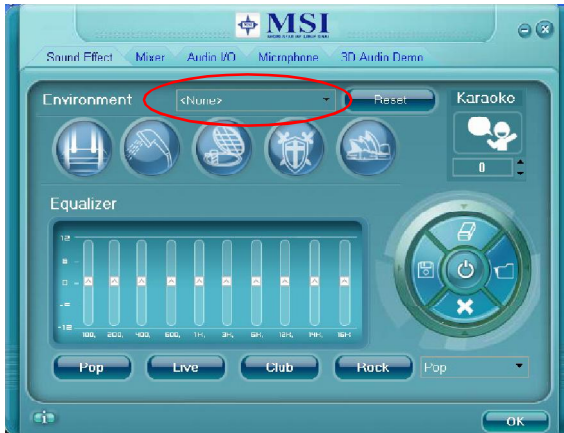
Environment Simulation

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

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

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

Equalizer Selection

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

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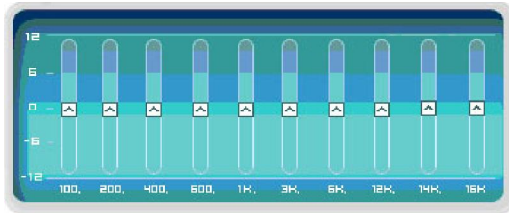
Save
The settings are saved permanently for future use

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

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

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

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

A-6

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

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

Karaoke Mode
Karaoke mode brings Karaoke fun back home. Simply using the music you usually play, Karaoke mode can help you eliminate the vocal of the song or adjust the key to accommodate your range.
1.Vocal Cancellation: Single click on "Voice Cancellation", the vocal of the song would be eliminated, while the background music is still in place, and you can be that singer!
2.Key Adjustment: Using "Up / Down Arrow" to find a key which better fits your vocal range.

Remove the human voice

Raise the key

Lower the key
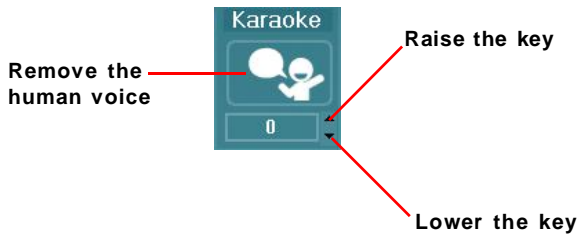
Mixer

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

1. Adjust Volume

You can adjust the volume of the speakers that you pluged in front or rear panel.

Important

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

2. Multi-Stream Function

ALC883/888 supports an outstanding feature called Multi-Stream, which means you may play different audio sources simultaneously and let them output respectively from the indicated real panel or front panel. This feature is very helpful when 2 people are using the same computer together for different purposes.

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

Important

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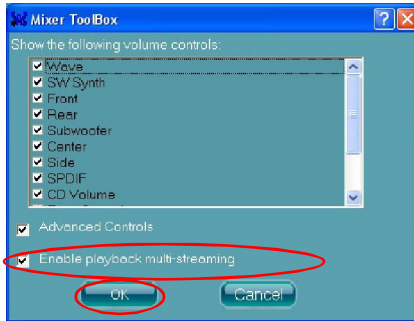
When you are playing the first audio source (for example: use Windows Media Player to play DVD/VCD), the output will be played from the rear panel, which is the default setting.

Then you **must** to select the **Realtek HD Audio 2nd output** from the scroll list **first**, and use a different program to play the second audio source (for example: use Winamp to play MP3 files). You will find that the second audio source (MP3 music) will come out from the Line-Out audio jack of Front Panel.
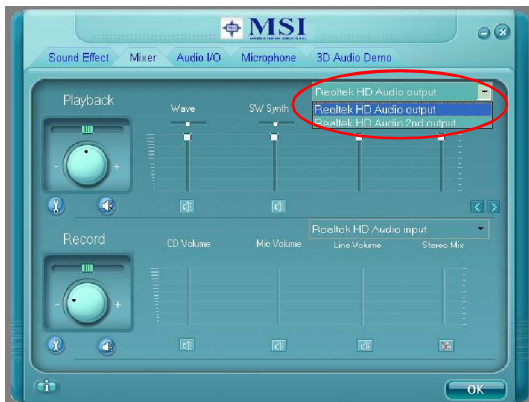
3. Playback control

Tool   *Mute*

Playback device
This function is to let you freely decide which ports to output the sound. And this is essential when multi-streaming playback enabled.
- Realtek HD Audio Output
- Realtek HD Audio 2nd Output
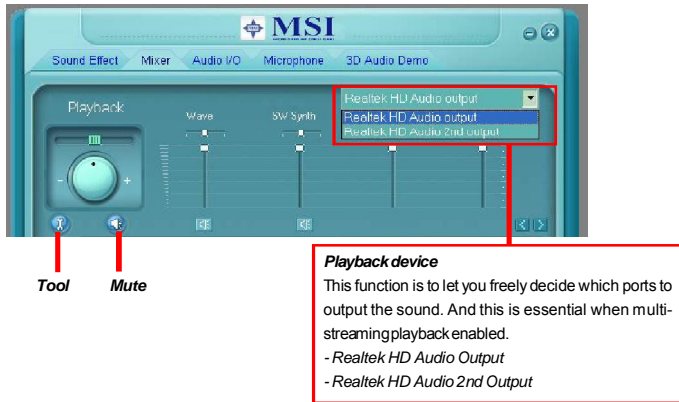
Mute
You may choose to mute single or multiple volume controls or to completely mute sound output.

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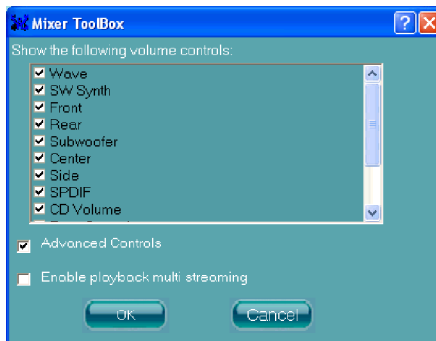
4. Recording control

Tool   *Mute*

Recording device
-Realtek HDA Primary input
-Mic in at front panel (Green)
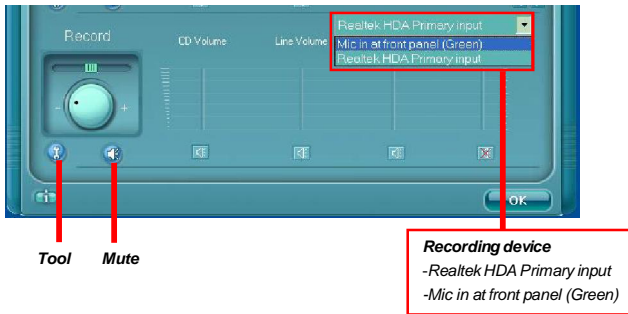
Mute
You may choose to mute single or multiple volume controls or to completely mute sound input.

Tool
- Show the following volume controls
This is to let you freely decide which volume control items to be displayed.
- Enable recording multi-streaming
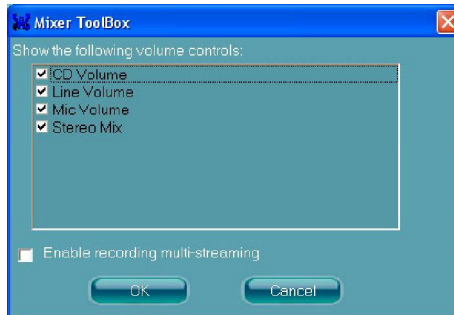
Important

ALC883/888 allows you to record the CD, Line, Mic and Stereo Mix channels simultaneously, frees you from mixing efforts. At any given period, you may choose 1 of the following 4 channels to record.

Audio I/O

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

   a. **Headphone** for the common headphone

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

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

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

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

Speaker Configuration:

1. Plug the speakers in the corresponding jack.

2. Dialogue "connected device" will pop up for your selection. Please select the device you have plugged in.
   - If the device is being plugged into the correct jack, you will be able to find the icon beside the jack changed to the one that is same as your device.
   - If not correct, Realtek HD Audio Manager will guide you to plug the device into the correct jack.

Connector Settings

Click [icon] to access connector settings.

Disable front panel jack detection (option)
Jack detection function only works with HD audio front panel.

Mute rear panel output when front headphone plugged in.

Enable auto popup dialogue, when device has been plugged in
Once this item checked, the dialog "Connected device" would automatically pop up when device plugged in.

S/PDIF (optional, for HDMI graphics card only)
Short for Sony/Philips Digital Interface, a standard audio file transfer format. S/PDIF allows the transfer of digital audio signals from one device to another without having to be converted first to an analog format. Maintaining the viability of a digital signal prevents the quality of the signal from degrading when it is converted to analog.
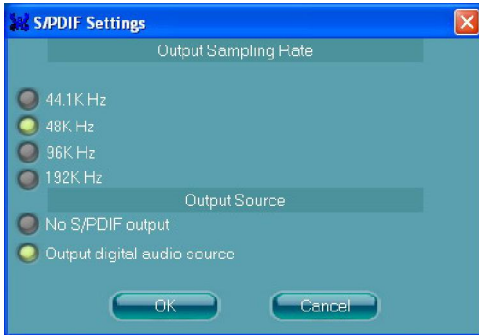
Output Sampling Rate
  44.1KHz: This is recommend while playing CD.
  48KHz: This is recommended while playing DVD or Dolby.
  96KHz: This is recommended while playing DVD-Audio.
  192KHz: This is recommended while playing High quality Audio.

Output Source
  No S/PDIF out: There will no S/PDIF out.
  Output digital audio source: The digital audio format (such as .wav, .mp3, .midi etc)
  will come out through S/PDIF-Out.

Test Speakers

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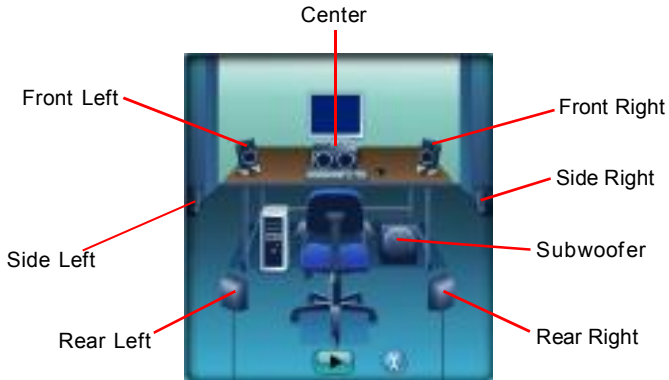
Microphone

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

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

3D Audio Demo

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

Information

In this tab it provides some information about this HD Audio Configuration utility, including Audio Driver Version, DirectX Version, Audio Controller & Audio Codec. You may also select the language of this utility by choosing from the **Language** list.
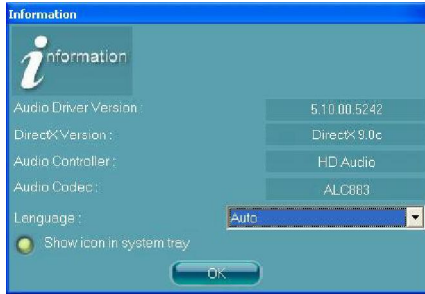
Also there is a selection **Show icon in system tray**. Switch it on and an icon will show in the system tray. Right-click on the icon and the **Audio Accessories** dialogue box will appear which provides several multimedia features for you to take advantage of.

Hardware Setup

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

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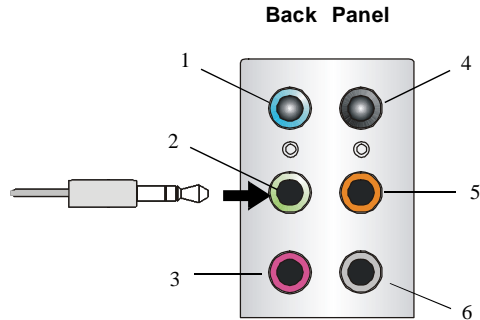
Back Panel

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

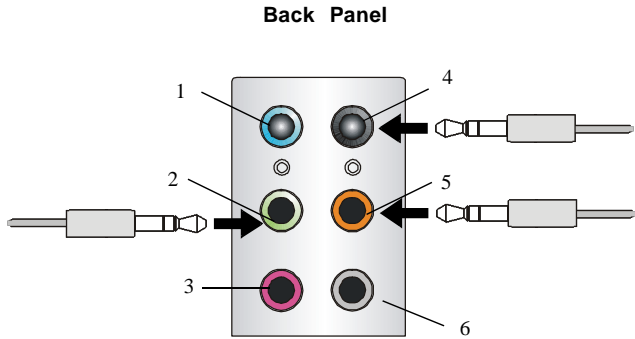n **4-Channel Mode for 4-Speaker Output**
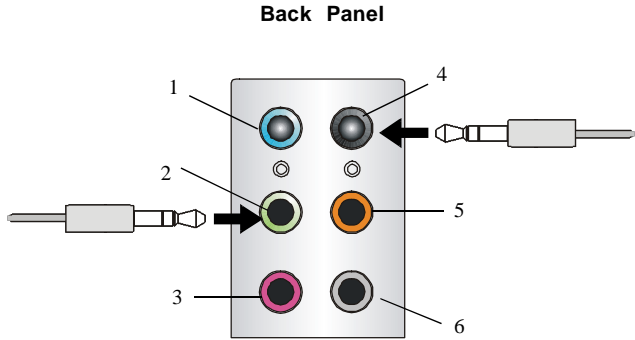
Back Panel

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

4-Channel Analog Audio Output

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

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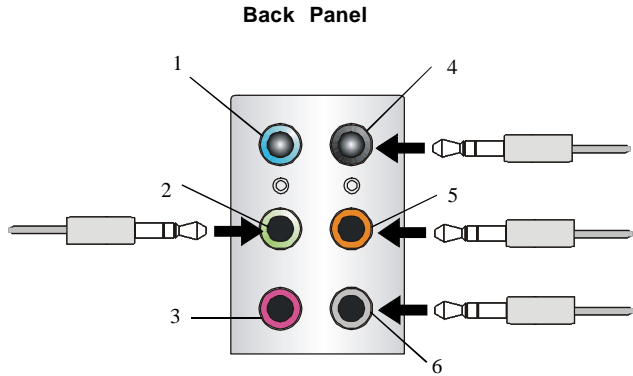
Back Panel

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

6-Channel Analog Audio Output

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

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n 8-Channel Mode for 8-Speaker Output

Back Panel

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)*