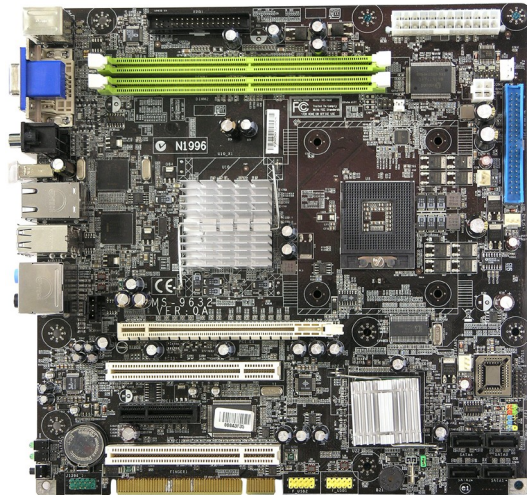# MSI
MICRO-STAR INTERNATIONAL

945GT Speedster

MS-9632 (V1.X) Workstation Board

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AMI® is a registered trademark of American Megatrends Inc.

Revision History

Revision	Revision History	Date
V1.0	First release	April 2006

Technical Support

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

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

ii

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. DO NOT COVER THE OPENINGS.
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by a service personnel:
    † The power cord or plug is damaged.
    † Liquid has penetrated into the equipment.
    † The equipment has been exposed to moisture.
    † The equipment has not work well or you can not get it work according to User's Manual.
    † The equipment has dropped and damaged.
    † The equipment has obvious sign of breakage.
12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60^0C (140^0F), IT MAY DAMAGE THE EQUIPMENT.

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

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

廢電池請回收

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

iii

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-9632**

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/EC), вступающей в силу 13 августа 2005 года, изделия, относящиеся к электрическому и электронному оборудованию, не могут рассматриваться как бытовой мусор, поэтому производители вышеперечисленного электронного оборудования обязаны принимать его для переработки по окончании срока службы. MSI обязустся соблюдать требования по приему продукции, проданной под маркой MSI на территории ЕС, в переработку по окончании срока службы. Вы можете вернуть эти изделия в специализированные пункты приема.

ESPAÑOL

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

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

NEDERLANDS

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

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

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

SRPSKI

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

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

POLSKI

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

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

TÜRKÇE

Çevreci özelliğiyle bilinen MSI dünyada çevreyi korumak için hatırlatır:

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

ČESKY

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

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

MAGYAR

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

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

ITALIANO

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

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

CONTENTS

Chapter 1
Getting Started

Thank you for choosing the 945GT Speedster (MS-9632 v1.X), an excellent u-ATX workstation board from MSI.

Based on the innovative **Intel® 945GT & ICH7R** controllers for optimal system efficiency, the 945GT Speedster server board accommodates the latest **Intel® Core Duo/Core Solo/Celeron M** processors in 478-pin package and supports up to two 240-pin 533/667MHz unbuffered non-ECC DDR-II DIMMs to provide the maximum of 4GB memory capacity.

In the entry-level and mid-range market segment, the 945GT Speedster can provide a high-performance solution for today's front-end and general purpose server/workstation, as well as in the future.

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Mainboard Specifications

Processor Support

- Intel® Core Duo/Core Solo/Celeron M CPU in the 478 package
- Supports 3/4 pin CPU Fan Pin-Header with Fan Speed Control
- Supports Intel Dual Core Technology to 533/667MHz and up

Supported FSB

- 533/667MHz

Chipset

- North Bridge: Intel® 945GT chipset
- South Bridge: Intel® ICH7R chipset

Memory Support

- DDRII 533/667 SDRAM (4GB Max)
- 2 DIMMs DDRII (240pin / 1.8V)

LAN

- Supports PCI Express LAN GB Fast Ethernet by Intel 82573E/L

IEEE 1394

- VIA VT6307 chip integrated
- Transfer rate is up to 400Mbps

Audio

- Realtek® ALC880 chip integrated
- Flexible 7.1 channel audio with jack sensing
- Compliant with Azalia 1.0 spec.

IDE

- 1 IDE port by ICH7R
- Supports Ultra DMA 66/100/133 mode
- Supports PIO, Bus Master operation mode

SATA

- SATA II ports by ICH7R
- Supports four SATA II devices
- Supports storage and data transfers at up to 300MB/s

RAID

- SATA1~4 supports RAID 0/ 1/ 0+1/ 5 by ICH7R

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
- 2 x RJ45 Gigabit LAN
- 1 IEEE 1394 port
- 4 USB 2.0 Ports
- 1 DVI + VGA connector
- 1 stacked Standard Video + RAC connector
- 1 7.1-channel audio connector

● **Onboard Pinheaders**
- 2 USB 2.0 pinheaders
- 1 IEEE 1394 pinheader

Slots
- 1 PCI Express x16 slot
- 1 PCI Express x 4 slot
- 2 32-bit/33MHz PCI slots

Form Factor
- u-ATX (24.4cm X 24.4 cm)
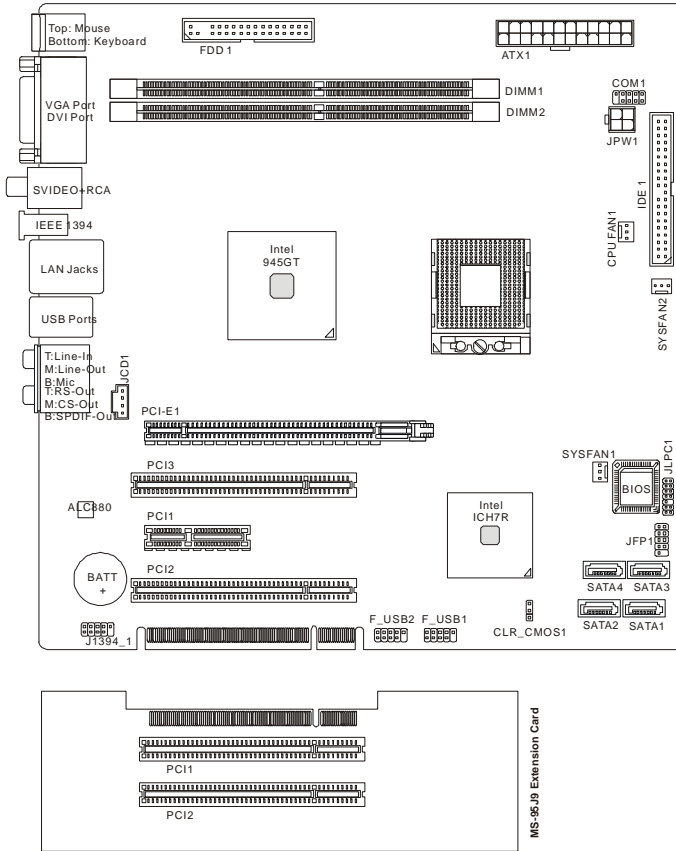
Mounting
- 9 mounting holes

MS-95J9 Card
- With 2 PCI slots
- Could extend u-ATX form factor to ATX form factor
- 18.016 cm X 6.1 cm

For more information on compatible components, please visit
http://www.msi.com.tw/program/products/server/svr/pro_svr_qvl.php

Mainboard Layout

945GT Speedster (MS-9632 v1.X) u-ATX Workstation Board

MSI Special Feature

Core Center *(Optional)*

The Core Center is a new utility you can find in the application CD. 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 overclock, overspec or to adjust the thresholds of system to send out the warning messages. If you click the *Core Center* button on the top, a screen pops up for you to choose the "*Auto mode*" or "*User mode*" of CPU fan. You may adjust the speeds of CPU fans and system fan here.

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

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

Top-side: User mode/Auto mode
Here you may adjust the CPU fan speed. If you choose *User mode*, you may adjust the CPU fan speed in 8 different modes, from **Stop** to **Full speed**.

Important

Items shown on Core Center may vary depending on your system status.

Chapter 2
Hardware Setup

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

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

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Quick Components Guide

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DDRII DIMMs, *p.2-6*

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COM1, *p.2-15*

Back Panel I/O, *p.2-8*

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IDE1, *p.2-11*

CPUFAN1/ SYSFAN2, *p.2-13*

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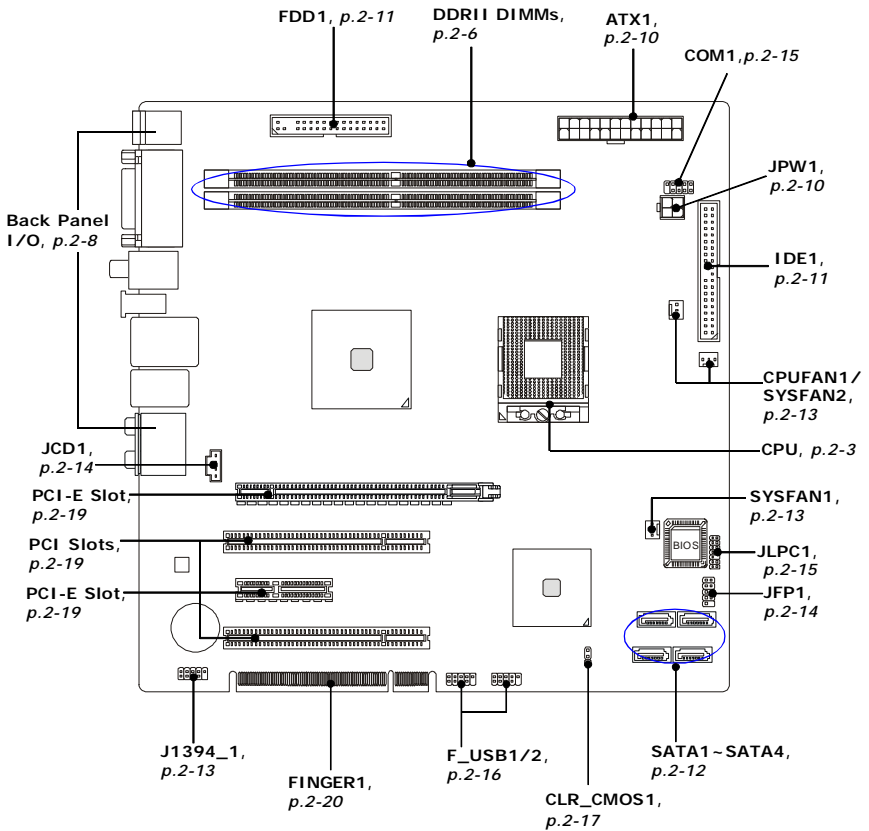
CPU (Central Processing Unit)

The mainboard supports **Intel® Core Duo/Core Solo/Celeron M** processors in 478-pin package. The mainboard uses Socket 478 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

For more information on compatible components, please visit ***http://www.msi.com. tw/program/products/server/svr/pro_svr_qvl.php*** .

Important

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

CPU & Cooler Set Installation

1. Place the CPU on top of the socket. Make sure to align the gold arrow on the CPU with the arrow key on the socket.

2. Push the CPU down until its pins securely fit into the socket.
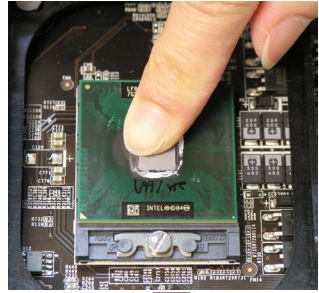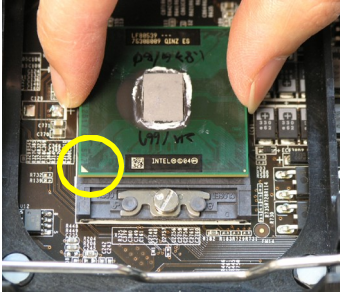
3. On the front end of the CPU socket is a locking mechanism designed into the form of a screw. Make sure that you actuate or deactuate this mechanism with a screwdriver before and after installing the CPU.
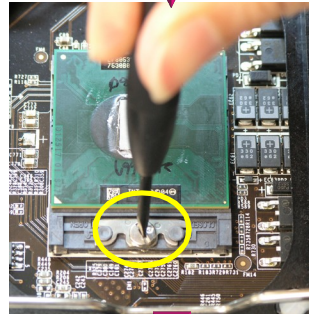
4. Release the metal clips on the retention mechanism.
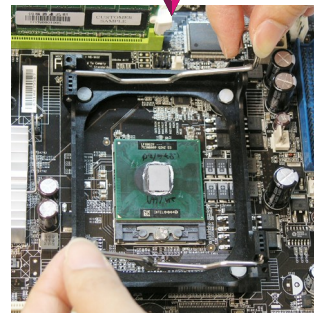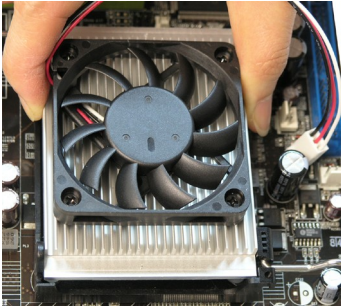
5. Mount the cooler set (fan & heatsink bundled) on top of the CPU and fit it into the retention mechanism.

6. Secure the metal clips back to the retention mechanism.

7. Connect the fan power cable from the mounted fan to the 3-pin fan power connector on the mainboard.

Memory

The mainboard provides two 240-pin non-ECC **DDRII 533/667** DIMMs and supports up to 4GB system memory.

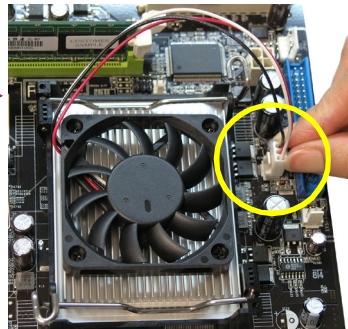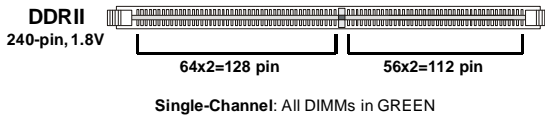For more information on compatible components, please visit *http://www.msi.com. tw/program/products/server/svr/pro_svr_qvl.php*.

DDRII
240-pin, 1.8V

64x2=128 pin   **56x2=112 pin**

Single-Channel: All DIMMs in GREEN

Memory Population Rules

This mainboard supports DDRII 533/667 memory interface.

Each DIMM slot supports up to a maximum size of 2GB. Users can install either single- or double-sided modules depending on their needs.

Slot	Combination 1	Combination 2	Combination 3
DIMM1	128MB~2GB	0	128MB~2GB
DIMM2	0	128MB~2GB	128MB~2GB
Total Memory	128MB~2GB	128MB~2GB	256MB~4GB

Important

Make sure that you install memory modules of the same type and density on DDRII DIMMs.

Installing DDRII Modules

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

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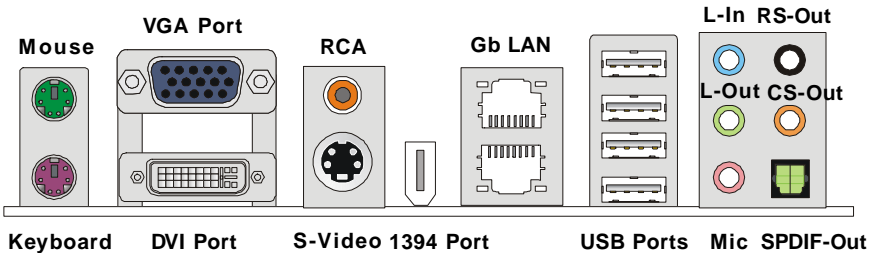
Important

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

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

Volt   Notch

Back Panel

L-In RS-Out

Mouse   VGA Port   RCA   Gb LAN   L-Out CS-Out

Keyboard   DVI Port   S-Video 1394 Port   USB Ports   Mic SPDIF-Out
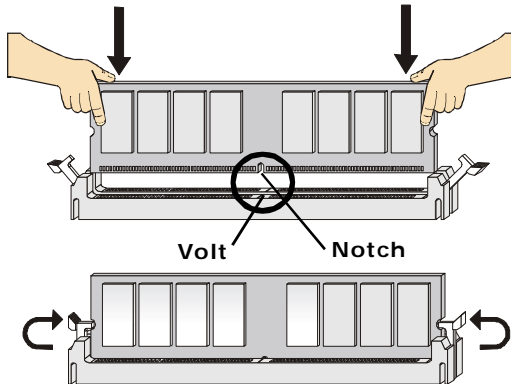
► **Mouse/Keyboard Connector**
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

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

► **Digital Panel Connector**
The DVI (Digital Visual Interface) connector allows you to connect an LCD monitor. It provides a high-speed digital interconnection between the computer and its display device. To connect an LCD monitor, simply plug your monitor cable into the DVI connector, and make sure that the other end of the cable is properly connected to your monitor (refer to your monitor manual for more information.)

► **RCA Connector**
The RCA connector allows users to connect display devices for **composite** video input/output.
Composite video, also called baseband video or RCA video, is the analog waveform that conveys the image data in a conventional National Television Standards Committee (NTSC) television signal. Composite video contains chrominance (hue and saturation) and luminance (brightness) information, along with synchronization and blanking pulses, all together in a single signal.

► **S-Video Connector**
The S-Video connector allows users to connect display devices for **component** video input/output.
S-Video (Super-Video, sometimes referred to as Y/C Video, or component video) is a video signal transmission in which the luminance signal and the chrominance signal are transmitted separately to achieve superior picture clarity. The luminance signal (Y) carries brightness information, which defines the black and white portion, and the chrominance signal (C) carries color information, which defines hue and saturation. An S-Video connection brings better video quality than a composite/RCA connection.

▶ IEEE 1394 Port
The 1394 port on the back panel provides connection to 1394 devices.

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

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

▶ Audio Port Connectors
These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.
- **Green audio jack** - Line Out, is a connector for speakers or headphones.
- **Blue audio jack** - Line In / Side-Surround Out in 7.1 channel mode, is used for external CD player, tapeplayer or other audio devices.
- **Pink audio jack** - Mic In, is a connector for microphones.
- **Orange audio jack** - Center/ Subwoofer Out in 5.1/ 7.1 channel mode.
- **Black audio jack** - Rear-Surround Out in 5.1/ 7.1 channel mode.

▶ Optical S/PDIF-Out connector
This SPDIF (Sony & Philips Digital Interconnect Format) connector is provided for digital audio transmission to external speakers through an optical cable.

2-9

Power Supply

SSI 24-Pin System Power Connector: ATX1

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

pin 13

pin 12

SSI 4-Pin CPU Power Connector: JPW1

This connector provides 12V power output to the CPU.

ATX1

1   12
13   24
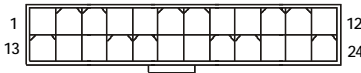
ATX1 Pin Definition

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

4   2
3   1

JPW1

JPW1 Pin Definition

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

Important

1. Maker sure that these two connectors are connected to adequate SSI power supplies to ensure stable operation of the mainboard.
*2. Power supply of **350watts** (and above) is highly recommended for system stability.*
3. SSI 12V power connection should be greater than 18A.

Connectors

Floppy Disk Drive Connector: FDD1

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

FDD1

ATA133 Hard Disk Connector: IDE1

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

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

 IDE1
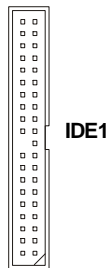
Important

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 SATA II interface ports and support SATA II data rates of 300MB/s. Each SATA II connector can connect to 1 hard disk device and is fully compliant with Serial ATA 2.0 specifications. Please refer to the *Appendix ICH7R RAID* for detailed application.

SATA4   SATA3

1   7

SATA2   SATA1
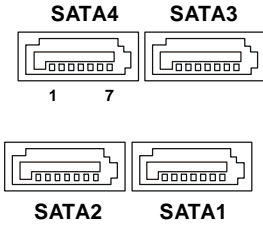
SATA1~ SATA4 Pin Definition

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

Serial ATA cable

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

Connect to SATA1/2/3/4
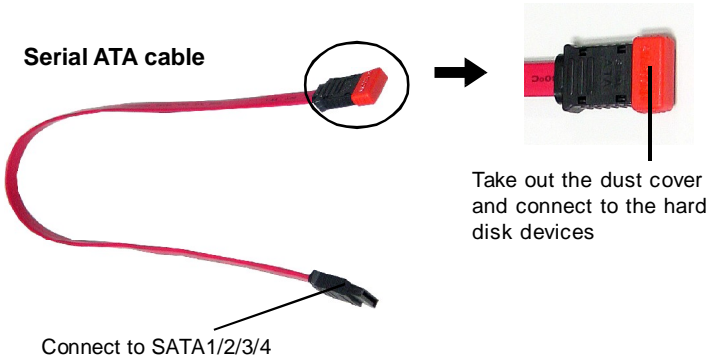
Important

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

IEEE 1394 Connector: J1394_1 (Optional)

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

Pin Definition

```
2 □□□□□ 10
1 □□□□□ 9
   J1394_1
```

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

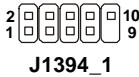## Fan Power Connectors: CPUFAN1, SYSFAN1, SYSFAN2

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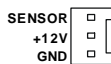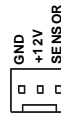
```
      GND          SENSOR        GND
      +12V         +12V          +12V
      SENSOR       GND           SENSOR

    CPUFAN1       SYSFAN1        SYSFAN2
```

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

CD-In Connector: JCD1

This connector is provided for CD-ROM audio.

JCD1

L
GND
R
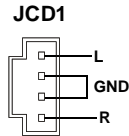
Front Panel Connectors: JFP1

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

JFP1

1   2
HDD + │ Power
LED - │ LED
Reset - │ + Power
Switch + │ - Switch
9   10
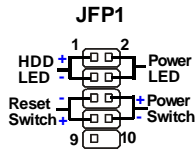
JFP1 Pin Definition

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.

FWH/LPC Debugging Pin Header: JLPC1

The pin header is for internal debugging only.

JLPC1 Pin Definition

JLPC1

1 ⬚⬚ 2
⬚⬚
⬚⬚
⬚⬚
13 ⬚⬚ 14
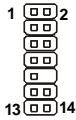
PIN	SIGNAL	PIN	SIGNAL
1	LCLK	2	Key (no pin)
3	LRST#	4	VCC3
5	LAD0	6	FID0_LRST
7	LAD1	8	VCC5
9	LAD2	10	Key (no pin)
11	LAD3	12	GND
13	LFRAME#	14	GND

Serial Port Connector: COM1

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.

COM1

9 ⬚⬚⬚⬚⬚ 1
⬚⬚⬚⬚⬚ 2

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

Front USB Connectors: F_USB1, F_USB2

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**.

F_USB1/2

```
2 ┌─┬─┬─┬─┬─┐ 10
1 └─┴─┴─┴─┴─┘ 9
```

Pin Definition

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

Important

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

Jumpers

Clear CMOS Jumper: CLR_CMOS1

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 CLR_CMOS1 (Clear CMOS Jumper) to clear data.

CLR_CMOS1

Keep Data   Clear Data
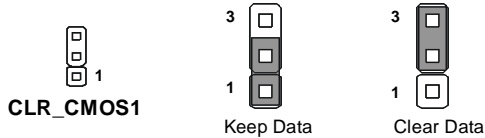
Important

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.

BIOS Flash Jumper: BIOS_WP1

This jumper is used to enable/disable the BIOS flash. When you intend to update the BIOS code, uncap this jumper first. Under normal operation, we suggest that you disable the BIOS flash by capping the BIOS_WP1 jumper to protect the system BIOS from virus infection.

BIOS Boot Block Jumper: BR1

A "boot block" program is included as part of the system BIOS to recover the system from a situation when the BIOS code is incorrect/corrupted or needs to be updated. When the BIOS code is corrupted or needs to be updated, you have to at first enable the boot block by shorting 1-2 pin of the BR1 jumper. Then the boot block will try to recover the BIOS code, usually by reading it from a specially-prepared floppy disk. *(Note that you also have to uncap the JBIOS1 jumper to enable BIOS flash in the meantime.)*

Under normal operation, we suggest that you disable the boot block by shorting 2-3 pin of the BR1 jumper to protect the boot block from virus infection.

BIOS_WP1   Disable BIOS Flash   Enable BIOS Flash

1 **BR1**   1 Enable Boot Block   1 Disable Boot Block
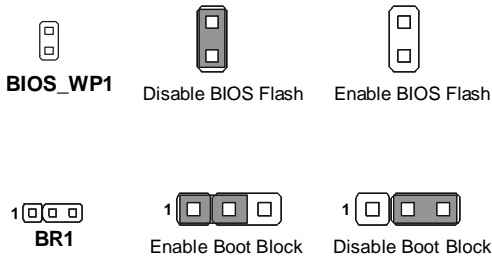
Slots

PCI (Peripheral Component Interconnect) Express Slots

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

PCI Express x16 Slot

PCI Express x4 Slot
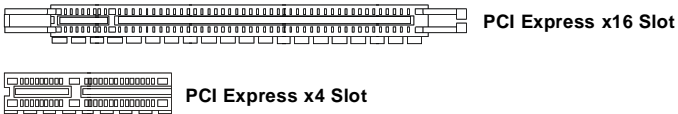
PCI (Peripheral Component Interconnect) Slots

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
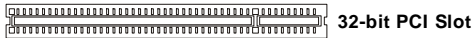
PCI Interrupt Request Routing

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:

DEVICE	ICH INT Pin	IDSEL	REQ & GNT
PCI Slot 1	INT# A/B/C/D	AD16	R/G#0
PCI Slot 2	INT# B/C/D/A	AD17	R/G#1
PCI Slot 3 (Extender Card)	INT# C/D/A/B	AD18	R/G#2
PCI Slot 4 (Extender Card)	INT# D/A/B/C	AD19	R/G#3
VT6307 IEEE 1394	INT# E	AD20	R/G#4

2-19

FINGER1 Golden Finger

The FINGER1 enables connection to the MS-95J9 Extension Card:
    (1) to provide the system with two additional 32-bit PCI slots and,
    (2) to extend the mainboard from u-ATX form factor to ATX form factor.
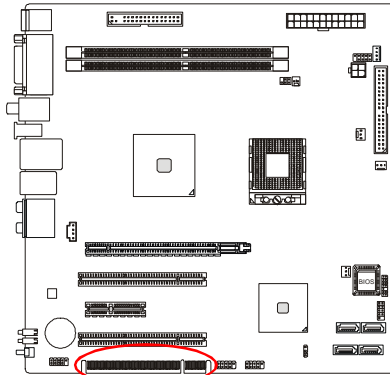
FINGER1
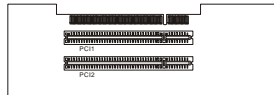
MS-95J9 Extension Card

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.

2-20

Chapter 3
BIOS Setup

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

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

² You want to change the default settings for customized features.

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 <F1> key to enter Setup.

Press F1 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:
>
>   *W9632IMS V1.0 031506 where:*
>
>   *1st digit refers to BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.*
>   *2nd - 5th digit refers to the model number.*
>   *6th digit refers to the chipset as I = Intel, N = nVidia, and V = VIA.*
>   *7th - 8th digit refers to the customer as MS = all standard customers.*
>   *V1.0 refers to the BIOS version.*
>   *031506 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.

3-3

The Menu Bar

```
              Phoenix - AwardBIOS CMOS Setup Utility
  Main    Advanced    PC Health    Security    System    Boot    Exit

   Date (mm:dd:yy)           Tue, Mar 28 2006          Item Help
   Time (hh:mm:ss)           11 : 16 :  0
                                                   Menu Level  ▶
 ▶ IDE Channel 0 Master      [ None]
 ▶ IDE Channel 0 Slave       [ None]               Change the day, month,
 ▶ IDE Channel 1 Master      [Maxtor 6Y080M0]      year and century
 ▶ IDE Channel 1 Slave       [ None]

   Drive A                   [1.44M, 3.5 in.]

   Base Memory                    640K
   Extended Memory             514048K
   Total Memory                515072K



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

▶ Main
Use this menu for basic system configurations, such as time, date etc.

▶ Advanced
Use this menu to set up the items of special enhanced features available on your system's chipset.

▶ PC Health
This entry monitors your hardware health status.

▶ Security
Use this menu to set Supervisor and User Passwords.

▶ System
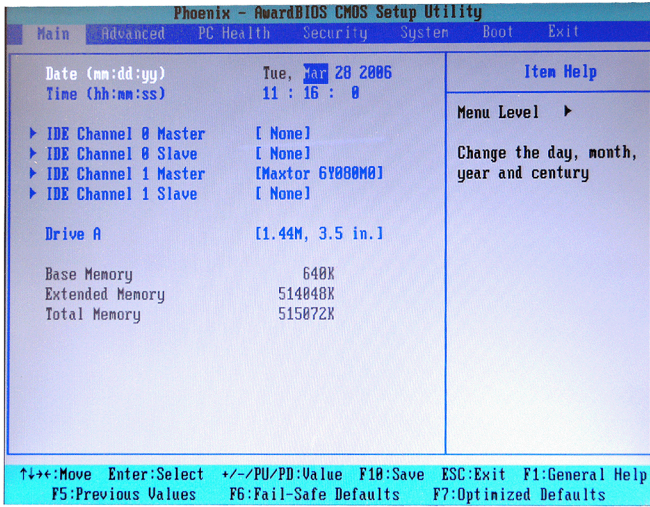This entry shows your system summary.

▶ Boot
Use this menu to specify the priority of boot devices.

▶ Exit
This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

Main

► **Date (mm:dd:yy)**
The date format is <Day>, <Month> <Date> <Year>.

► **Time (hh:mm:ss)**
The time format is <Hour> <Minute> <Second>.

► **IDE Channel 0/1 Master/Slave**
Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually.

If you select [Manual], related information is asked to be entered to the following items. Enter the information directly from the keyboard. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

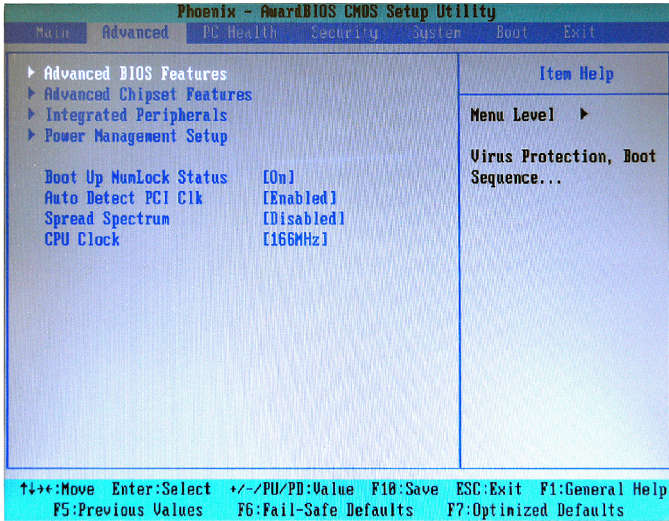|	
Access Mode	The settings are CHS, LBA, Large, Auto.
Capacity	The formatted size of the storage device.
Cylinder	Number of cylinders.
Head	Number of heads.
Precomp	Write precompensation.
Landing Zone	Cylinder location of the landing zone.
Sector	Number of sectors.

3-5

►Drive A
This item allows you to set the type of floppy drives installed.
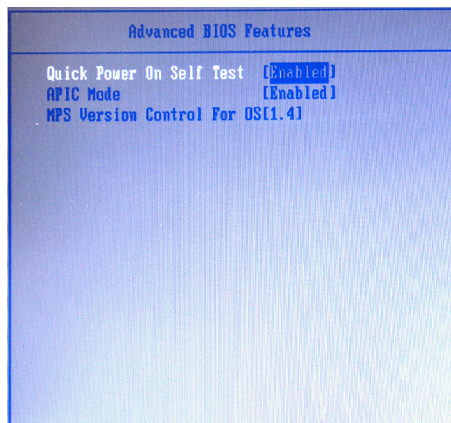
► Base/Extended/Total Memory
The three items show the memory status of the system. (Read-only)

Advanced

```
            Phoenix - AwardBIOS CMOS Setup Utility
   Main   Advanced   PC Health   Security   System   Boot   Exit

▶ Advanced BIOS Features                          Item Help
▶ Advanced Chipset Features
▶ Integrated Peripherals              Menu Level  ▶
▶ Power Management Setup
                                      Virus Protection, Boot
  Boot Up NumLock Status    [On]      Sequence...
  Auto Detect PCI Clk       [Enabled]
  Spread Spectrum           [Disabled]
  CPU Clock                 [166MHz]




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

▶ **Advanced BIOS Features**
The sub-menu is used to configure chipset features for optimal system performance.

```
              Advanced BIOS Features

  Quick Power On Self Test  [Enabled]
  APIC Mode                 [Enabled]
  MPS Version Control For OS[1.4]
```

▶ Quick Power On Self Test
Select [Enabled] to reduce the amount of time required to run the power-on self-test (POST). A quick POST skips certain steps. We recommend that you normally disable quick POST. Better to find a problem during POST than lose data during your work.
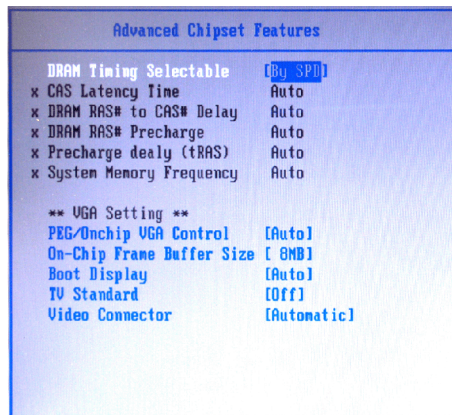
▶ APIC Mode
This field is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance with PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQ resources for the system.

▶ MPS Version Control For OS
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.

▶ Advanced Chipset Features
The sub-menu is used to configure chipset features for optimal system performance.

```
              Advanced Chipset Features

   DRAM Timing Selectable    [By SPD]
 x CAS Latency Time           Auto
 x DRAM RAS# to CAS# Delay    Auto
 x DRAM RAS# Precharge        Auto
 x Precharge dealy (tRAS)     Auto
 x System Memory Frequency    Auto

   ** VGA Setting **
   PEG/Onchip VGA Control     [Auto]
   On-Chip Frame Buffer Size  [ 8MB]
   Boot Display               [Auto]
   TV Standard                [Off]
   Video Connector            [Automatic]
```

▶ DRAM Timing Selectable
Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to [By SPD] enables DRAM timing to be determined automatically by BIOS based on the configurations on the SPD. Selecting [Manual] allows users to configure the following fields manually.

▶ CAS Latency Time
This controls the timing delay (in clock cycles) before SDRAM starts a read

command after receiving it. Smaller clocks increase system performance while bigger clocks provide more stable system performance.

▶ 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.

▶ Precharge Delay (tRAS)
The field specifies the idle cycles before precharging an idle bank.

▶ System Memory Frequency
Use this item to configure the clock frequency of the installed DRAMs.

VGA Setting
The following items allow you to configure the VGA settings of the system.

▶ PEG/Onchip VGA Control
This setting allows you to select whether to use the onchip graphics processor or the PCI Express card.
When set to [Onchip VGA], the motherboard boots up using the onboard graphics processor, even when a PCI Express graphics card is installed.
When set to [PEG Port], the motherboard boots up using the PCI Express graphics card, if one is installed. Otherwise, it defaults to the onboard graphics processor.
When set to [Auto], the BIOS checks to see if a PCI Express graphics card is installed. If it detects that a PCI Express graphics card is present, the motherboard boots up using that card. Otherwise, it defaults to the onboard graphics processor.

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

▶ Boot Display
Use the field to select the type of device you want to use as the display(s) of the system.
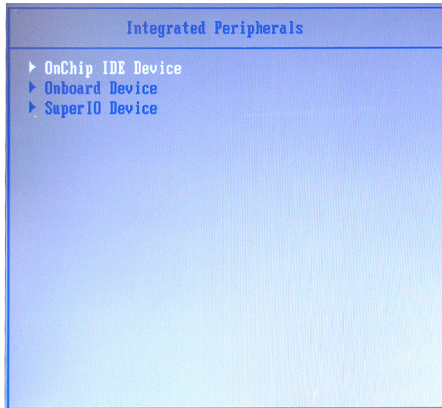
▶ TV Standard
Select the TV standard which is used as the video signal format of your TV if you have connected a TV to the system.

3-9

▶ Video Connector
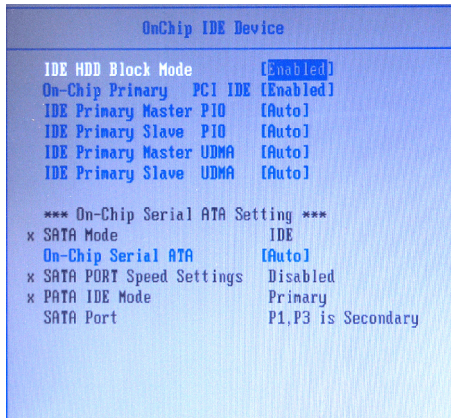This setting specifies the connector for video devices.

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

```
              Integrated Peripherals

   ▶ OnChip IDE Device
   ▶ Onboard Device
   ▶ SuperIO Device
```

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

```
                OnChip IDE Device

   IDE HDD Block Mode            [Enabled]
   On-Chip Primary   PCI IDE [Enabled]
   IDE Primary Master PIO      [Auto]
   IDE Primary Slave  PIO      [Auto]
   IDE Primary Master UDMA      [Auto]
   IDE Primary Slave  UDMA      [Auto]

   *** On-Chip Serial ATA Setting ***
 x SATA Mode                    IDE
   On-Chip Serial ATA         [Auto]
 x SATA PORT Speed Settings   Disabled
 x PATA IDE Mode               Primary
   SATA Port          P1,P3 is Secondary
```

▶ IDE HDD Block Mode
Block mode is also called block transfer, multiple commands, or multiple

sector read/write. If your IDE hard drive supports block mode (most new drives do), select [Enabled] for automatic detection of the optimal number of block read/writes per sector the drive can support.

▶ On-Chip Primary PCI IDE

The setting disables/enables the onchip primary PCI IDE interface.

▶ IDE Primary Master/Slave PIO

The IDE PIO (Programmed Input/Output) fields let you set a PIO mode 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.

▶ IDE Primary Master/Slave UDMA

Ultra DMA 33/66/100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows ME, XP or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, Ultra DMA/66, Ultra DMA/100 and Ultra DMA/133, select [Auto] to enable BIOS support.

*** On-Chip Serial ATA Setting ***

▶ SATA Mode

This setting specifies the SATA controller operation mode.

▶ On-Chip Serial ATA

This setting specifies the function of the on-chip SATA controller.

[Disabled]	Disable SATA controller
[Auto]	Automatically determined by BIOS
[Enhanced Mode]	Enable both SATA and PATA, max. 6 IDE drives supported
[SATA Only]	SATA operates in legacy mode

▶ SATA Port Speed Settings

This setting controls the speed of the SATA port.

▶ PATA IDE Mode / SATA Port

These settings specify the modes of the PATA & SATA ports.

▶ **Onboard Device**
Press <Enter> to enter the sub-menu and the following screen appears:

```
                    Onboard Device

    Planar Ethernet #1        [Enabled]
    Onboard Lan1 Boot ROM     [Enabled]
    Planar Ethernet #2        [Enabled]
    Onboard Lan2 Boot ROM     [Enabled]
    PCI-E Compliancy Mode     [v1.0a]

    USB Controller            [Enabled]
    USB 2.0 Controller        [Enabled]
    USB Keyboard Support      [Enabled]
    USB Mouse Support         [Disabled]
    Azalia/AC97 Audio Select  [Auto]
```
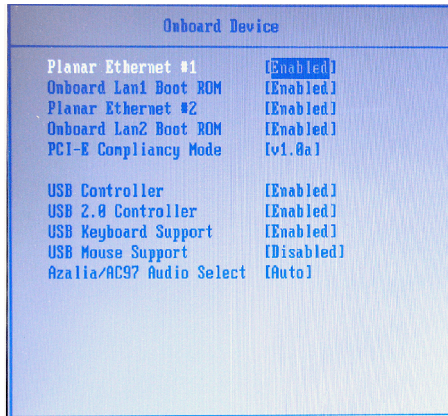
▶ **Planar Ethernet 1# / Planar Ethernet 2#**
These settings disable/enable the onboard Ethernet controller.

▶ **Onboard LAN1 / LAN2 Boot ROM**
The items enable or disable the initialization of the onboard LAN Boot ROMs during bootup. Selecting [Disabled] will speed up the boot process.

▶ **PCI-E Compliancy Mode**
This setting specifies the compliancy mode of the PCI-Express ports (1.0 or 1.0a).

▶ **USB Controller**
This setting is used to enable/disable the onboard USB controller.

▶ **USB 2.0 Controller**
This setting is used to enable/disable the onboard USB 2.0 controller.

▶ **USB Keyboard/Mouse Support**
Set to [Enabled] if your need to use a USB-interfaced keyboard/mouse in the operating system that does not support or have any USB driver installed, such as DOS and SCO Unix.

▶ **Azalia/AC97 Audio Select**
Azalia is the codename of "High Definition Audio." This setting controls the High Definition Audio interface integrated in the ICH7R southbridge.

▶ **Super IO Device**
Press <Enter> to enter the sub-menu and the following screen appears:

```
                    SuperIO Device

    Onboard FDC Controller      [Enabled]
    Onboard Serial Port 1       [3F8/IRQ4]
```
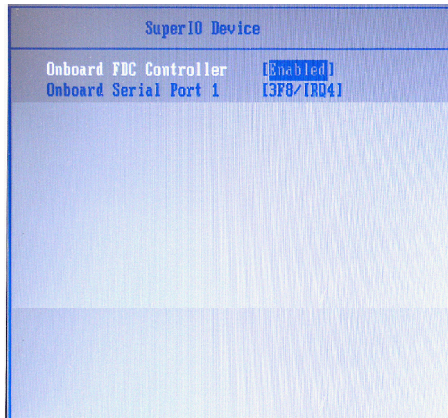
▶ **Onboard FDC Controller**
Select [Enabled] if your system has a floppy disk controller (FDD) installed on
the system board and you wish to use it. If you install add-on FDC or the
system has no floppy drive, select [Disabled] in this field.

▶ **Onboard Serial Port 1**
Select an address and corresponding interrupt for Serial Port 1.

▶ **Power Management Setup**
Press <Enter> to enter the sub-menu and the following screen appears:

```
                    Power Management Setup

   ▶ PCI Express PM Function    [Press Enter]
     ACPI Function              [Enabled]
     ACPI Suspend Type          [S3(STR)]
     Soft-Off by PWR-BTTN       [Instant-Off]
     Wake-Up by PCI card        [Enabled]
     USB KB Wake-Up From S3     [Disabled]
     Resume by Alarm            [Disabled]
   x Date(of Month) Alarm        0
   x Time(hh:mm:ss) Alarm        0 :  0 :  0
     PWRON After PWR-Fail       [Off]
```
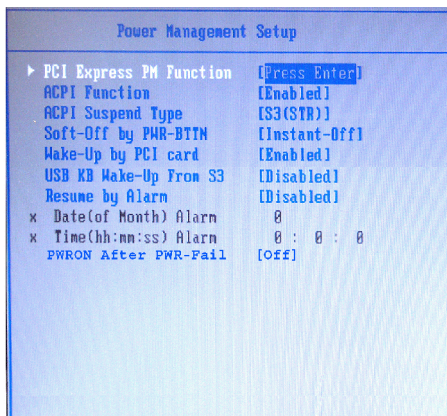
▶ **PCI Express PME Function**
This setting specifies whether the system will be awakened by the PCI Express PME (Power Management Event).

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

▶ **ACPI Suspend Type**
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 information 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.

▶ **Soft-Off by PWR-BTTN**

This feature allows users to configure the power button function. Settings are:

[Instant-Off]   The power button functions as a normal power-on/-off button.
[Delay 4 Sec.] 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.

▶ **Wake-Up By PCI Card**

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

▶ **USB KB Wake-Up from S3**

This setting allows you to enter "Any Key" (max. 8 numbers) to wake up the system from S3 state.

▶ **Resume By Alarm**

When [Enabled], your can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

▶ **Date (of Month) Alarm**

When *Resume By Alarm* is set to [Enabled], the field specifies the month for *Resume By Alarm*.

▶ **Time (hh:mm:ss) Alarm**

You can choose what hour, minute and second the system will boot up.

▶ **PWRON After PWR-Fail**

This item 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.
      [Former-sts] Restores the system to the status before power failure or interrupt occurred.

▶ **Boot Up NumLock Status**

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.

▶ **Auto Detect PCI Clk**

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

▶ 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.*

▶ CPU Clock

This item specifies the clock frequency of the CPU host bus (FSB) for overclocking purposes.

PC Health

```
          Phoenix - AwardBIOS CMOS Setup Utility
   Main   Advanced   PC Health   Security   System   Boot   Exit

 ► Smart Fan Setting                                    ┌──────────────────┐
   Current System Temp1        32°C/  89°F              │    Item Help     │
   Current CPU1 Temperature    50°C/ 122°F              ├──────────────────┤
   Current System Temp2        29°C/  84°F              │ Menu Level    ►  │
   SYSFan1 Speed                  0 RPM                 │                  │
   CPUFan1 Speed               5357 RPM                 │ Entry for setting│
   SYSFan2 Speed                  0 RPM                 │ smart fan function│
   Vcore                        1.24V
   12V                         12.19V
   V_1P5_Core                   1.59V
   VCC_DDR2                     1.07V
   VCC3                         3.32V
   VBAT (V)                     3.24V
   3VSB (V)                     3.32V


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

▶ **Smart Fan Setting**
The sub-menu is used to control fan speeds for optimal system performance.

```
              Smart Fan Setting

 Smart SYSFan1 Temperature [40°C/104°F]
 SYSFan1 Tolerance Value    [ 5]
 Smart CPUFan1 Temperature [40°C/104°F]
 CPUFan1 Tolerance Value    [ 5]
```
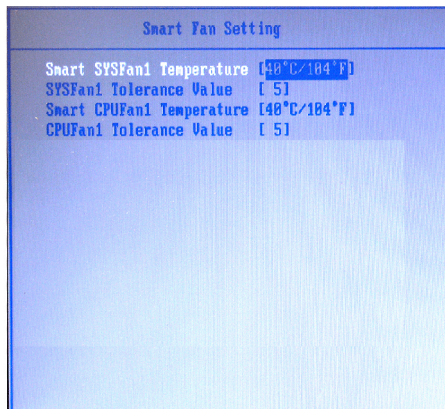
▶ Smart SYSFan1 / CPUFan1 Temperature
Select a temperature setting here, and if the temperature of the CPU/system climbs up to the selected temperature setting, the system will automatically increase the speed of the CPU/system fan to cool down the overheated CPU/system.

▶ SYSFan1 / CPUFan1 Tolerance Value
You can select a fan tolerance value here for the specific range for the *Smart SYSFan1 / CPUFan1 Temperature* items. If the current temperatures of the fans reach to the maximum threshold (the temperatures set in the *Smart SYSFan1 / CPUFan1 Temperature* plus the tolerance values you set here), the fans will speed up for cooling down. On the contrary if the current temperatures reach to the minimum threshold (the set temperatures minus the tolerance values), the fans will slow down to keep the temperatures stable.

▶ Current System Temp 1/Current CPU1 Temperature/Current System Temp 2/SYSFan1 Speed/CPUFan1 Speed/SYSFan2 Speed/Vcore/12V/V_1P5_Core/ VCC_DDR2/VCC3/VBAT(V)/3VSB(V)
These items display the current status of all of the monitored hardware devices/components such as CPU voltage, temperatures and all fans' speeds.

Security

```
        Phoenix - AwardBIOS CMOS Setup Utility
 Main   Advanced   PC Health   Security   System   Boot   Exit

 Set Supervisor Password                        Item Help
 Set User Password
 Security Option          [Setup]        Menu Level  ▶

                                         Change/Set/Disable
                                         Password




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5:Previous Values   F6:Fail-Safe Defaults   F7:Optimized Defaults
```
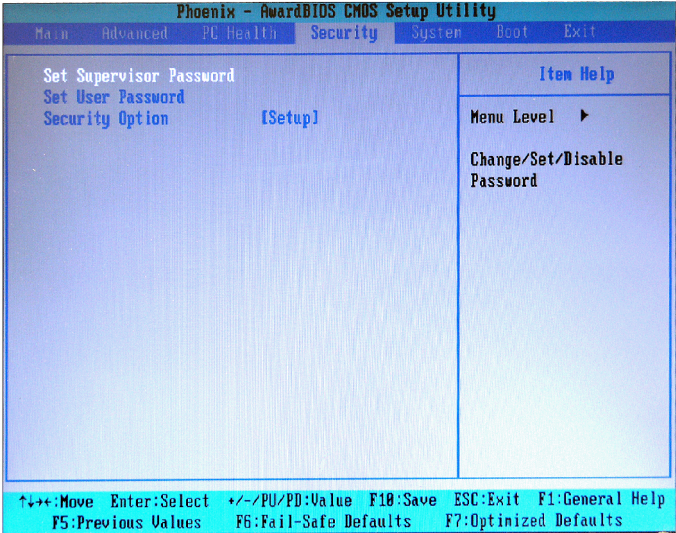
► Set Supervisor Password
Supervisor Password controls access to the BIOS Setup utility.

► Set User Password
User Password controls access to the system at boot.

► Security Option
This specifies the type of BIOS password protection that is implemented. Settings are described below:

Option	Description
[Setup]	The password prompt appears only when end users try to run Setup.
[System]	A password prompt appears every time when the computer is powered on or when end users try to run Setup.
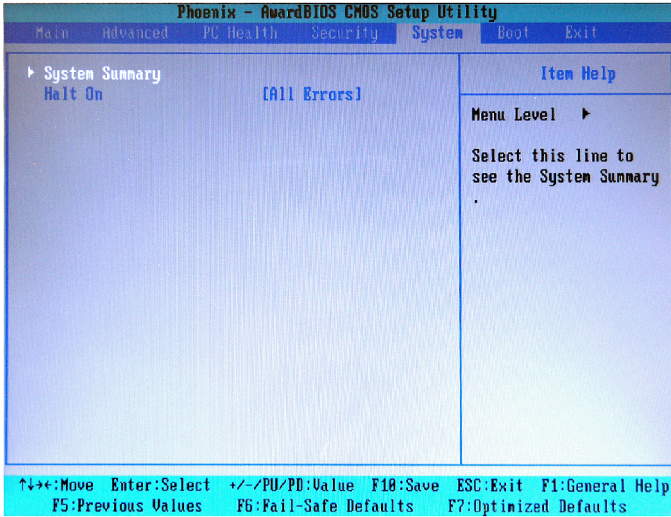
System

▶ **System Summary**

Press <Enter> to view the hardware specifications of your system.

▶ **Halt On**

The setting determines whether the system will stop if an error is detected at boot. When the system stops for the errors preset, it will halt on for 15 seconds and then automatically resume its operation. Available options are:

      [All Errors]   The system stops when any error is detected.
      [No Errors]   The system doesn't stop for any detected error.
      [All, But Keyboard]   The system doesn't stop for a keyboard error.
      [All, But Diskette]   The system doesn't stop for a disk error.
      [All, But Disk/Key]   The system doesn't stop for either a disk or a key-
                             board error.

Boot
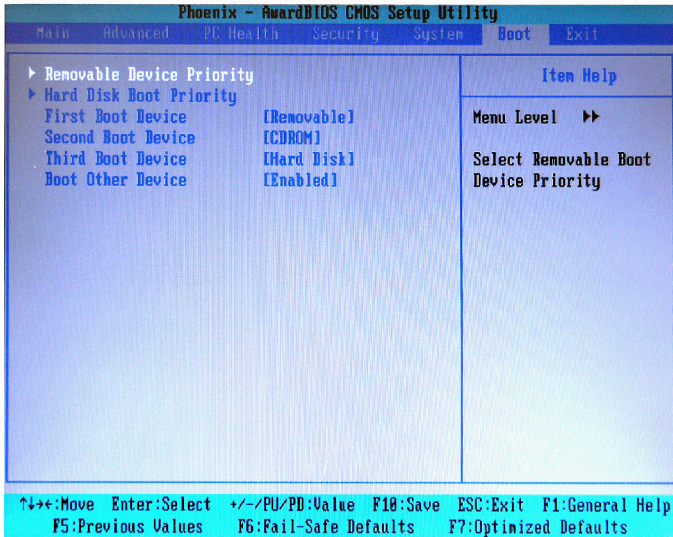
▶ **Removable Device Priority/Hard Disk Boot Priority/CD-ROM Boot Priority**
These settings allow users to set the priority of the specified devices. First press
<Enter> to enter the sub-menu. Then you may use the arrow keys (↑↓) to select the
desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/
down in the priority list.

▶ **First Boot Device/Second Boot Device/Third Boot Device**
The items allow you to set the sequence of boot devices where BIOS attempts to load
the disk operating system.

▶ **Boot Other Device**
Setting the option to [Enabled] allows the system to try to boot from other device if the
system fails to boot from the first/second/third boot device.

Exit

```
            Phoenix - AwardBIOS CMOS Setup Utility
 Main    Advanced   PC Health   Security   System   Boot   Exit

 Load Fail-Safe Defaults                            Item Help
 Load Optimized Defaults
 Save & Exit Setup                     Menu Level   ▶▶
 Exit Without Saving
                                       Load Fail-Safe
                                       Defaults




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5:Previous Values    F6:Fail-Safe Defaults   F7:Optimized Defaults
```
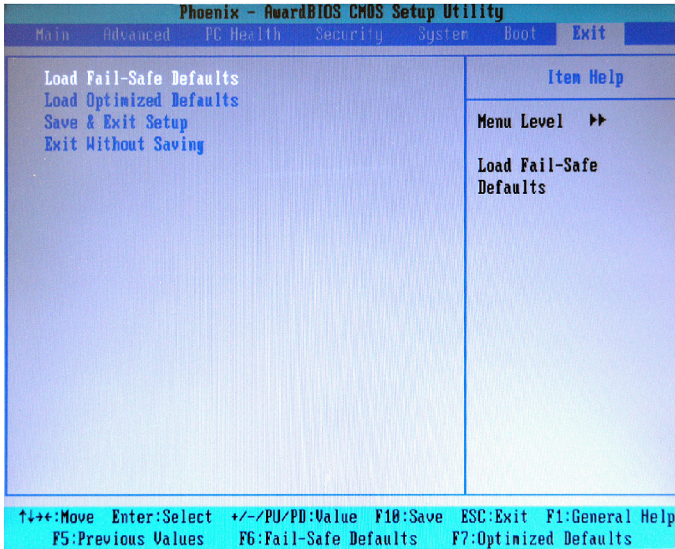
▶ **Load Fail-Safe Defaults**
Use this menu to load the default values set by the BIOS vendor for stable system performance.

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

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

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

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Appendix A
Intel ICH7R SATA RAID

The ICH7R provides a hybrid solution that combines four independent SATAII ports for support of up to four Serial ATAII (Serial ATAII RAID) drives.

It offers RAID level 0 (Striping), RAID level 1 (Mirroring and Duplexing), RAID level 5 (Block Interleaved Distributed Parity), RAID level 10 (A Stripe of Mirrors) and Intel® Martix Storage Technology.

MSI
MICRO-STAR INTERNATIONAL

ICH7R Introduction

The ICH7R provides a hybrid solution that combines four independent SATAII ports for support of up to four Serial ATAII (Serial ATAII RAID) drives.

Serial ATAII (SATAII) is the latest generation of the ATA interface. SATA hard drives deliver blistering transfer speeds up to 300MB/sec. Serial ATA uses long, thin cables, making it easier to connect your drive and improving the airflow inside your PC. The most outstanding features are:

> 1. Supports 300MB/s transfers with CRC error checking.
> 2. Supports Hot-plug-n-play feature.
> 3. Data handling optimizations including tagged command queuing, elevator seek and packet chain command.

Intel® ICH7R offers RAID level 0 (Striping), RAID level 1 (Mirroring and Duplexing), RAID level 5 (Block Interleaved Distributed Parity), RAID level 10 (A Stripe of Mirrors) and Intel® Martix Storage Technology.

RAID 0 breaks the data into blocks which are written to separate hard drives. Spreading the hard drive I/O load across independent channels greatly improves I/O performance. RAID 1 provides data redundancy by mirroring data between the hard drives and provides enhanced read performance. RAID 5 Provides data striping at the byte level and also stripe error correction information. This results in excellent performance and good fault tolerance. Level 5 is one of the most popular implementations of RAID. RAID 10 Not one of the original RAID levels, multiple RAID 1 mirrors are created, and a RAID 0 stripe is created over these. Intel Matrix RAID Technology is the advanced ability for two RAID volumes to share the combined space of two hard drives being used in unison.

Important

The least number of hard drives for RAID 0, RAID 1 or Matrix mode is 2. The least number of hard drives for RAID 10 mode is 4. And the maximum number of hard drives for RAID 5 mode is 3.
All the information/volumes listed in your system might differ from the illustrations in this appendix.

BIOS Configuration

The Intel Matrix Storage Manager Option ROM should be integrated with the system BIOS on all motherboards with a supported Intel chipset. The Intel Matrix Stroage Manager Option ROM is the Intel RAID implementation and provides BIOS and DOS disk services. Please use <Ctrl> + <I> keys to enter the "Intel(R) RAID for Serial ATA" status screen, which should appear early in system boot-up, during the POST (Power-On Self Test). Also, you need to enable the RAID function in BIOS to create, delete and reset RAID volumes.

Using the Intel Matrix Stroage Manager Option ROM

1. Creating, Deleting and Resetting RAID Volumes:
The Serial ATA RAID volume may be configured using the RAID Configuration utility stored within the Intel RAID Option ROM. During the Power-On Self Test (POST), the following message will appear for a few seconds:

Important

The "Driver Model", "Serial #" and "Size" in the following example might be different from your system.

```
Intel(R) Matrix Storage Manager option ROM  v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation,  All Rights Reserved.'

 RAID Volumes
 None defined.

 Physical Disks::
 Port Device Model       Serial #            Size    Type/Status(Vol ID)
 0    HDS722580VLSA80  VNRB3EC20549SL      76.7GB   Non-RAID Disk
 1    HDS722580VLSA80  VNRB3EC20559SL      76.7GB   Non-RAID Disk
 2    HDS722580VLSA80  VNRB3EC20569SL      76.7GB   Non-RAID Disk
 3    HDS722580VLSA80  VNRB3EC20579SL      76.7GB   Non-RAID Disk

Press  <CTRL-I>  to enter Configuration Utility..
```

After the above message shows, press <Ctrl> and <I> keys simultaneously to enter the RAID Configuration Utility.

Important

The following procedure is only available with a newly-built system or if you are reinstalling your OS. It should not be used to migrate an existing system to RAID.

After pressing the <Ctrl> and <I> keys simultaneously, the following window will appear:
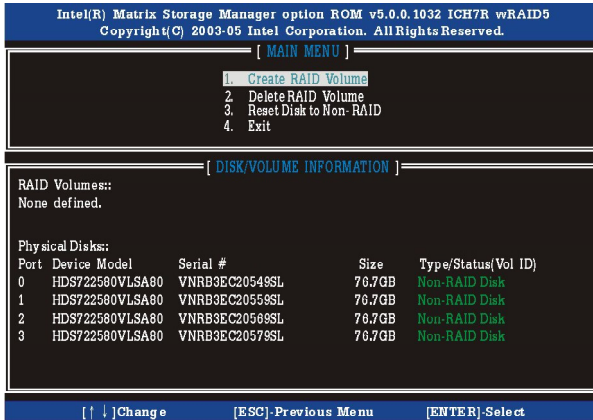
(1) Create RAID Volume

1. Select option 1 "Create RAID Volume" and press <Enter> key. The following screen appears. Then in the **Name** field, specify a RAID Volume name and then press the <TAB> or <Enter> key to go to the next field.
2. Use the arrow keys to select the RAID level best suited to your usage model in **RAID Level**.
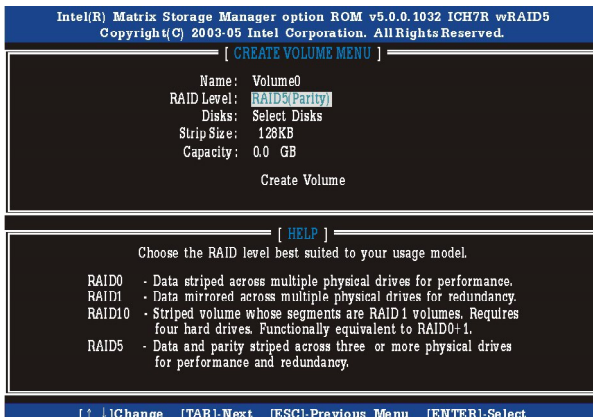
3. In the **Disk** field, press <Enter> key and the following screen appears. Use <Space> key to select the disks you want to create for the RAID volume, then click <Enter> key to finish selection.

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
            Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
=========================[ CREATE VOLUME MENU ]=========================

                        Name:   Volume0
                   RAID Level:   RAID5(Parity)
            =========================[ SELECT DISKS ]=========================

    Port Drive Model         Serial #              Size      Status
       0 HDS722580VLSA80      VNRB3EC20549SL        76.7GB    Non-RAID Disk
       1 HDS722580VLSA80      VNRB3EC20559SL        76.7GB    Non-RAID Disk
       2 HDS722580VLSA80      VNRB3EC20569SL        76.7GB    Non RAID Disk
       3 HDS722580VLSA80      VNRB3EC20579SL        76.7GB    Non RAID Disk


                Select 3 to 4 disks to use in creating the volume.


    [↑↓]-Previous/Next      [SPACE]-Selects      [ENTER]-Selection Complete



        [↑↓]Change    [TAB]-Next    [ESC]-Previous Menu    [ENTER]-Select
```

4. Then select the strip value for the RAID array by using the "upper arrow" or "down arrow" keys to scroll through the available values, and pressing the <Enter> key to select and advance to the next field. The available values range from 4KB to 128 KB in power of 2 increments. The strip value should be chosen based on the planned drive usage. Here are some typical values:
   RAID0 – 128KB
   RAID10 – 128KB
   RAID5 – 64KB
5. Then select the capacity of the volume in the **Capacity** field. The default value is the maximum volume capacity of the selected disks.

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
            Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
=========================[ CREATE VOLUME MENU ]=========================

                        Name:   Volume0
                   RAID Level:   RAID5(Parity)
                        Disks:   Select Disks
                   Strip Size:   64KB
                     Capacity:   228.0  GB
                                 Create Volume


            =========================[ HELP ]=========================

            Enter the volume capacity. The default value indicates the
            maximum volume capacity using the selected disks. If less
            than the maximum capacity is chosen, creation of a second
            volume is needed to utilize the remaining space.


        [↑↓]Change    [TAB]-Next    [ESC]-Previous Menu    [ENTER]-Select
```

Important

Since you want to create two volumes (Intel Matrix RAID Technology), this default size (maximum) needs to be reduced. Type in a new size for the first volume. As an example: if you want the first volume to span the first half of the two disks, re-type the size to be half of what is shown by default. The second volume, when created, will automatically span the remainder of two hard drives.

6. Then the following screen appears for you to confirm if you are sure to create the RAID volume. Press <Y> to continue.

7. Then the following screen appears to indicate that the creation is finished.
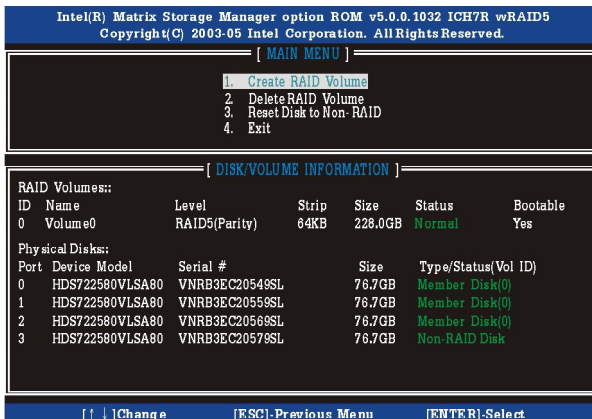
(2) Delete RAID Volume

Here you can delete the RAID volume, but please be noted that all data on RAID drives will be lost.

Important

If your system currently boots to RAID and you delete the RAID volume in the Intel RAID Option ROM, your system will become unbootable.

Select option 2 **Delete RAID Volume** from the main menu window and press <Enter> key to select a RAID volume for deletion. Then press <Delete> key to delete the selected RAID volume. The following screen appears.
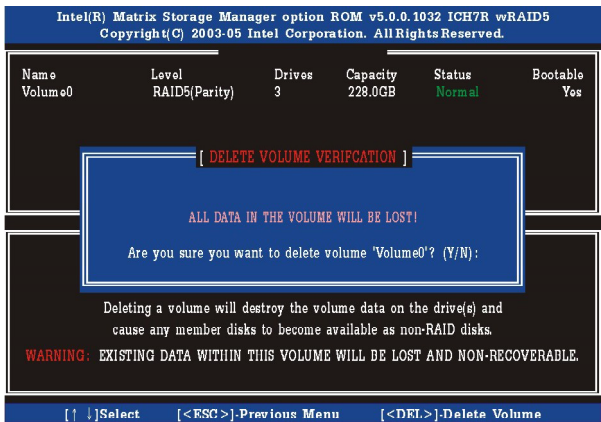
Press <Y> key to accept the volume deletion.

(3) Reset Disks to Non-RAID

Select option 3 **Reset Disks to Non-RAID** and press <Enter> to delete the RAID volume and remove any RAID structures from the drives. The following screen appears:
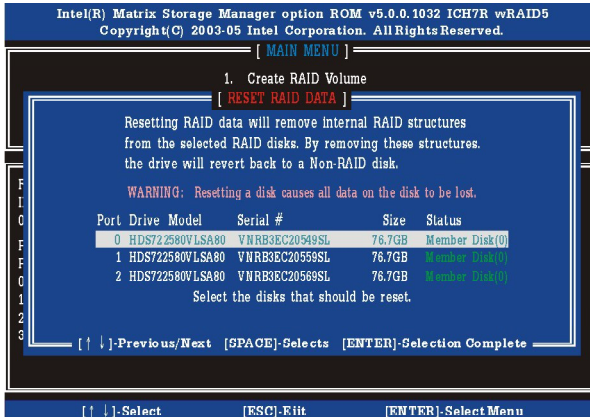
Press <Y> key to accept the selection.

Important

1. You will lose all data on the RAID drives and any internal RAID structures when you perform this operation.
2. Possible reasons to 'Reset Disks to Non-RAID' could include issues such as incompatible RAID configurations or a failed volume or failed disk.

Installing Software

Install Driver in Windows XP / 2000

† **New Windows XP / 2000 Installation**

The following details the installation of the drivers while installing Windows XP / 2000.

1. Start the installation:
   Boot from the CD-ROM. Press F6 when the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
2. When the Windows XP Setup window is generated, press S to specify an Additional Device(s).
3. Insert the driver diskette *Intel IAA RAID XP Driver For ICH7R (NH82801GR)* into drive A: and press <Enter>.
4. Choose the driver *Intel(R) 82801GR SATA RAID Controller* from the drop-down list that appears on Windows XP Setup screen, and press the <Enter> key.
5. Press <Enter> to continue with installation or if you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, press <Enter> to continue with installation.
6. From the Windows XP/2000 Setup screen, press the <Enter> key. Setup will now load all device files and then continue the Windows XP/2000 installation.

† **Existing Windows XP/2000 Driver Installation**

1. Insert the MSI CD into the CD-ROM drive.
2. The CD will auto-run and the setup screen will appear.
3. Under the Driver tab, click on *Intel IAA RAID Edition*.
4. The drivers will be automatically installed.

† **Confirming Windows XP/2000 Driver Installation**

1. From Windows XP/2000, open the **Control Panel** from **My Computer** followed by the System icon.
2. Choose the **Hardware** tab, then click the **Device Manager** tab.
3. Click the "**+**" in front of the **SCSI and RAID Controllers** hardware type. The driver *Intel(R) NH82801GR SATAII RAID Controller* should appear.

Installation of Intel Matrix Storage Console

The Intel Application Accelerator RAID Edition driver may be used to operate the hard drive from which the system is booting or a hard drive that contains important data. For this reason, you cannot remove or un-install this driver from the system after installation; however, you will have the ability to un-install all other non-driver components.

Insert the MSI CD and click on the **Intel IAA RAID Edition** to install the software.
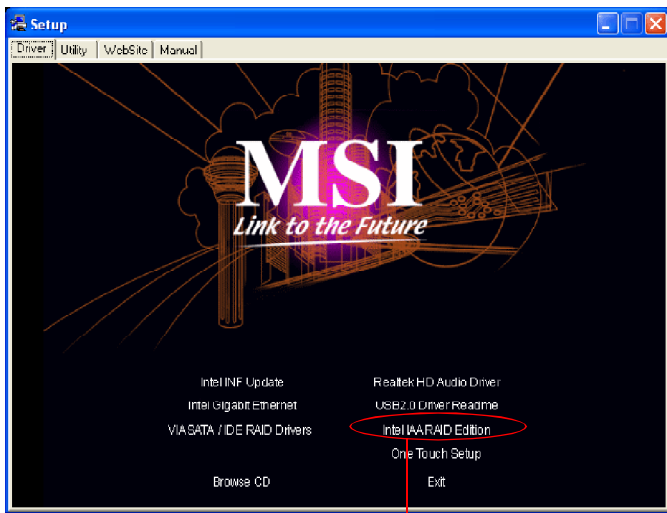
Click on this item

The **InstallShield Wizard** will begin automatically for installation showed as following:

Click on the **Next** button to proceed the installation in the welcoming window.
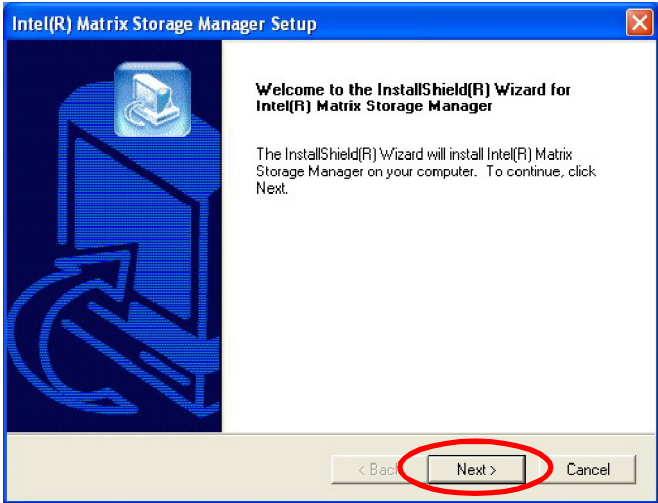
The window shows the components to be installed. Click **Next** button to continue.
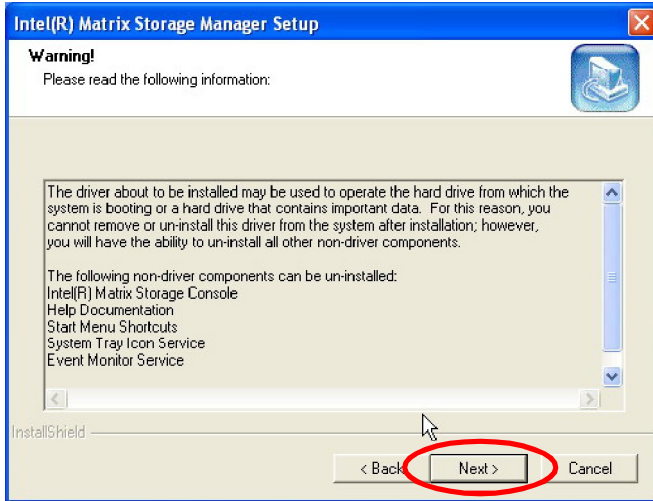
After reading the license agreement in the following window, click **Yes** button to continue.
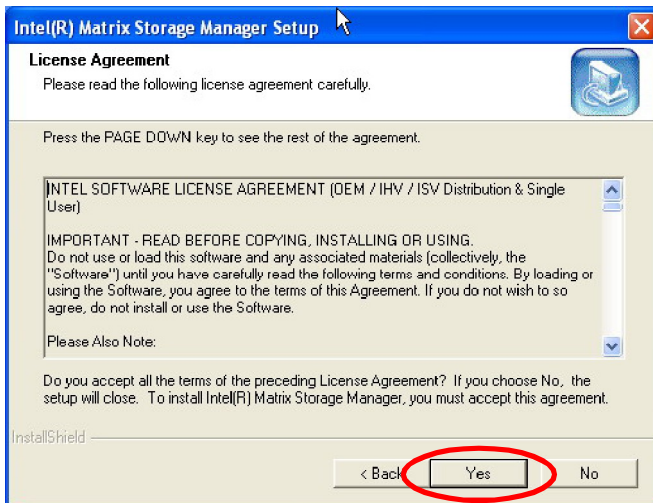
Select the folder in which you want the program to be installed in the following window, and click **Next** button to start installation.
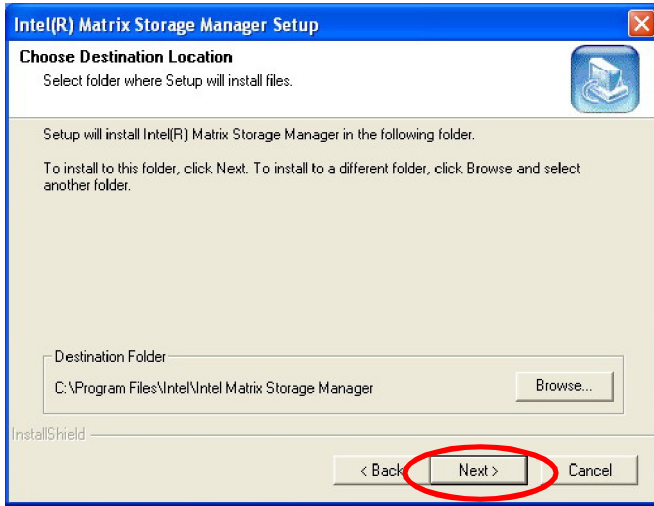
Select a program folder in the following window where you want Setup to add the program icon.
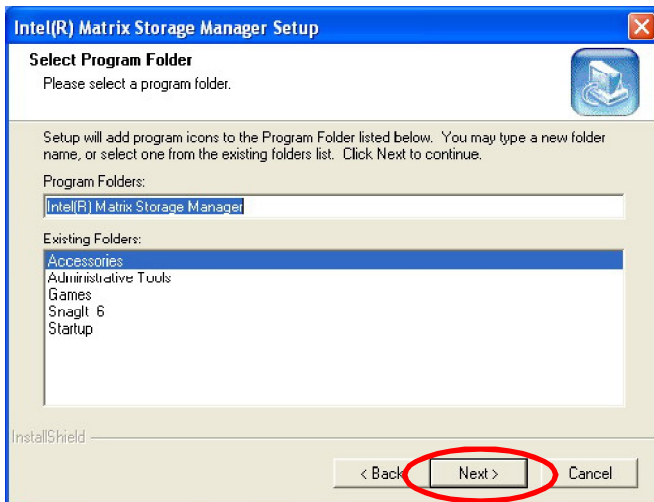
The following window appears to show the Intel Application Accelerator RAID Edition Setup installation status.
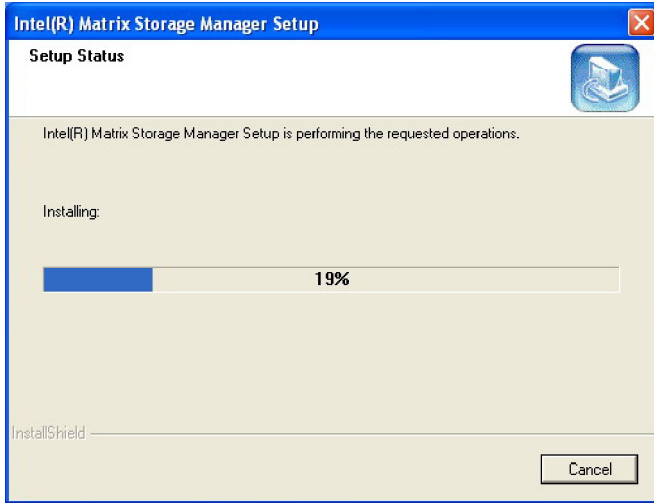
Once the installation is complete, the following window appears.
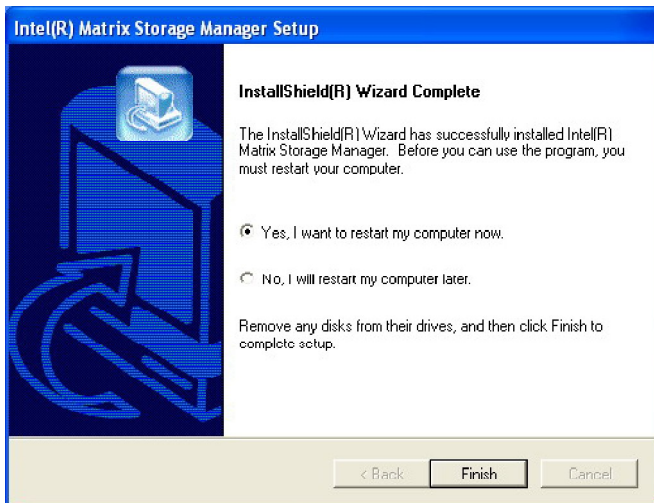
RAID Migration Instructions

The Intel Matrix Storage Console offers the flexibility to upgrade from a single Serial ATA (SATA) hard drive to RAID configuration when an additional SATA hard drive is added to the system. This process will create a new RAID volume from an existing disk. However, several important steps must be followed at the time the system is first configured in order to take advantage of RAID when upgrading to a second SATA hard drive:

> 1. BIOS must be configured for RAID before installing Windows XP on the single SATA hard drive. Refer to **On Chip SATA Setting** for properly setting of the BIOS.
> 2. Install the Intel Application Accelerator RAID Driver during Windows Setup. Refer to **Installing Software** for instructions on installing the driver during Windows Setup.
> 3. Install the Intel Matrix Storage Console after the operating system is installed.

To create a volume from an existing disk, complete the following steps:

Important

*A **Create from Existing Disk** operation will delete all existing data from the added disk and the data cannot be recovered. It is critical to backup all important data on the added disk before proceeding. However, during the migration process, the data on the source disk is preserved.*

After the Intel Matrix Storage Console has been successfully installed and the system has rebooted, click on the Intel Application Accelerator shortcut link (**Start --> All Programs --> Intel Matrix Storage Manager --> Intel Matrix Storage Console**) and the following window will appear:
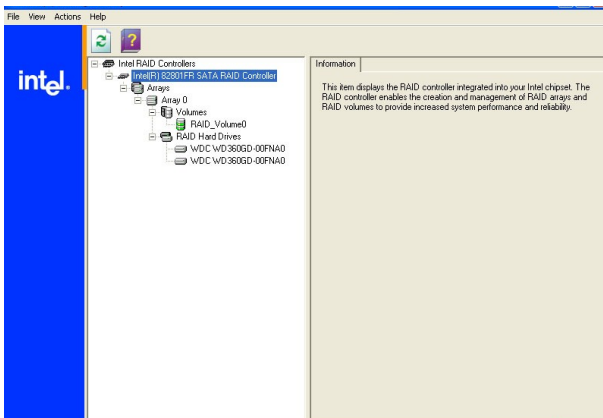
Create RAID Volume from Existing Disk

To create a RAID volume from an existing disk, choose **Action --> Create RAID Volume from Existing Hard Drive**.
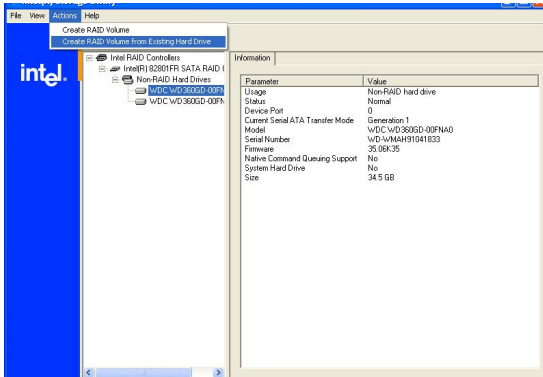
The **Create RAID Volume from Existing Hard Drive Wizard** pops up to lead you for the following procedure. Click **Next** to continue.
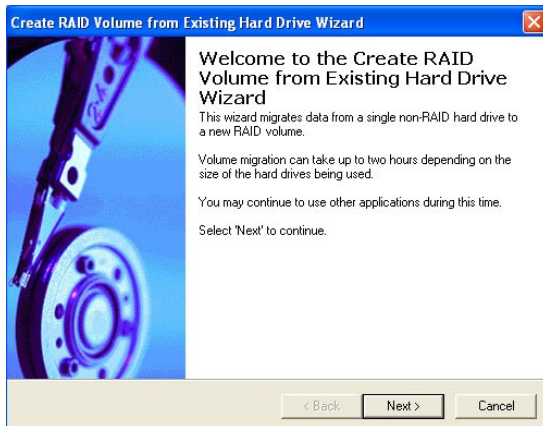
(1) Step 1: Configure Volume

Here you can configure the new RAID volume by entering the volume name, selecting the RAID level and strip size.

† **RAID Volume Name:**

A desired RAID volume name needs to be typed in where the 'RAID_Volume1' text currently appears above. The RAID volume name has a maximum limit of 16 characters. The RAID volume name must also be in English alphanumeric ASCII characters.

† **RAID Level:**

Select the desired RAID level:

RAID 0 (Performance) – A volume optimized for performance will allow you to access your data more quickly.

RAID 1 (Redundancy) – A volume optimized for data redundancy will provide you with a realtime duplicate copy of your data. Note: Only half of the available volume space will be available for data storage.

RAID 5 (Useful) – RAID 5 can be used on three or more disks, with zero or more spare-disks. The resulting RAID-5 device size will be (N-1)*S, where N is the how many drive, S is the size of the smallest drive in the array. If one of the disks fail, all data are still intact. It can rebuild the disk from the parity information. If spare disks are available, re-construction will begin immediately after the device failure. If two disks fail simultaneously, all data are lost. RAID-5 can survive one disk failure, but not two or more. Both read and write performance usually increase, but can be hard to predict how much. Reads are similar to RAID-0 reads, writes can be either rather

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expensive (requiring read-in prior to write, in order to be able to calculate the correct parity information), or similar to RAID-1 writes. The write efficiency depends heavily on the amount of memory in the machine, and the usage pattern of the array. Heavily scattered writes are bound to be more expensive.

RAID 10 (Mirrored Stripes) – A RAID 1 array of two RAID 0 arrays.

† **Strip Sizes:**

Select the desired strip size setting. As indicated, the optimal setting is 128KB. Selecting any other option may result in performance degradation. Even though 128KB is the recommended setting for most users, you should choose the strip size value which is best suited to your specific RAID usage model. The most typical strip size settings are:

4KB: For specialized usage models requiring 4KB strips
8KB: For specialized usage models requiring 8KB strips
16KB: Best for sequential transfers
32KB: Good for sequential transfers
64KB: Good general purpose strip size
128KB: Best performance for most desktops and workstations

(2) Select the source disk

Then select the source disk that you wish to use and then click **"--->"** to move it to the **Selected** field. Then click **Next** to continue.

It is very important to note which disk is the source disk (the one containing all of the information to be migrated) and which one is the target disk. On a RAID Ready system, this can be determined by making a note during POST of which port (e.g. Port 0 or Port 1) the single disk is attached to.

You can also use the Intel Application Accelerator RAID Edition utility before the second disk is installed to verify the Port and serial number of the drive that contains all the data.
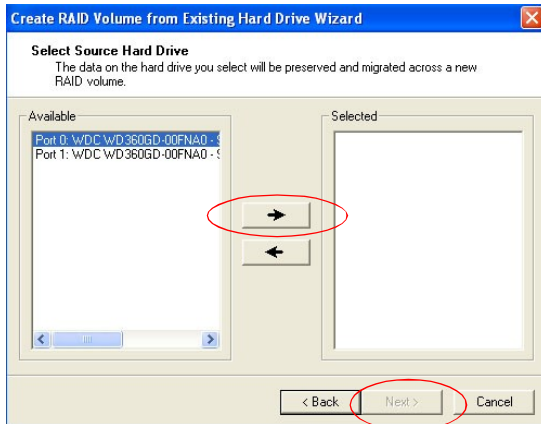
(3) Select Member Hard Drive(s)
Then select the member disk (the target disk) that you wish to use and then click **"--->"** to move it to the **Selected** field. Then click **Next** to continue.
Please note that the existing data on the selected hard drive(s) will be deleted permanently. Do not forget to back up all the important data before continuing.
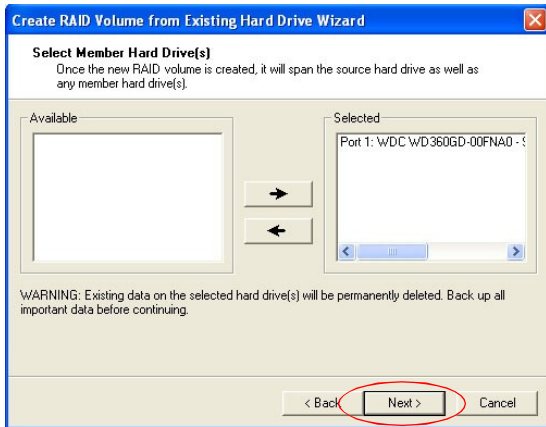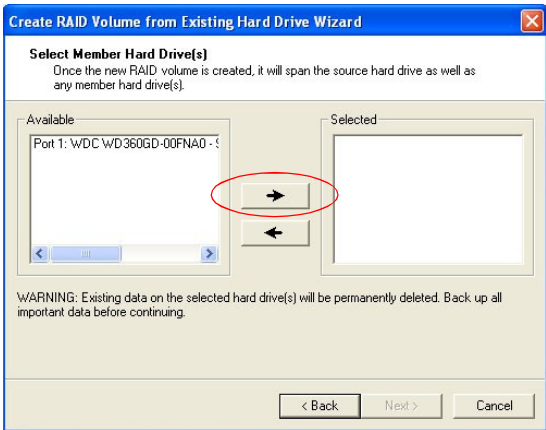
(4) Specify Volume Size
Specify the amount of available array space to be used by the new RAID volume. You may enter the amount in the space or use the slider to specify. It is recommended you use 100% of the available space for the optimized usage. For RAID 0 volume, if you do not specify 100% of the hard drive space, the rest hard drive space will be worked as RAID 1 volume, which is the new technology called Intel Matrix RAID. Then click **Next** to continue.
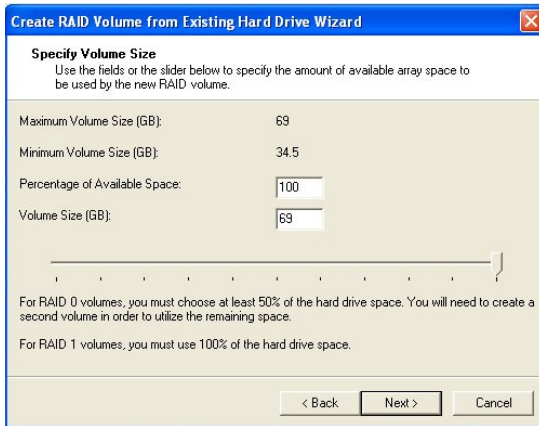
(5) Start Creating RAID Volume from Existing Hard Drive Wizard
Before you continue the procedure of RAID volume creation from existing hard drive, read the dialogue box below carefully. Please note that once you click **Finish**, the existing data on the selected hard drive(s) will be deleted permanently and this operation cannot be undone. It is critical that you backup all important data before selecting **Finish** to start the migration process.
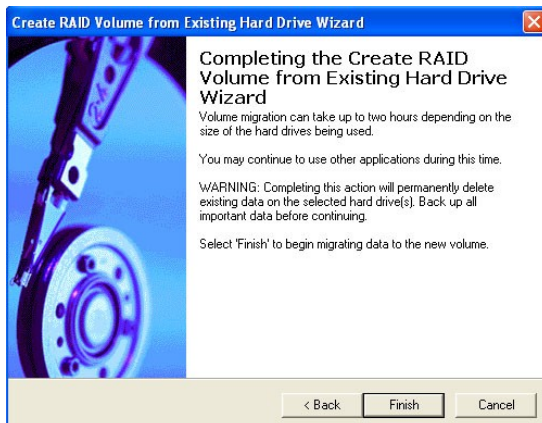
(6) Start Migration

The migration process may take up to two hours to complete depending on the size of the disks being used and the strip size selected. A dialogue window will appear stating that the migration process may take considerable time to complete, meanwhile a popup dialogue at the taskbar will also show the migration status. While you can still continue using your computer during the migration process, once the migration process starts, it cannot be stopped. If the migration process gets interrupted and your system is rebooted for any reason, it will pick up the migration process where it left off. You will be provided with an estimated completion time (the remaining time will depend on your system) once the migration process starts.
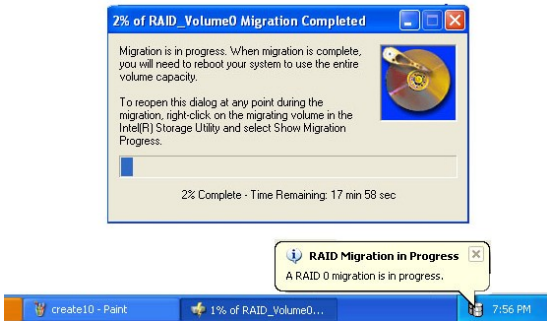
The following screen appears if the migration process is completed successfully. Then you have to reboot your system to use the full capacity of the new volume.
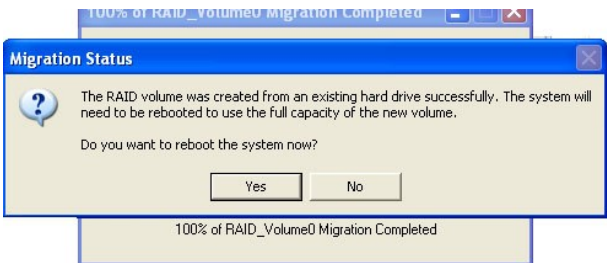
Degraded RAID Array

A RAID 1, RAID 5 or RAID 10 volume is reported as degraded when one of its hard drive members fails or is temporarily disconnected, and data mirroring is lost. As a result, the system can only utilize theremaining functional hard drive member. To re-establish data mirroring and restore data redundancy, refer to the procedure below that corresponds to the current situation.

Missing Hard Drive Member
1. Make sure the system is powered off.
2. Reconnect the hard drive.
3. Reboot the system to Windows; the rebuild will occur automatically.

Failed Hard Drive Member
1. Make sure the system is powered off.
2. Replace the failed hard drive with a new one that is of equal or greater capacity.
3. Reboot the system to Intel RAID Option ROM by press <Ctrl> and <I> keys simultaneously during the Power-On Self Test (POST).

4. Select the port of the destination disk for rebuilding, and then press ENTER.

5. Exit Intel RAID Option ROM, and then reboot to Windows system.
6. When prompted to rebuild the RAID volume, click 'Yes'.
7. The Intel(R) Storage Utility will be launched. Right-click the new hard drive and select 'Rebuild to this Disk'. The 'Rebuild Wizard' will be launched which will guide you through the process of rebuilding to the new hard drive.
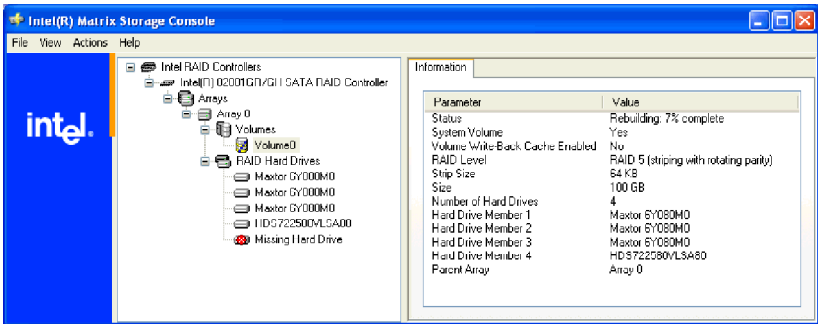
Appendix B
Realtek ALC880 Audio

The Realtek ALC880 provides support for 8-channel audio output, including 2 Front, 2 Rear, 1 Center and 1 Subwoofer channel. ALC880 allows the board to attach 2, 4, 6 or 8 speakers for better surround sound effect. The section will tell you how to install and use 2-, 4-, 6- or 8-channel audio function on the board.

MSI
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Installing the Realtek HD Audio Driver

You need to install the driver for Realtek ALC880 codec to function properly before you can get access to 2-, 4-, 6- or 8- channel audio operations. Follow the procedures described below to install the drivers for different operating systems.

Installation for Windows 2000/XP

For Windows® 2000, you must install Windows® 2000 Service 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

Intel INF Update
Intel 915G VGA Drivers
Marvell LAN Drivers
Browse CD

Realtek HD Audio Driver
USB2.0 Driver Readme
Exit
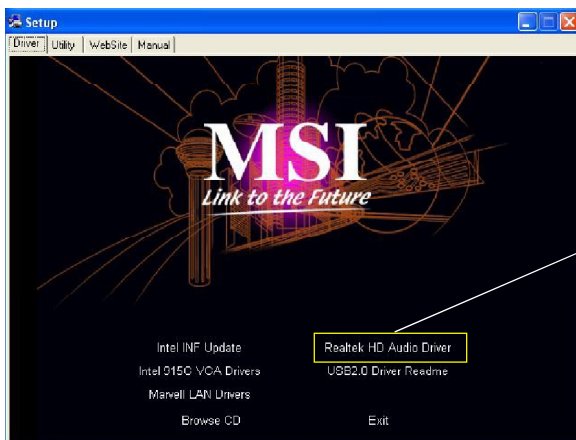
Important

*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.
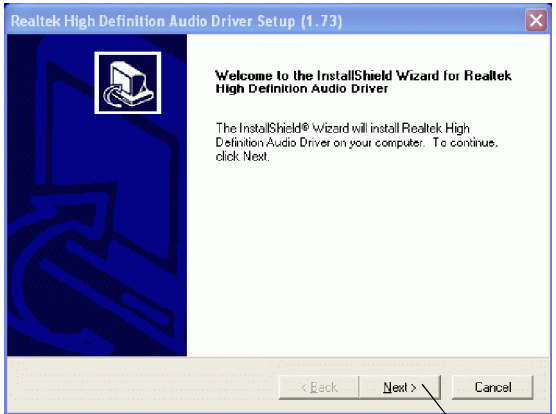
Click here

4. Click **Finish** to restart the system.
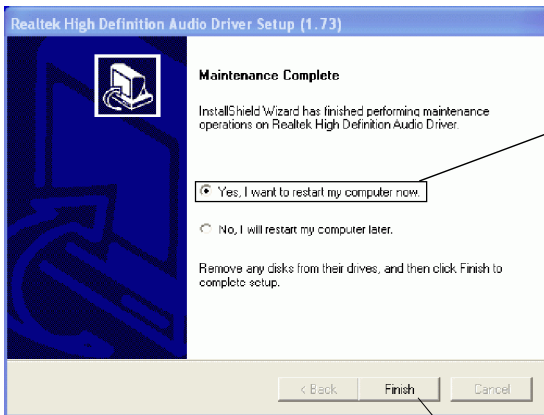
Select this
option

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**.
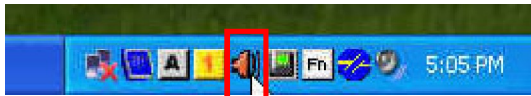
Double click
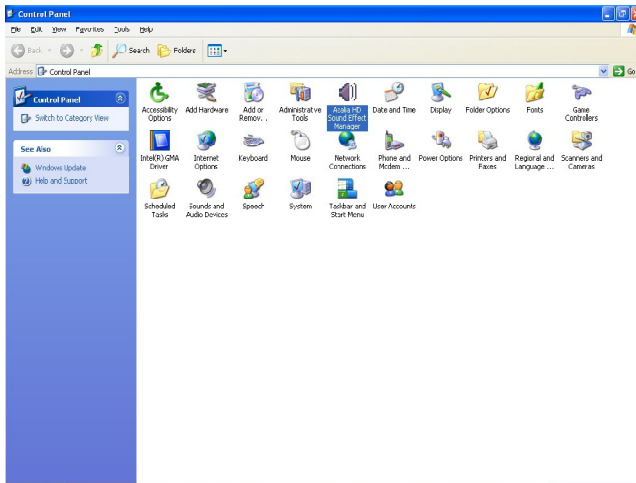
Sound Effect

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

Load EQ Setting

Reset EQ Setting

EQ Setting On/Off

Save Preset

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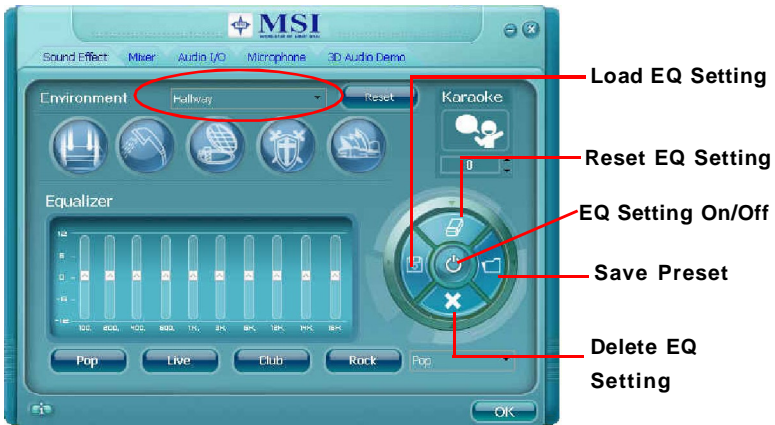
You may choose the provided sound effects, and the equalizer will adjust automatically. If you like, you may also load an equalizer setting or make an new equalizer setting to save as an new one by using the "**Load EQ Setting**" and "**Save Preset**" button, click "**Reset EQ Setting**" button to use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

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.

Equalizer Selection

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

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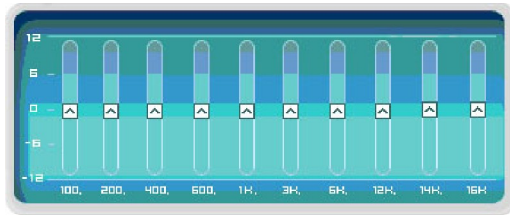
Save
The settings are saved permanently for future use

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

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

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

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

Frequently Used Equalizer Setting
Realtek 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.
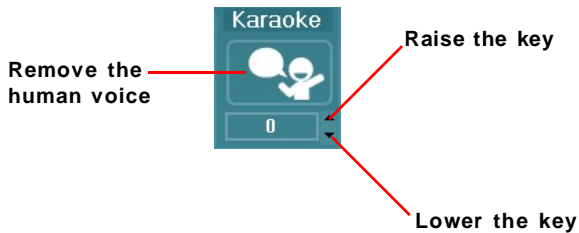
Mixer
In the **Mixer** part, you may adjust the volumes of the rear and front panels individually.

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

Important

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

2. Multi-Stream Function
ALC880 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 [icon] button and the Mixer **ToolBox** menu will appear. Then check the **Enable playback multi-streaming** and click **OK** to save the setup.

Important

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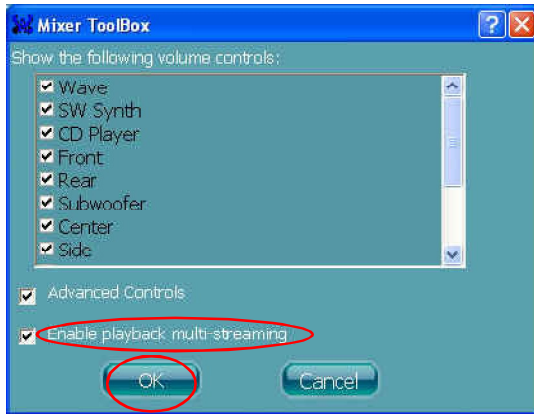
When you are playing the first audio source (for example: use Windows Media Player to play DVD/VCD), the output will be played from the rear panel, which is the default setting.

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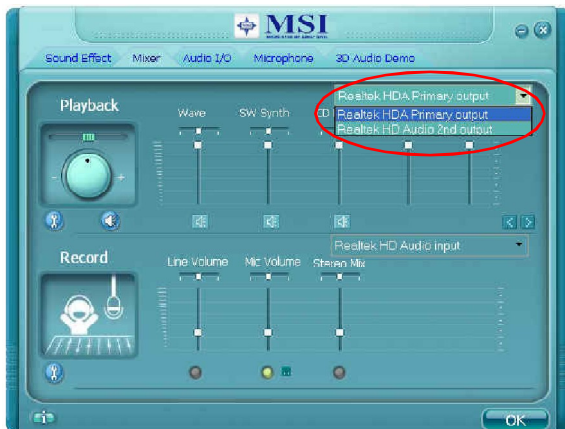
3. Playback control

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.

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

Tool
Show the following volume control

This is to let you freely decide which volume control items to be displayed, total 13 items to be chosen.

Advanced controls
Enable playback multi-streaming

With this function, you will be able to have an audio chat with your friends via head-phone (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.
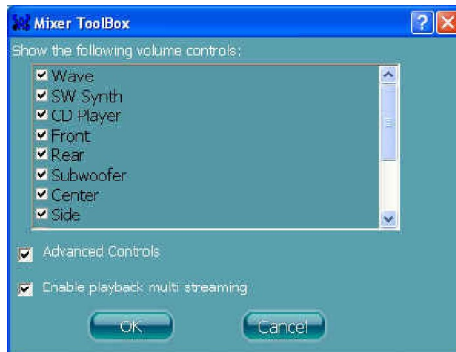
4. Recording control

Tool

Recording device
Back Line In/Mic, Front Line In
Realtek HD Audio Digital Input
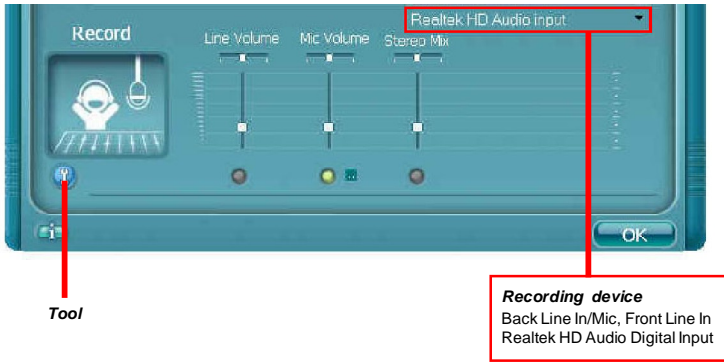
Tool
Show the following volume controls
This is to let you freely decide which volume control items to be displayed.

Advanced controls.
Advanced control is a "Microphone Boost" icon.
Once this item is checked, you will find "advanced" icon beside "Front Pink In" & "Mic Volume". With this, the input signal into "Front Pink In" & "Mic Volume" will be strengthen.

Enable recording multi-streaming
At any given period, you can have maximum 2 streams operating simultaneously.
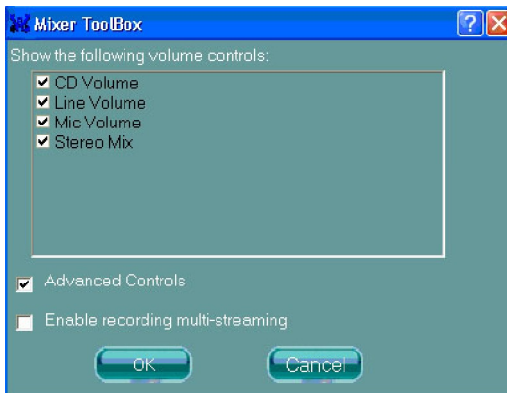
5. Recording

If you want to use microphone to record, usually the microphone is connected to the MIC jack (the pink one) in the rear panel. You can start recording in this case. If you'd like to connect your microphone to the front audio panel.

You may control the microphone volume by **Mic Volume** or **front mic-in** on the mixer.

> **Important**
>
> *Only the speakers that are plugged into the Line-Out jack (the green ne) on the back panel will be functional when you intend to listen to the audio that has been recorded from the microphone.*

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 8-Speaker Output (default setting)

Realtek HD Audio Manager frees you from default speaker settings. Different from before, for each jack, they are not limited to perform certain functions. Instead, now each jack is able to be chosen to perform either output (i.e. playback) function or input (i.e. Recording) function, we call this "Retasking".[1]

Audio I/O aims to help you set jacks right. Moreover, other than blue to blue, pink to pink, the way that you used to do, Audio I/O would guide you to other right jacks that can also serve as microphone / speaker / headphone.

Speaker Configuration

Step 1: Plug in the device in any available jack.

Step 2: Dialogue "connected device" will pop up for your selection. Please select the device you are trying to plug 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.

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Correct Message

Assume to plug a headphone in the Green jack at back panel. The icon beside green jack become visible and the dialogue "connected device" pops up. Check the headphone, then click OK. As soon as OK is clicked, the icon beside green jack becomes "headphone" as your selection.
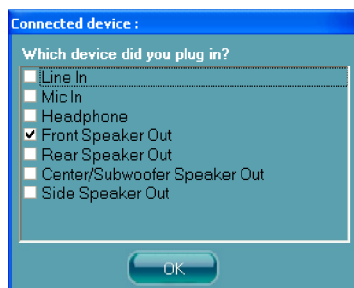
Error Message

Assume to plug a headphone in the Blue jack at back panel. The icon beside Blue jack becomes visible and the dialogue "connected device" pops up (the default setting of blue jack is "Line-in". Check the **headphone** anyway, then click OK. You should notice the icon beside blue jack remains the same without any change and the error message pops.

Pop-screen check list

2CH Speakers configutaion - check the **Front Speaker Out** anyway.

4CH Speakers configuration - check the **Front Speaker Out** & **Rear Speaker Out** anyway.

6CH Speakers configuraion - check the **Front Speaker Out** / **Rear Speaker Out** & **Center/ Subwoofer Speaker out** anyway.

8CH Speakers configuraion - check the **Front Speaker Out** / **Rear Speaker Out** / **Center/Subwoofer Speaker out** & **Side Speaker Out** anyway.

Global Connector Settings

Click to access global connector settings.
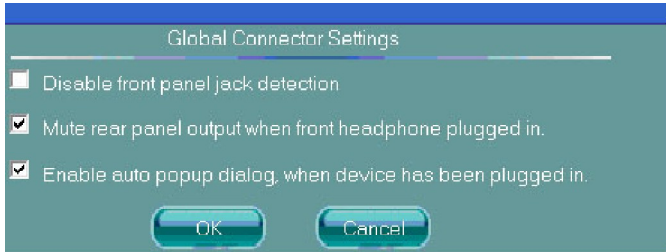
1. Mute rear panel output when front headphone plugged in

Once this item is checked, whenever front headphone is plugged, the music that is playing from the back panel, will be stopped.

2. Disable front panel jack detection (option)

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

3. Enable auto popup dialogue, when device has been plugged in

Once this item is checked, the dialog "Connected device" would not automatically pop up when device is plugged in.

S/PDIF

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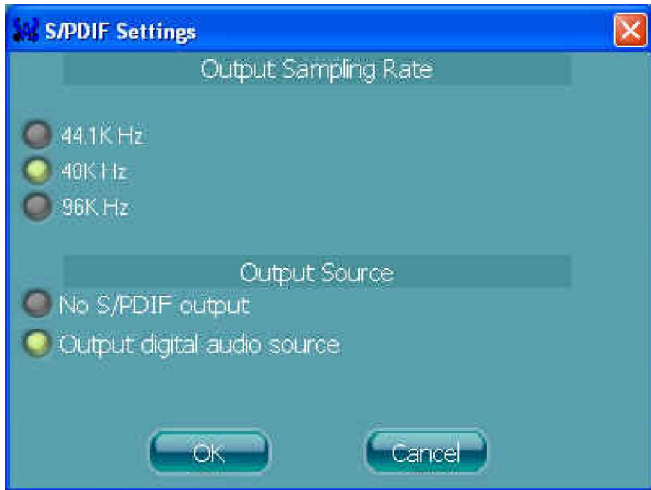
1. Output Sampling Rate

44.1KHz: This is recommended while playing CD

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

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

2. Output Source

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

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

Test Speakers

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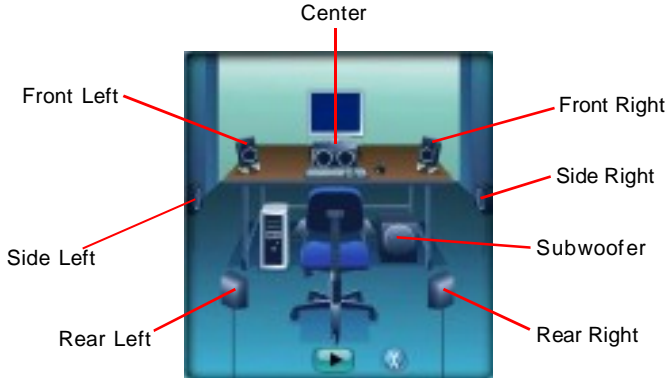
Microphone

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.

Also, please use the drop-down list to choose the recording source from **Realtek HD Audio real input** or **Realtek HD Audio front input**.
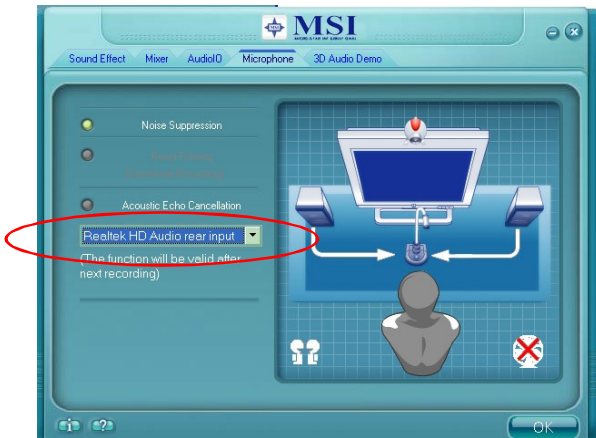
3D Audio Demo

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.

Before you begin using the front panel function, please complete the following steps:

1. Please install the pinheaders of the front panel according to Chapter 2.
2. Select **AC97** or **Azalia** in the BIOS setting (Chapter 3).
3. If you are using **Azalia** setting, the microphone function on the front panel is fixed, but the headphone jack will auto detect the device you connect and pop-up the selection window.
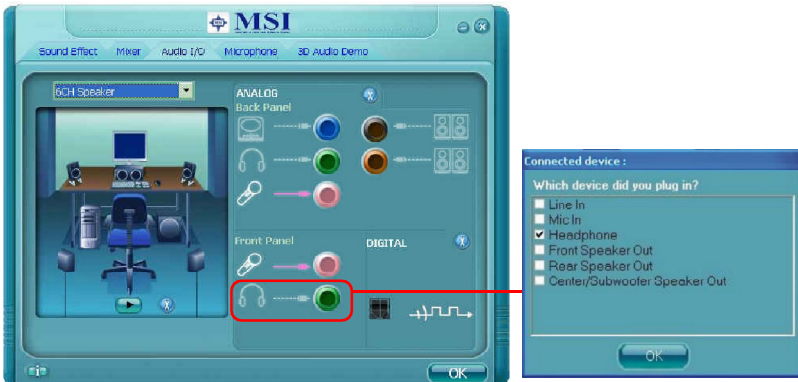
4. If you are using **AC97** setting, both microphone and headphone on the front panel are fixed.

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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.

■ 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
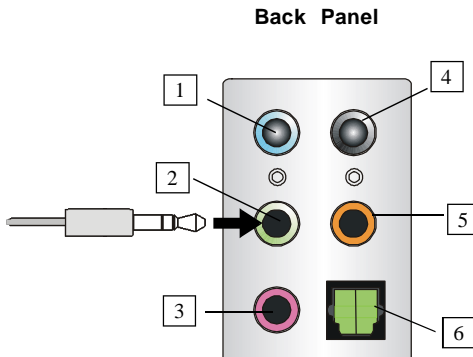
1. Line In
2. Line Out *(Front channels)*
3. MIC
4. Line Out *(Rear channels, but no functioning in this mode)*
5. Line Out *(Center and Subwoofer channel, but no functioning in this mode)*
6. Optical SPDIF Out *(in 7.1CH / 5.1CH)*

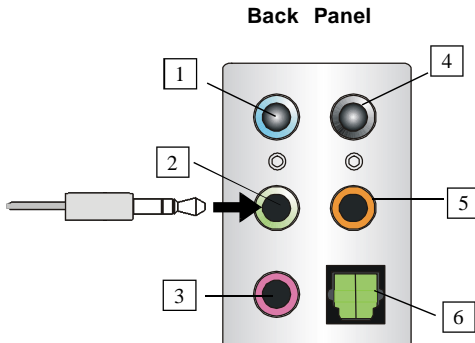n **4-Channel Mode for 4-Speaker Output**
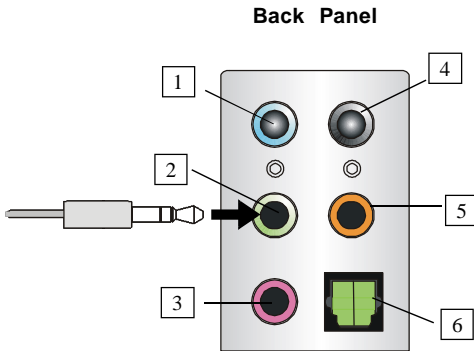
Back Panel

Description:
Connect two speakers to back panel's 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 channels)*
5 Line Out *(Center and Subwoofer channel, but no functioning in this mode)*
6 Optical SPDIF Out *(in 7.1CH / 5.1CH)*
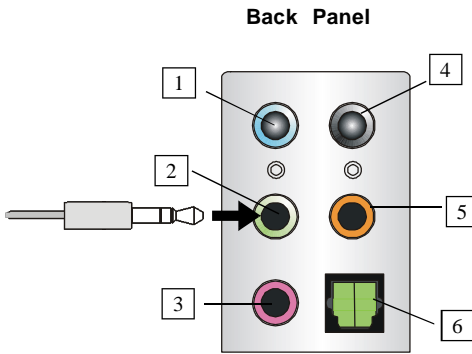
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n **6-Channel Mode for 6-Speaker Output**

Back Panel

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

6-Channel Analog Audio Output

1 Line In
2 Line Out *(Front channels)*
3 MIC
4 Line Out *(Rear channels)*
5 Line Out *(Center and Subwoofer channel)*
6 Optical SPDIF Out *(in 7.1CH / 5.1CH)*

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, two speakers to the center/subwoofer-channel Line Out connectors, and two speakers to the side-channel Line Out connectors.

8-Channel Analog Audio Output

1 Line Out *(Side channels)*
2 Line Out *(Front channels)*
3 MIC
4 Line Out *(Rear channels)*
5 Line Out *(Center and Subwoofer channel)*
6 Optical SPDIF Out *(in 7.1CH / 5.1CH)*