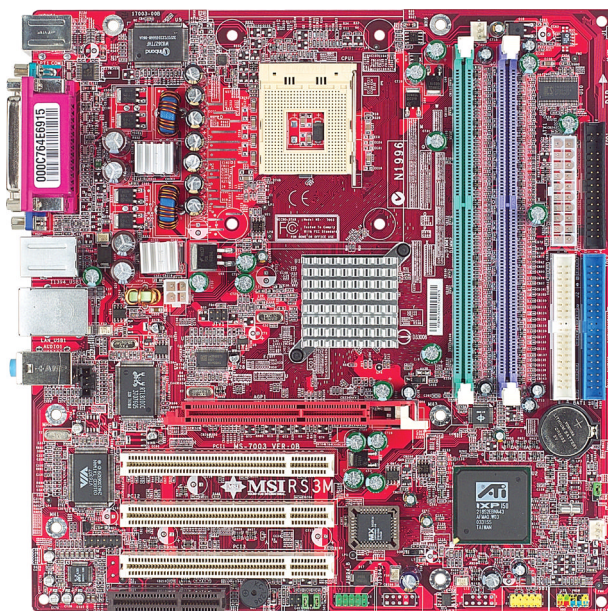# RS3M Series

MS-7003 (v1.X) Micro ATX Mainboard

Version 1.1
G52-M7003X2

Manual Rev: 1.1
Release Date: January 2004

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

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 when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.
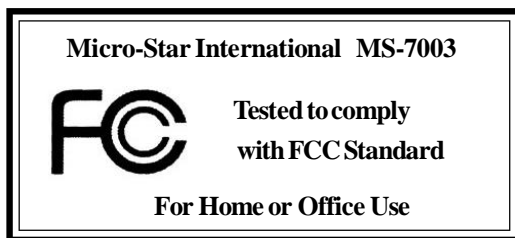
Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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-7003

Tested to comply
with FCC Standard

For Home or Office Use

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Revision History

Revision	Revision History	Date
V1.1	Add JKBV1 and Appendix B Update BIOS and Appendix A	January 2004

Safety Instructions

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

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

CONTENTS

1

Getting Started

Thank you for purchasing RS3M Series (MS-7003) v1. X Micro ATX mainboard. The RS3M Series are based on **ATI®
Radeon 9100 IGP** & **ATI® IXP150** chipsets for optimal system efficiency. With all these special designs, the RS3M Series deliver a high performance and professional desktop platform solution.

Mainboard Specifications

CPU
➤ Socket 478 for Intel Pentium 4 processors (PSC478/Willamette 478/Northwood 478/Celeron 478) at 400/533/800 MHz
➤ Supports up to 3.2GHz and higher speed

Chipset
➤ ATI Radeon 9100 IGP
   - Supports AGP 8x/4x at 0.8V (AGP 3.0) or 4x at 1.5V
   - Supports TV-out (Optional)
   - Supports ATI SurroundView
   - ATI RADEON 9100 graphic controller Integrated
   - Supports 400/533/800MHz memory FSB
➤ ATI IXP150
   - AC'97 2.2 interface
   - 6 USB 2.0/1.1 ports
   - 2 channel Ultra ATA33/66/100 Bus Master IDE controller

MainMemory
➤ Supports two 184-pin unbuffered DDR200/266/333/400 DIMMs
➤ Supports up to 2GB memory size without ECC

Slots
➤ One AGP3.0 Slot
➤ Three PCI 2.3 32-bit Master PCI Bus slots
➤ One CNR slot (Optional)

On-Board IDE
➤ Dual IDE controllers integrated in ATI IXP150
➤ Support Bus Master, Ultra DMA 33/66/100 operation modes
➤ Can connect up to four IDE devices

On-BoardPeripherals
➤ On-Board Peripherals include:
   - 1 floppy port supports 2 FDDs with 360K, 720K, 1.2M, 1.44M and 2.88 Mbytes.
   - 1 serial port and 1 VGA port

- 1 parallel port
- 6 USB 2.0/1.1 ports (Rear x 4 ports / Front x 1 header for 2 ports)
- 3 audio ports in vertical
- Two 1394 ports (Rear x 1/ Front x 1 header)
- one RJ-45 LAN Jack

Audio
➤ Realtek 6 Channels codec
➤ Supports SPDIF-Out via SBRACKET pin header

IEEE1394(Optional)
➤ VIA VT6307 PCI Controller with integrated PHY (Optional)
➤ VIA VT6306 PCI Controller with integrated PHY (Optional)

LAN(Optional)
➤ Realtek RTL8100C 10/100 LAN (Optional)
➤ Realtek RTL8110S Gigabit LAN (Optional)
➤ Supports Wake-On-LAN

BIOS
➤ Award BIOS with PNP BIOS, ACPI, SMBIOS 2.3, Green and Boot Block.
➤ Provides DMI 2.0, WFM 2.0, WOL, WOR, and SMBus for system management.

Dimension
➤ Micro-ATX Form Factor: 24.38 cm (L) x 23.5 cm (W)

Mounting
➤ 6 mounting holes

Others
➤ PC2001 Compliant
➤ Suspends to RAM/Disk

MSI Reminds You...
The mainboard provides two video-out connectors (JTV1 and VGA port) but supports only one video output. Therefore, if a device is connected to JTV1 first, the VGA port will be disabled and vice versa.
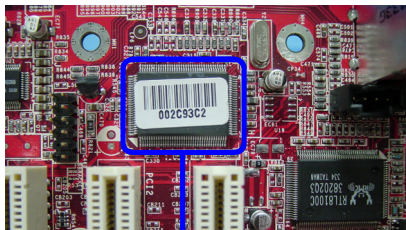
1394 GUID address
Label (optional)

MSI Reminds You...

1. Each board will be given a unique 1394 GUID from the manufacturer's default settings in the system BIOS.

2. Use the flash utility or Live Update from MSI's website for BIOS update. The 1394 GUID address is burnt in the BIOS core. If the 1394 GUID address is lost due to an unpredictable event, such as replacing a new BIOS chip, users can use the utility from MSI's website by entering the 1394 GUID address to recover its original one.

Mainboard Layout
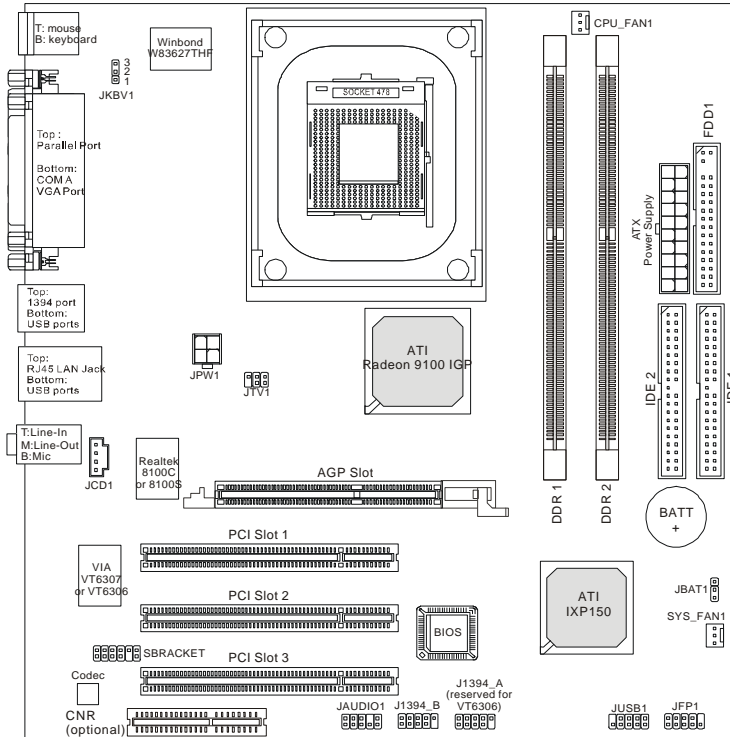
RS3M Series (MS-7003) v1.X M-ATX Mainboard

MSI Special Features

Live Monitor™

The Live Monitor™ is a tool used to schedule the search for the latest BIOS/drivers version on the MSI Web site. To use the function, you need to install the "MSI Live Update 3" application. After installation, the "MSI Live Monitor" icon (as shown on the right) will appear on the screen. Double click this icon to run the application.

Double click the "MSI Live Monitor" icon at the lower-right corner of the taskbar, and the following dialog box will appear. You can specify how often the system will automatically search for the BIOS/drivers version, or change the LAN settings right from the dialog box.

You can right-click the MSI Live Monitor icon to perform the functions listed below:

- **Auto Search** – Searches for the BIOS/drivers version you need immediately.
- **View Last Result** – Allows you to view the last search result if there is any.
- **Preference** – Configures the Search function, including the Search schedule.
- **Exit** – Exits the Live Monitor™ application.
- **FAQ** – Provides a link to a database which contains various possible questions about MSI's products for users to inquire.

Live BIOS™/Live Driver™

The Live BIOS™/Live Driver™ is a tool used to detect and update your BIOS/drivers online so that you don't need to search for the correct BIOS/driver version throughout the whole Web site. To use the function, you need to install the "MSI Live Update 3" application. After the installation, the "MSI Live Update 3" icon (as shown on the right) will appear on the screen.

Double click the "MSI Live Update 3" icon, and the following screen will appear:
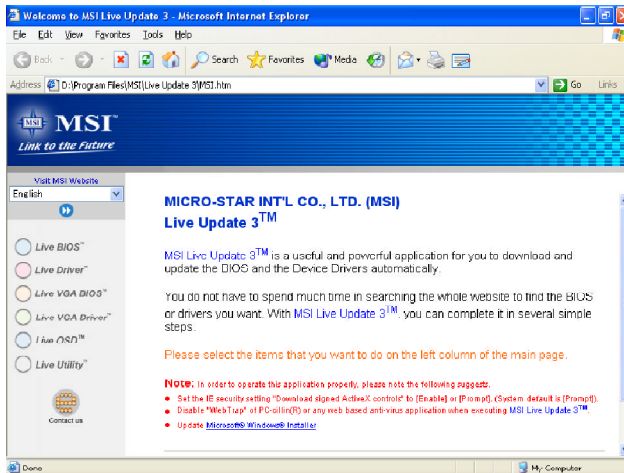
Six buttons are placed on the left column of the screen. Click the desired button to start the update process.

✦ **Live BIOS** – Updates the BIOS online.
✦ **Live Driver** – Updates the drivers online.
✦ **Live VGA BIOS** – Updates the VGA BIOS online.
✦ **Live VGA Driver** – Updates the VGA driver online.
✦ **Live OSD** – Updates the firmware of the OSD products online.
✦ **Live Utility** – Updates the utilities online.

If the product you purchased does not support any of the functions listed above, a "sorry" message is displayed. For more information on the update instructions, insert the companion CD and refer to the "Live Update Guide" under the "Manual" Tab.

CoreCenter

CoreCenter (TM)- contains OC Menu panel, wherein users can determine their processor and memory type to optimize its memory capacity. This all-in-one hardware console is advanced combination of the popular PC Alert and Fuzzy Logic. Including powerful function with hardware monitor, system alert and instinctive UI of overclocking, CoreCenter 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 in the top, a screen pops up for you to choose the "*Auto mode*" or "*User mode*" of CPU fan.

Left-wing: Current system status

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

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-wing: PC hardware status during real time operation

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

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 **Low speed** to **High speed**.

2

Hardware Setup

This chapter tells you how to install the CPU, memory modules, and expansion cards, as well as how to setup the jumpers on the mainboard. It also provides the instructions on connecting the peripheral devices, such as the mouse, keyboard, etc.

While doing the installation, be careful in holding the components and follow the installation procedures.

Quick Components Guide

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JKBV1, *p.2-23*

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DDR DIMMs, *p.2-7*

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J1394_A & J1394_B,
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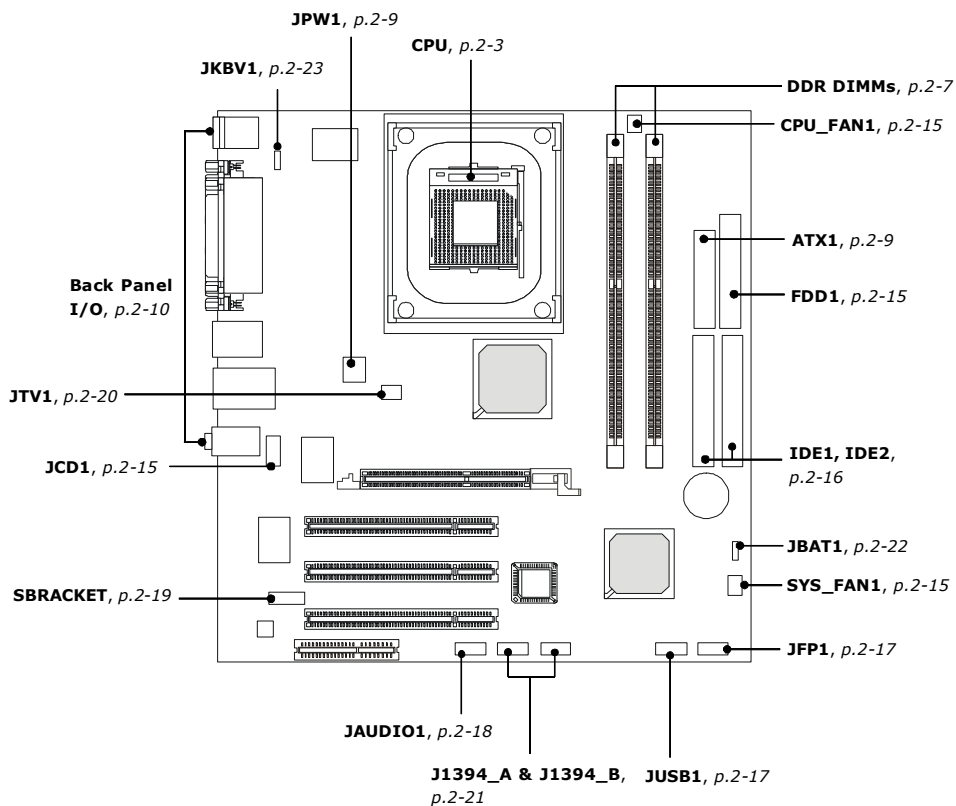
Central Processing Unit: CPU

The mainboard supports Intel® Pentium® 4 PSC, Willamette, Celeron, Northwood processor in the 478 pin package. The mainboard uses a CPU socket called PGA478 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 find the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

CPU Core Speed Derivation Procedure

If	CPU Clock	=	100MHz
	Core/Bus ratio	=	17
then	CPU core speed	=	Host Clock x Core/Bus ratio
		=	100MHz x 17
		=	1.7GHz

MSI Reminds You...

Overheating
Overheating will seriously damage the CPU and system, always make sure the cooling fan can work properly to protect the CPU from overheating.

Replacing the CPU
While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from grounded outlet first to ensure the safety of CPU.

CPU Installation Procedures for Socket 478

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

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

3. Look for the gold arrow. The gold arrow should point towards the lever pivot. The CPU can only fit in the correct orientation.

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

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

Open Lever

Sliding Plate   90 degree

Gold arrow

Correct CPU placement

Gold arrow

Incorrect CPU placement

Gold arrow

Press down the CPU   Close Lever
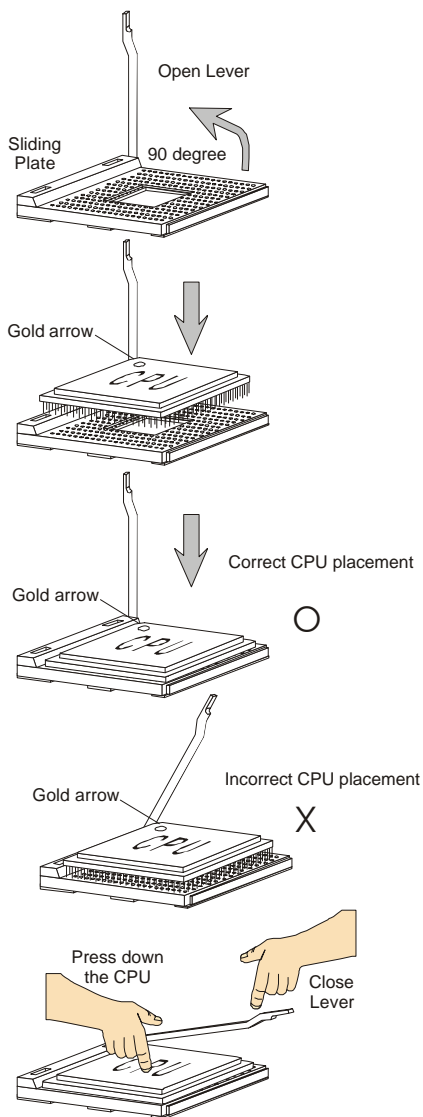
Installing the CPU Fan

As processor technology pushes to faster speeds and higher performance, thermal management becomes increasingly important. To dissipate heat, you need to attach the CPU cooling fan and heatsink on top of the CPU. Follow the instructions below to install the Heatsink/Fan:

1. Locate the CPU and its retention mechanism on the motherboard.

retention mechanism

2. Position the heatsink onto the retention mechanism.
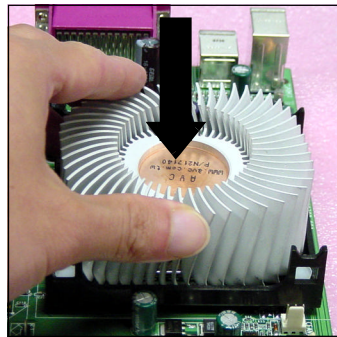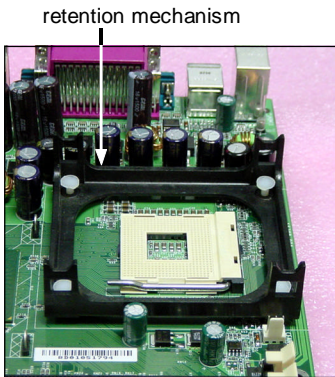
3. Mount the fan on top of the heatsink. Press down the fan until its four clips get wedged in the holes of the retention mechanism.

4. Press the two levers down to fasten the fan. Each lever can be pressed down in only ONE direction.

levers
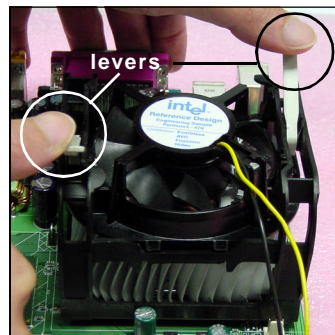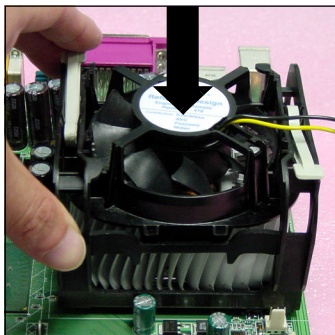
5. Connect the fan power cable from the mounted fan to the 3-pin fan power connector on the board.
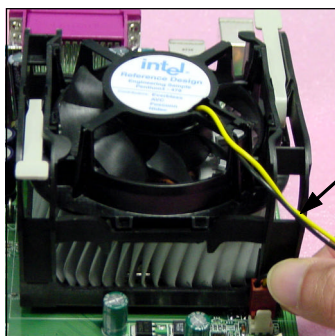
fan power cable

NOTES

Memory

The mainboard provides two 184-pin unbuffered DDR200/DDR266/DDR333/DDR400 SDRAM, and supports the memory size up to 2GB. To operate properly, at least one DIMM module must be installed.

Please refer to Appendix B for Recommended Memory Modules.

**DDR DIMM Slots
(DDR 1~2)**
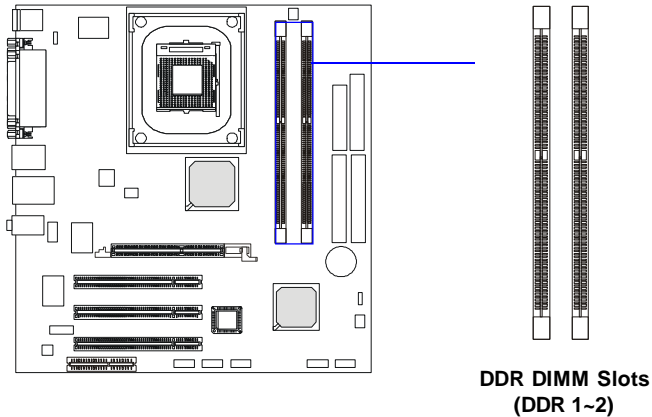
Memory Speed/CPU FSB Support Matrix

Memory CPU FSB	DDR266	DDR333	DDR400
400MHz	Yes	Yes	Yes
533MHz	Yes	Yes	Yes
800MHz	Yes	Yes	Yes

DDR Module Combination

Install at least one DIMM module on the slots. Memory modules can be installed on the slots in any order. You can install either single- or double-sided modules to meet your own needs.

Memory modules can be installed in any combination as follows:

Slot	Memory Module	Total Memory
DDR 1 (Bank 0 & 1)	S/D	64MB~1GB
DDR 2 (Bank 2 & 3)	S/D	64MB~1GB
Maximum System Memory Supported		64MB~2GB

S: Single Side   D: Double Side

Installing DDR Modules

1. The DDR DIMM has only one notch on the center of module. The module 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.

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

Volt   **Notch**
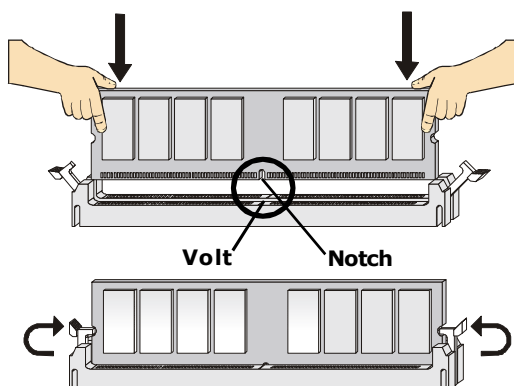
MSI Reminds You...
You can barely see the golden finger if the module is properly inserted in the socket.

Power Supply

The mainboard supports ATX power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

ATX 20-Pin Power Connector: ATX1

This connector allows you to connect to an ATX power supply. To connect to the ATX 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.

ATX 12V Power Connector: JPW1

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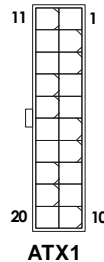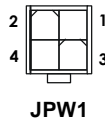
JPW1

ATX1

JPW1 Pin Definition

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

ATX1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

Back Panel

The back panel provides the following connectors:

Mouse   **Parallel**   **IEEE1394**   **LAN**   **L-in**   **L-out**   **MIC**

Keyboard   **COMA**   **VGA**   **USB**   **USB**
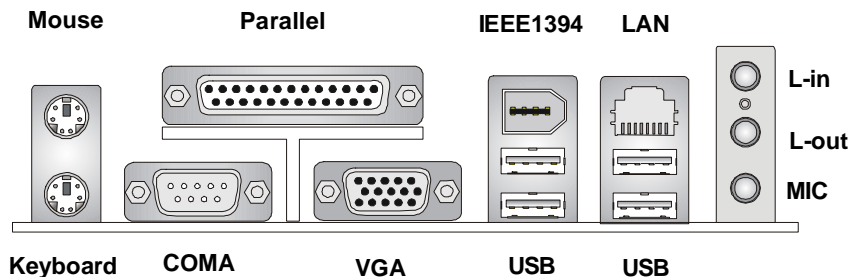
Mouse Connector

The mainboard provides a standard PS/2® mouse mini DIN connector for attaching a PS/2® mouse. You can plug a PS/2® mouse directly into this connector. The connector location and pin assignments are as follows:
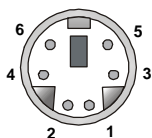
Pin Definition

PS/2 Mouse (6-pin Female)

PIN	SIGNAL	DESCRIPTION
1	Mouse DATA	Mouse DATA
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Mouse Clock	Mouse clock
6	NC	No connection

Keyboard Connector

The mainboard provides a standard PS/2® keyboard mini DIN connector for attaching a PS/2® keyboard. You can plug a PS/2® keyboard directly into this connector.

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	Keyboard DATA	Keyboard DATA
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Keyboard Clock	Keyboard clock
6	NC	No connection
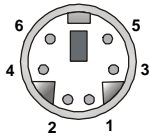
PS/2 Keyboard (6-pin Female)

USB Connectors

The mainboard uses the EHCI (Echo Host Controller Interface) and OHCI (Open Host Controller Interface) Universal Serial Bus roots for attaching USB2.0 and USB 1.1 compatible devices respectively. You can plug the USB device directly into the connector.
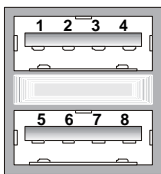
USB Port Description

PIN	SIGNAL	DESCRIPTION
1	VCC	+5V
2	-Data 0	Negative Data Channel 0
3	+Data0	Positive Data Channel 0
4	GND	Ground
5	VCC	+5V
6	-Data 1	Negative Data Channel 1
7	+Data 1	Positive Data Channel 1
8	GND	Ground

USB Ports

Serial Port Connectors: COMA

The mainboard offers one 9-pin male DIN connector as serial port COM A. This port is 16550A high speed communication ports that send/receive 16 bytes FIFOs. You can attach a serial mouse or other serial device directly to it.

1 2 3 4 5

6 7 8 9
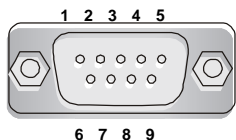
9-Pin Male DIN Connector

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

VGA Connector

The mainboard provides a DB 15-pin female connector to connect a VGA monitor.

5   1

15   11
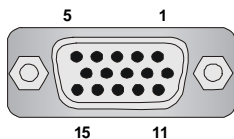
VGA Connector
(DB 15-pin)

Pin	Signal Description
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	+5V
10	GND
11	N/C
12	SDA
13	Horizontal Sync
14	Vertical Sync
15	SCL

RJ-45 LAN Jack

The mainboard provides one standard RJ-45 jack for connection to Local Area Network (LAN). You can connect a network cable to the LAN jack.
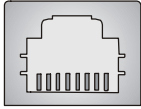
Pin Definition

RJ-45 LAN Jack

PIN	SIGNAL	DESCRIPTION
1	TDP	Transmit Differential Pair
2	TDN	Transmit Differential Pair
3	RDP	Receive Differential Pair
4	NC	Not Used
5	NC	Not Used
6	RDN	Receive Differential Pair
7	NC	Not Used
8	NC	Not Used

Audio Port Connectors

Line Out is a connector for Speakers or Headphones. **Line In** is used for external CD player, Tape player, or other audio devices. **Mic** is a connector for microphones.

1/8" Stereo Audio Connectors

Line In

Line Out

Mic In

MSI
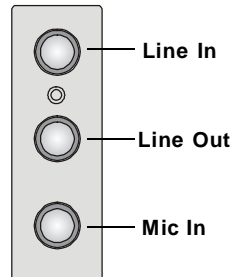
MSI Reminds You...

*For advanced audio application, Realtek ALC 655 is provided to offer support for **6-channel audio operation** and can turn rear audio connectors from 2-channel to 4-/6-channel audio. For more information on **6-channel audio operation**, please refer to Appendix A: Using 2-, 4- or 6-Channel Audio Function.*

IEEE1394 Port Connector

The mainboard provides an IEEE1394 port for users to connect to any IEEE1394 device.
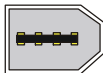
Parallel Port Connector: LPT1

The mainboard provides a 25-pin female centronic connector as LPT. A parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.
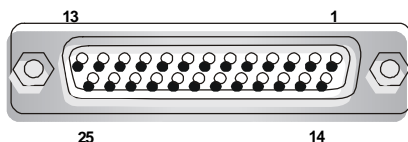
Pin Definition

PIN	SIGNAL	DESCRIPTION
1	STROBE	Strobe
2	DATA0	Data0
3	DATA1	Data1
4	DATA2	Data2
5	DATA3	Data3
6	DATA4	Data4
7	DATA5	Data5
8	DATA6	Data6
9	DATA7	Data7
10	ACK#	Acknowledge
11	BUSY	Busy
12	PE	PaperEnd
13	SELECT	Select
14	AUTO FEED#	Automatic Feed
15	ERR#	Error
16	INIT#	Initialize Printer
17	SLIN#	Select In
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground
25	GND	Ground

Connectors

The mainboard provides connectors to connect to FDD, IDE HDD, case, LAN, USB Ports, IR module and CPU/System/Power Supply FAN.

Floppy Disk Drive Connector: FDD1

The mainboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.

CD-In Connector: JCD1

The connector is for CD-ROM audio connector.

Fan Power Connectors: CPU_FAN1/SYS_FAN1

The CPU_FAN1 (processor fan) and SYS_FAN1 (system fan) support system cooling fan with +12V. They support three-pin head connector. 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.

Sensor
+12V
GND
CPU_FAN1

R
GND
L

JCD1

Sensor
+12V
GND
SYS_FAN1
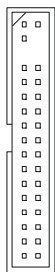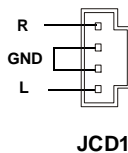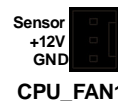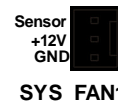
FDD1

Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/10 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 33/66/100 function. You can connect up to four hard disk drives, CD-ROM, 120MB Floppy and other devices.

IDE2   IDE1
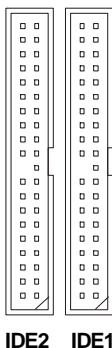
IDE1 (Primary IDE Connector)

The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.

IDE2 (Secondary IDE Connector)

IDE2 can also connect a Master and a Slave drive.

MSI Reminds You...

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.

Front Panel Connector: JFP1

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

Front USB Connector: JUSB1

The mainboard provides one USB 2.0 pin header *JUSB1* that is compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.
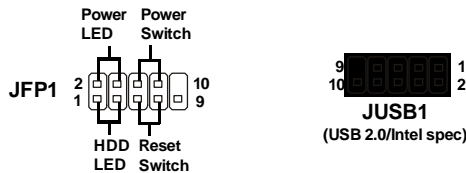
JUSB1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	USBOC

JFP1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED_P	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED_N	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW_N	Reset Switch low reference pull-down to GND
6	PWR_SW_P	Power Switch high reference pull-up
7	RST_SW_P	Reset Switch high reference pull-up
8	PWR_SW_N	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

Front Panel Audio Connector: JAUDIO1

The JAUDIO1 front panel audio connector allows you to connect to the front panel audio and is compliant with Intel® Front Panel I/O Connectivity Design Guide.

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

JAUDIO1

JAUDIO1 Pin Definition

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

MSI **MSI Reminds You...**

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

```
6    10
┌─┬─┬─┬─┬─┐
└─┴─┴─┴─┴─┘
5     9
```
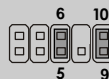
S-Bracket (SPDIF) Connector: SBRACKET

The connector allows you to connect a S-Bracket for Sony & Philips Digital Interface (SPDIF). The S-Bracket offers 2 SPDIF jacks for digital audio transmission (one for optical fiber connection and the other for coaxial), and 2 analog Line-Out jacks for 4-channel audio output.

To attach the fiber-optic cable to optical SPDIF jack, you need to remove the plug from the jack first. The two SPDIF jacks support *SPDIF output* only. For more information on the S-Bracket, refer to *Appendix: Using 4- or 6-Channel Audio Function*.

SBRACKET

SBRACKET Pin Definition

PIN	SIGNAL	DESCRIPTION	PIN	SIGNAL	DESCRIPTION
1	VCC5	VCC 5V	2	VDD3	VDD 3.3V
3	SPDFO	S/PDIF output	4	(No Pin)	Key
5	GND	Ground	6	SPDFI	S/PDIF input
7	LFE-OUT	Audio bass output	8	SOUT-R	Audio right surrounding output
9	CET-OUT	Audio center output	10	SOUT-L	Audio left surrounding output
11	GND	Ground	12	GND	Ground

Optional S-Bracket

Analog Line-Out jack

Connect to
SBRACKET

SPDIF jack (optical)   SPDIF jack (coaxial)
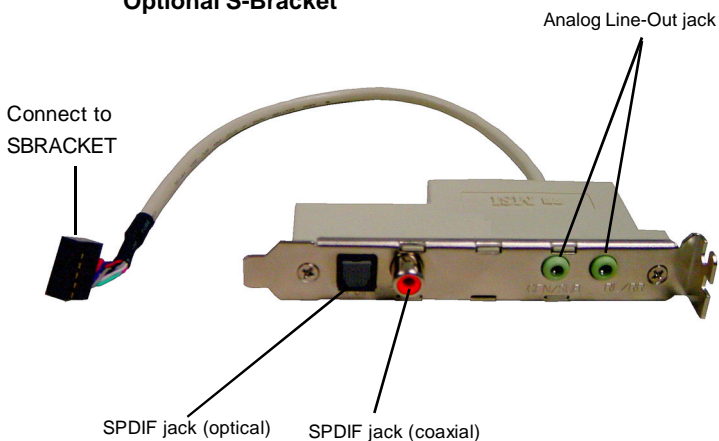
TV-Out Connector: JTV1

The mainboard optionally provides a TV-Out connector for you to attach a TV-Out bracket. The TV-Out bracket offers two types of TV-Out connectors: S-Video and RCA Composite connector. Select the appropriate one to connect to the television and the television will be able to display PC's information.

JTV1

TV-Out Bracket

JTV1 Pin Definition

Pin	Description	Pin	Description
1	GND	4	CVBS
2	Yout	5	GND
3	Cout		
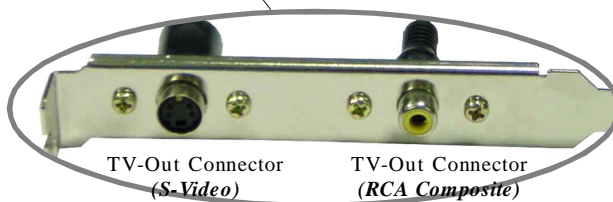
TV-Out Connector
(S-Video)

TV-Out Connector
(RCA Composite)

IEEE 1394 Connectors: J1394_A (reserved) & J1394_B

The mainboard is normally integrated with VIA VT6307 PCI Controller to provide one IEEE1394 pin header, J1394_B.

If VIA VT6306 PCI Controller is integrated, the mainboard will provide two IEEE1394 pin headers that allow you to connect IEEE 1394 ports.

J1394_A
(reserved)

J1394_B

Pin Definition

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

Jumpers

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

Clear CMOS Jumper: JBAT1

There is a CMOS RAM on board 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, use the JBAT1 (Clear CMOS Jumper) to clear data. Follow the instructions below to clear the data:

1

JBAT1

1

3

Keep Data

1

3

Clear Data

MSI
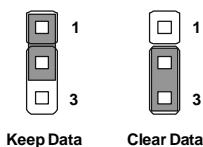
MSI Reminds You...

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

Keyboard Wake-up Jumper: JKBV1

The JKBV1 jumper is used to set the PS/2 keyboard/mouse wake-up function. To use the function, you should also go to BIOS to enable the PS/2 keyboard/mouse wake-up (power on) function.

Please note that once the ATX Power Supply cord was unplugged, the keyboard wake-up password will be cleared. Reset the keyboard password to restart the keyboard wake-up function.

JKBV1

5V Standby
Enable Keyboard Power On function

VCC 5V (Default)
Disable Keyboard Power On Function

MSI Reminds You...
To enable this function, you need a power supply that provides enough power for this feature. (Power Supply with 750mA 5V Standby)

Slots

The motherboard provides one AGP slot, three 32-bit PCI bus slots and one CNR slot.

AGP Slot

PCI Slots

CNR Slot
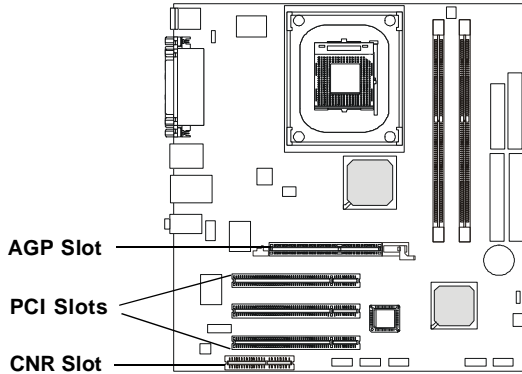
AGP (Accelerated Graphics Port) Slot

The AGP slot allows you to insert the AGP graphics card. AGP is an interface specification designed for the throughput demands of 3D graphics. It introduces a 66MHz, 32-bit channel for the graphics controller to directly access main memory.

PCI (Peripheral Component Interconnect) Slots

The PCI slots allow you to insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to make any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

CNR slot (Optional)

The CNR slot allows you to insert the CNR expansion cards. CNR is a specially designed audio, or modem riser card for ATX family motherboards. Its main processing is done through software and controlled by the motherboard's chipset.

PCI Interrupt Request Routing

The IRQ, abbreviation 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 INT A# ~ INT D# pins as follows:

	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT A#	INT B#	INT C#	INT D#
PCI Slot 2	INT B#	INT C#	INT D#	INT A#
PCI Slot 3	INT C#	INT D#	INT A#	INT B#

3

BIOS Setup

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

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

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

Entering Setup

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

Press DEL to enter SETUP

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

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
<F1>	General help, only for Status Page Setup Menu and Option Page Setup Menu
<F5>	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
<F6>	Load the default CMOS value from Fail-Safe default table, only for Option Page Setup Menu
<F7>	Load Optimized defaults
<F10>	Save all the CMOS changes and exit

Getting Help

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

Main Menu

The main menu lists the setup functions you can make changes to. You can use the control 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 containing additional options can be launched from this field. You can use control 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 <Esc >.

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

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.

> **MSI**　**MSI Reminds You...**
> *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.*

The Main Menu

Once you enter Phoenix-Award® BIOS CMOS Setup Utility, the Main Menu (Figure 1) will appear on the screen. The Main Menu allows you to select from twelve setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

```
          Phoenix - Award WorkstationBIOS CMOS Setup Utility
 ┌─────────────────────────────────────────────────────────────────────┐
 │  ▶ Standard CMOS Features        ▶ Frequency/Voltage Control          │
 │  ▶ Advanced BIOS Features           Load High Performance Defaults    │
 │  ▶ Advanced Chipset Features        Load BIOS Setup Defaults          │
 │  ▶ Integrated Peripherals           Set Supervisor Password          │
 │  ▶ Power Management Setup            Set User Password                │
 │  ▶ PnP/PCI Configurations           Save & Exit Setup                │
 │  ▶ PC Health Status                 Exit Without Saving              │
 ├─────────────────────────────────────────────────────────────────────┤
 │  Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item      │
 │  F10 : Save & Exit Setup                                             │
 ├─────────────────────────────────────────────────────────────────────┤
 │                 Time, Date, Hard Disk Type...                        │
 └─────────────────────────────────────────────────────────────────────┘
```

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

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

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

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

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

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

PC Health Status
This entry shows your PC health status.

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

Load High Performance Defaults
Use this menu to load the BIOS values for the best system performance, but the system stability may be affected.

Load BIOS Setup Defaults
Use this menu to load factory default settings into the BIOS for stable system performance operations.

Set Supervisor Password
Use this menu to set Supervisor Password.

Set User Password
Use this menu to set User Password.

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

Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

The items in Standard CMOS Features Menu are divided into 11 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
            Phoenix - Award WorkstationBIOS CMOS Setup Utility
                          Standard CMOS Features
    ┌──────────────────────────────────────────────┬──────────────────────┐
    │  Date (mm:dd:yy)        Mon, Oct 20 2003      │       Item Help      │
    │  Time (hh:mm:ss)        15 : 28 : 37          ├──────────────────────┤
    │                                               │  Menu Level    ▶     │
    │ ▶ IDE Primary Master                          │                      │
    │ ▶ IDE Primary Slave                           │  Change the day, month,│
    │ ▶ IDE Secondary Master                        │  year and century    │
    │ ▶ IDE Secondary Slave                         │                      │
    │                                               │                      │
    │   Drive A               [1.44M, 3.5 in.]      │                      │
    │                                               │                      │
    │   Video                 [EGA/VGA]             │                      │
    │   Halt On               [All Errors]          │                      │
    │                                               │                      │
    │   CPU Type                                    │                      │
    │   BIOS version                                │                      │
    │   Video Memory                                │                      │
    │   System Memory                               │                      │
    │   Total Memory                                │                      │
    ├──────────────────────────────────────────────┴──────────────────────┤
    │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
    │      F5: Previous Values      F7: BIOS Setup Defaults                 │
    └──────────────────────────────────────────────────────────────────────┘
```

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

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

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

IDE Primary/Secondary 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.

Drive A
This item allows you to set the type of floppy drives installed. Available options: *None, 360K, 5.25 in., 1.2M, 5.25 in., 720K, 3.5 in., 1.44M, 3.5 in., 2.88M, 3.5 in.*.

Video
The setting controls the type of video adapter used for the primary monitor of the system. Available options are *EGA/VGA* , *CGA 40*, *CGA 80* and *Mono*.

Halt On
The setting determines whether the system will stop if an error is detected at boot. 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 keyboard error.

CPU Type/BIOS Version/Video Memory/System Memory/Total Memory
The items show the CPU type, BIOS version and memory status of your system (read only).

Advanced BIOS Features

```
          Phoenix - Award WorkstationBIOS CMOS Setup Utility
                       Advanced BIOS Features
 ▶ Hard Disk Boot Priority        [Press Enter]  ▲          Item Help
   BIOS Virus Warning             [Disabled]
   Hyper-Threading Technology[Enabled]                 Menu Level    ▶
   Quick Boot                     [Enabled]
   Full Screen LOGO Show          [Enabled]            Select Hard Disk Boot
   1st Boot Device                [Floppy]             Device Priority
   2nd Boot Device                [Hard Disk]
   3rd Boot Device                [CDROM]
   Boot Other Device              [Enabled]
   Boot Up Floppy Seek            [Disabled]
   Boot Up Num-Lock LED           [On]
   Gate A20 Option                [Fast]
   Security Option                [Setup]
   APIC Function                  [Enabled]
   MPS Table Version              [1.4]
   Boot OS/2 For DRAM > 64MB      [No]
   Hard Disk S.M.A.R.T.           [Disabled]
   Typematic Rate Setting         [Disabled]
 x Typematic Rate (Chars/Sec) 6
 x Typematic Delay (Msec)    250                 ▼
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values      F7: BIOS Setup Defaults
```

Hard Disk Boot Priority
This feature allows you to specify the hard disk boot priority.

```
          Phoenix - Award WorkstationBIOS CMOS Setup Utility
                       Hard Disk Boot Priority
   1. Pri.Master:                                         Item Help
   2. Pri.Slave :
   3. Sec.Master:                                  Menu Level   ▶▶
   4. Sec.Slave :
   5. USBHDD0   :                                  Use <↑> or <↓> to
   6. USBHDD1   :                                  select a device , then
   7. USBHDD2   :                                  press <+> to move it
   8. Bootable Add-in Cards                        up , or <-> to move it
                                                   down the list. Press
                                                   <ESC> to exit this
                                                   menu.




   ↑↓:Move    PU/PD/+/-:Change Priority    F10:Save      ESC:Exit
```
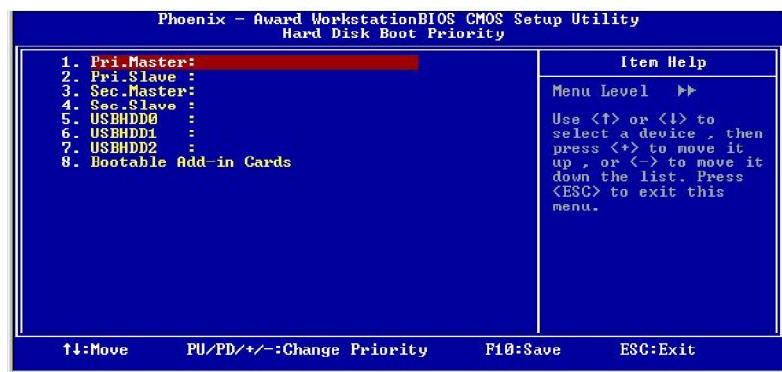
Virus Warning
The item is to set the Virus Warning feature for IDE Hard Disk boot sector protection. If the function is enabled and any attempt to write data into this area is made, BIOS will display a warning message on screen and beep. Settings: *Disabled* and *Enabled*.

Hyper-Threading Technology
This field is used to enable or disable the Intel Hyper Threading CPU function.

Setting to *Enabled* will increase the system performance. Settings: *Enabled*, *Disabled*. **Please disable this item if your operating system doesn't support** *HT Function,* **or unreliability and instability may occur.**

> **MSI Reminds You...**
> *Enabling the functionality of Hyper-Threading Technology for your computer system requires ALL of the following platform Components:*
> *CPU: An Intel® Pentium® 4 Processor with HT Technology;*
> *Chipset: A chipset that supports HT Technology;*
> *BIOS: A BIOS that supports HT Technology and has it enabled;*
> *OS: Only Microsoft® Windows 2000 and XP can support HT technology.*

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. It is better to find a problem during POST than lose data during your work. Options: Enabled, Disabled.

1st/2nd/3rd 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 1st/2nd/3rd boot device.

Boot Up Floppy Seek
Setting to *Enabled* will make BIOS seek floppy drive A: before booting the system. Settings: *Disabled*, *Enabled*.

Boot Up Num-Lock 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. Setting options: *On*, *Off*.

Gate A20 Option
This item is to set the Gate A20 status. A20 refers to the first 64KB of extended memory. When the default value *Fast* is selected, the Gate A20 is controlled by Port92 or chipset specific method resulting in faster system performance. When *Normal* is selected, A20 is controlled by a keyboard controller or chipset hardware.

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.

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. Settings: *Enabled* and *Disabled*.

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. Settings: *1.4*, *1.1*.

OS Select for DRAM > 64MB
This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose *Non-OS2*, you cannot run the OS/2® operating system with DRAM larger than 64MB. Settings: *OS2, Non-OS2*.

HDD S.M.A.R.T. Capability
This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S.M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an oppor-

tunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline. Settings: *Enabled* and *Disabled*.

Typematic Rate Setting
This item is used to enable or disable the typematic rate setting including Typematic Rate & Typematic Delay.

Typematic Rate (Chars/Sec)
After *Typematic Rate Setting* is enabled, this item allows you to set the rate (characters/second) at which the keys are accelerated. Settings: *6*, *8*, *10*, *12*, *15*, *20*, *24* and *30*.

Typematic Delay (Msec)
This item allows you to select the delay between when the key was first pressed and when the acceleration begins. Settings: *250*, *500*, *750* and *1000*.

Advanced Chipset Features

```
          Phoenix - Award WorkstationBIOS CMOS Setup Utility
                      Advanced Chipset Features
   Current DRAM Clock                                    Item Help
   DRAM Clock By                 [By SPD]
   Current CAS Latency                             Menu Level    ▶
   Current TRCD
   Current TRP                                     Select [By SPD] to
   Current TRAS                                    enter DRAM clock by
   DRAM Timing                   [By SPD]          DRAM SPD data
 x CAS Latency                    1               Select [Manual] to
 x TRCD                           1               enter DRAM clock by
 x TRP                            1               manually
 x TRAS                           1
   AGP Aperture Size             [128MB]
   Onboard VGA Frame Buffer      [32MB]
   Video Display Devices         [Auto]
   Tv Standard                   [NTSC]
   Memory Hole                   [Disabled]
   System BIOS Cacheable         [Disabled]


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

> **MSI** **MSI Reminds You...**
> *Change these settings only if you are familiar with the chipset.*

Current DRAM Clock
It shows the clock frequency of the installed DRAMs. (read only)

DRAM Clock By
This item is used to configure the clock frequency of the installed DRAM.
Settings: *By SPD, 1:1, DDR-200, DDR-266, DDR-333, DDR-400.*

Current CAS Latency
The field controls the CAS latency, which determines the timing delay before
RAM starts a read command after receiving it. Settings: (read only).

Current TRCD
This item allows you to control the number of SDRAM clocks used for SDRAM
parameters Trcd. Trcd specifies the minimum clock cycles required for the
active command to be transferred to the re-active command. Settings: (read
only).

Current TRP
This item allows you to control the number of SDRAM clocks used for the SDRAM parameters Trp. Trp specifies the minimum clock cycles required for the precharge command to be transferred to the active command. Settings: (read only).

Current TRAS
This item allows you to control the number of SDRAM clocks used for SDRAM parameters Tras. Tras specifies the minimum clock cycles required for the active command to be transferred to the precharge command. Settings: (read only).

DRAM Timing
Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to *By SPD* enables DRAM timings to be determined by BIOS based on the configurations on the SPD. Selecting *Manual* allows users to configure the DRAM timings manually.

CAS Latency
The field controls the CAS latency, which determines the timing delay before RAM starts a read command after receiving it. Settings: *1, 1.5, 2, 2.5, 3, 3.5, 4.*

TRCD
This item allows you to control the number of SDRAM clocks used for SDRAM parameters Trcd. Trcd specifies the minimum clock cycles required for the active command to be transferred to the re-active command. Settings: *1, 2, 3, 4.*

TRP
This item allows you to control the number of SDRAM clocks used for the SDRAM parameters Trp. Trp specifies the minimum clock cycles required for the precharge command to be transferred to the active command. Settings: *1, 2, 3, 4.*

TRAS
This item allows you to control the number of SDRAM clocks used for SDRAM parameters Tras. Tras specifies the minimum clock cycles required for the active command to be transferred to the precharge command. Settings: 1~8.

AGP Aperture Size
This setting controls just how much system RAM can be allocated to AGP for video purposes. The aperture is a portion of the PCI memory address range dedicated to graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The option allows the selection of an aperture size of *32MB, 64MB, 128MB, 256MB, 512MB, 1GB, 2GB and None.*

Onboard VGA Frame Buffer
Frame Buffer is the video memory that stores data for video display (frame). This field is used to determine the memory size for Frame Buffer. Larger frame buffer size increases video performance. Settings: *8M, 16M, 32M, 64M, 128MB and None*.

Video Display Devices
Use the field to select the type of device you want to use as the display(s) of the system. Settings: *Auto*, *CRT Only, CLD Only, DFP Only, TV Only, CRT Force Other Auto, TV Force Other Auto, CRT Force TV Force.*

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. Setting are: *NTSC, PAL, PAL-M, PAL-60, NTSC-JAP, PAL-CN, PAL-N, SCART_RGB.*

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

Integrated Peripherals
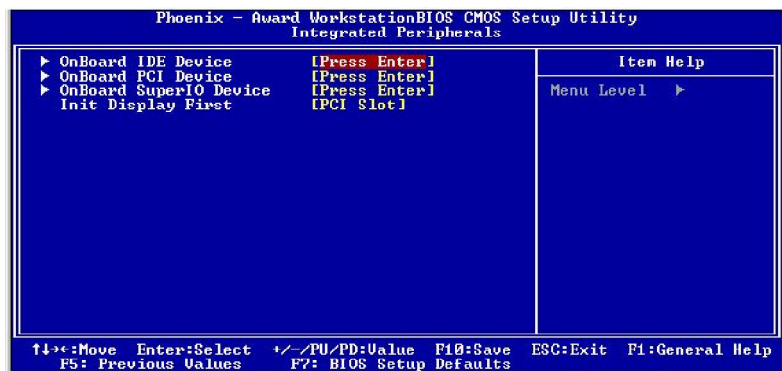
OnBoard IDE Device

Press <Enter> to enter the sub-menu and the following screen appears:
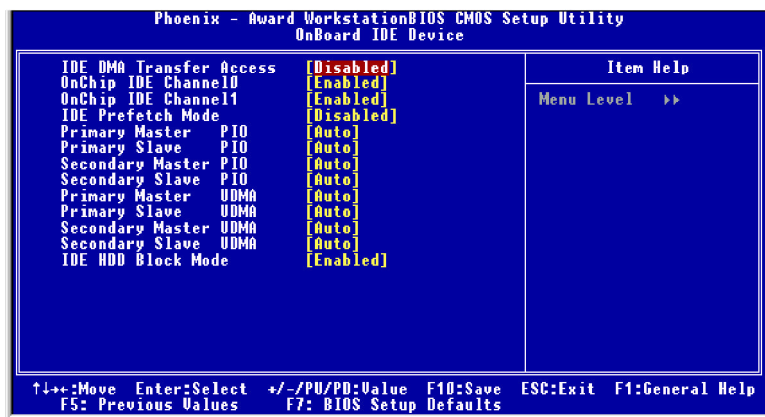
IDE DMA Transfer Access

This item is used to enable or disable the DMA transfer function of the IDE Hard Drive. The settings are: *Enabled, Disabled*.

OnChip IDE Channel 0/1

The integrated peripheral controller contains an IDE interface with support

for two IDE channels. Choose [Enabled] to activate each channel separately. Settings: *Enabled*, *Disabled*.

IDE Prefetch Mode
The onboard IDE drive interfaces support IDE prefetching, for faster drive accesses. When you install a primary and/or secondary add-in IDE interface, set this option to *Disabled* if the interface does not support prefetching. Settings: *Enabled, Disabled*.

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

Primary/Secondary Master/Slave UltraDMA
Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, Ultra DMA/66 and Ultra DMA/100 select Auto to enable BIOS support. The settings are: *Auto, Disabled*.

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. Settings: *Enabled, Disabled.*

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

```
         Phoenix - Award WorkstationBIOS CMOS Setup Utility
                        OnBoard PGI Device

  Onboard AC97 Audio       [Auto]                    Item Help
  Onboard MC97 Modem       [Auto]
  USB Controller           [Enabled]          Menu Level   ▶▶
  USB 2.0 Controller       [Enabled]
  USB Keyboard Support     [Disabled]
  UGB Mouse Support        [Disabled]
  Onboard LAN Device       [Enabled]
  Onboard 1394 Device      [Enabled]




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
       F5: Previous Values        F7: BIOS Setup Defaults
```
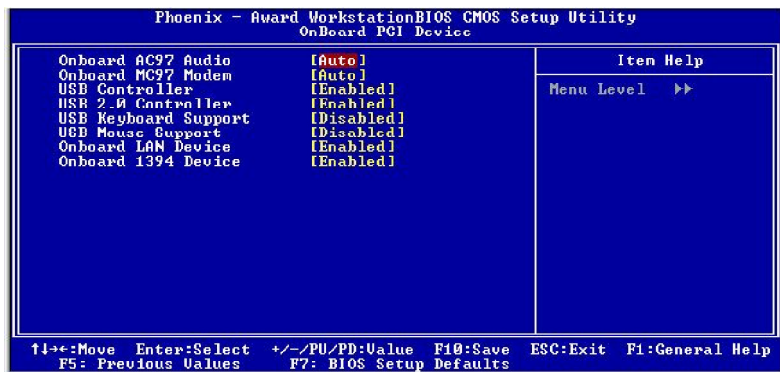
Onboard AC97 Audio

Auto allows the mainboard to detect whether an audio device is used. If
an audio device is detected, the onboard AC'97 (Audio Codec'97) con-
troller will be enabled; if not, it is disabled. Disable the controller if you
want to use other controller cards to connect an audio device. Settings:
Auto, Disabled.

Onboard MC97 Modem

Auto allows the mainboard to detect whether a modem is used. If a mo-
dem is detected, the onboard MC'97 modem controller will be enabled; if
not, it is disabled. Disable the controller if you want to use other control-
ler cards to connect a modem. Settings: *Auto*, *Disabled*.

USB Controller

Select *Enabled* if your system contains a Universal Serial Bus (USB)
controller and you have USB peripherals. Settings: *Enabled*, *Disabled*.

USB 2.0 Controller

This item is used to enable/disable the USB 2.0 Support. Settings: *Enabled*,
Disabled.

USB Keyboard/Mouse Support

Set to *Enabled* if you need to use a USB keyboard/mouse in the operating
system that does not support or does not have any USB driver installed,
such as DOS and SCO Unix. Settings: *Enabled, Disabled*.

Onboard LAN Device
This item allows you to enable/disable the LAN controller. Setting options: *Enabled* and *Disabled*.

Onboard 1394 Device
This item allows you to enable/disable the onboard IEEE1394 controller. Setting options: *Enabled* and *Disabled*.

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

```
               Phoenix - Award WorkstationBIOS CMOS Setup Utility
                            OnBoard SuperIO Device

     Onboard FDC Controller      [Enabled]               Item Help
     Onboard Serial Port 1       [3F8/IRQ4]
     Onboard Parallel Port       [378/IRQ7]        Menu Level    ▶▶
     Parallel Port Mode          [SPP]
     EPP Mode Select             [EPP1.7]
     ECP Mode Use DMA            [3]





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

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. The settings are: *Enabled* and *Disabled*.

Onboard Serial Port 1
Select an address and corresponding interrupt for Serial Port 1. The settings are: *3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto*.

Onboard Parallel Port
This specifies the I/O port address and IRQ of the onboard parallel port. Settings: *378/IRQ7, 278/IRQ5, 3BC/IRQ7, Disabled*.

Parallel Port Mode
> SPP : Standard Parallel Port
> EPP : Enhanced Parallel Port
> ECP : Extended Capability Port
> ECP + EPP: Extended Capability Port + Enhanced Parallel Port
> Normal

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

EPP Mode Select
The onboard parallel port is EPP Spec. compliant, so after the user chooses the onboard parallel port with the EPP function, the following message will be displayed on the screen: "EPP Mode Select." At this time either *EPP 1.7* spec or *EPP 1.9* spec can be chosen.

ECP Mode Use DMA
The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: "ECP Mode Use DMA." At this time, the user can choose between DMA channel *3* or *1*.

Init Display First
This item specifies which VGA card is your primary graphics adapter. Settings: *PCI Slot* and *OnChip VGA/AGP*.

Power Management Setup

```
        Phoenix - Award WorkstationBIOS CMOS Setup Utility
                     Power Management Setup

   Sleep State                [S1(POS)]            Item Help
   Power Management Option     [User Define]
   HDD Power Down              [Disabled]        Menu Level  ▶
   Suspend Mode               [Disable]
   Video Off Option           [Suspend -> Off]
   Video Off Method           [V/H SYNC+Blank]
   MODEM Use IRQ               [3]
   Power Button Function       [Power Off]
   PowerOn by PCI Card         [Disabled]
   POWER ON Function          [BUTTON ONLY]
   KB Power ON Password        [Enter]
   Hot Key Power ON            [Ctrl-F1]
   After AC Power Lost         [Off]
   RTC Alarm Resume            [Disabled]
 x Date (of Month)             0
 x Resume Time (hh:mm:ss)      0 :  0 :  0
 ▶ IRQ/Event Activity Detect [Press Enter]


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

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

Sleep State

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

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

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

S1 & S3   The system will decide when to enter S1 or S3 state.

Power Management Option

This item is used to select the degree (or type) of power saving and is related to these modes: *Suspend Mode* and *HDD Power Down*. There are three options for power management:

    Min Saving   Minimum Power Management. Suspend Mode=1 Hour
    Max Saving Maximum Power Management. Suspend Mode=1 Min
    User Define Allows end users to configure each mode separately.

HDD Power Down

If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active. Settings are *Disabled* and *1 through 15 Min.*

Suspend Mode

When you choose *User Define* in the *Power Management* item, this item is selectable. This setting allows you to select the type of Suspend mode. Setting options: *Disabled* (default setting), *1 min, 2 min, 4 min, 6 min, 8 min, 10 min, 20 min, 30 min, 40 min, 1 hour.*

Video Off Option

This setting is used to control the mode in which the monitor will shut down. Setting options:

    Always On   Monitor remains on during power-saving modes.
    Suspend -> Off   Monitor blanked when system enters Suspend mode.

Video Off Method

This determines the manner in which the monitor is blanked.

    V/H SYNC+Blank This selection will cause the system to turn off the vertical and rizontal synchronization ports and write blanks to the video buffer.
    Blank Screen   This option only writes blanks to the video buffer.
    DPMS Support   Initial display power menagement signaling

MODEM Use IRQ

This setting names the interrupt request (IRQ) line assigned to the modem (if any) on your system. Activity of the selected IRQ always awakens the system. Setting options: *3, 4, 5, 7, 9, 10, 11, NA.*

Soft-Off by PWRBTN
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.
By HardWare	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.

Power On by PCI card
This item specifies whether the system will be awakened from power saving modes (S1, S3, S4) when activity or input signal of the specified hardware peripheral is detected. Settings are: *Enabled* and *Disabled*.

Power ON Function
This item controls how the PS/2 mouse or keyboard can power on the system. Settings: Password, Hot Key, Mouse Left, Mouse Right, Any, Key, BUTTON ONLY and Keyboard 98.

Keyboard Power ON Password
If Power ON Function is set to Password, then you can set a password in the field for the PS/2 keyboard to power on the system.

Hot Key Power ON
If POWER ON Function is set to Hot KEY, you can sssign a hot key combination in the field for the PS/2 keyboard to power on the system. Settings: Ctrl-F1 through Ctrl-F12.

PWRON After PWF-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	Reboots the computer
Former-Sts	Restores the system to the status before power failure or interrupt occurred.

RTC Alarm Resume

This function is for setting time for your computer to boot up. Setting options: *Disabled*, *Enabled*.

Date (of Month)

When Resume By Alarm is set to Enabled, the field specifies the month for *Resume By Alarm*. Settings: *NA, 1-12*.

Resume Time (hh:mm:ss)

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

> **MSI Reminds You...**
>
> *If you have changed this setting, you must let the system boot up until it enters the operating system, before this function will work.*

IRQ/Event Activity Detect

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

```
         Phoenix - Award WorkstationBIOS CMOS Setup Utility
                      IRQ/Event Activity Detect
   Modem Ring Resume         [Disabled]              Item Help
   IRQ3   (COM 2)            [Enabled]
   IRQ4   (COM 1)            [Enabled]          Menu Level  ▶▶
   IRQ5   (LPT 2)            [Enabled]
   IRQ6   (Floppy Disk)      [Enabled]
   IRQ7   (LPT 1)            [Enabled]
   IRQ8   (RTC Alarm)        [Disabled]
   IRQ9   (IRQ2 Redir)       [Disabled]
   IRQ10  (Reserved)         [Disabled]
   IRQ11  (Reserved)         [Disabled]
   IRQ12  (PS/2 Mouse)       [Enabled]
   IRQ13  (Coprocessor)      [Enabled]
   IRQ14  (Hard Disk)        [Enabled]
   IRQ15  (Reserved)         [Disabled]



   ↑↓←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values       F7: BIOS Setup Defaults
```

Modem Ring Resume

This item allows the activity of the USB device to wake up the system from S3 (Suspend to RAM) state. Settings are: *Enabled* and *Disabled*.

IRQ3~IRQ15

IRQ3~IRQ15 enable or disable the monitoring of the specified IRQ line. If set to [Enabled], the activity of the specified IRQ line will prevent the system from entering power saving modes or awaken it from power saving modes.

PNP/PCI Configurations

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

Reset Configuration Data

Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system can not boot. The settings are: *Enabled* and *Disabled*.
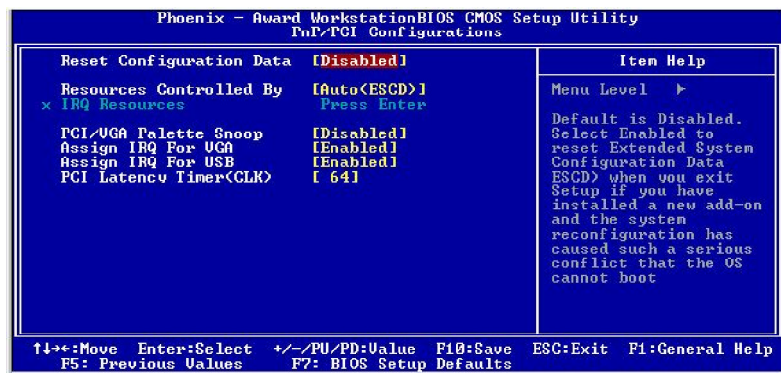
Resource Controlled By

The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows® 95/98. If you set this field to "manual" choose specific resources by going into each of the sub menu that follows this field (a sub menu is preceded by a "➤"). The settings are: *Auto (ESCD)*, *Manual*.

IRQ Resources

The items are adjustable only when *Resources Controlled By* is set to *Manual*.

Press <Enter> and you will enter the sub-menu of the items. IRQ Resources list IRQ 3/4/5/7/9/10/11/12/14/15 for users to set each IRQ a type depending on the type of device using the IRQ. Settings are:

PCI Device   For Plug & Play compatible devices designed for PCI bus architecture.

Reserved   The IRQ will be reserved for further request.

PCI/VGA Palette Snoop

When set to *Enabled*, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example, if there are two VGA devices in the computer (one PCI and one ISA) and the:

VGA Palette Snoop Bit Setting	Action
Disabled	Data read or written by the CPU is only directed to the PCI VGA device's palette registers.
Enabled	Data read or written by the CPU is directed to both the PCI VGA device's palette registers and the ISA VGA device's palette registers, permitting the palette registers of both VGA devices to be identical.

The setting must be set to *Enabled* if any ISA bus adapter in the system requires VGA palette snooping.

Assign IRQ for VGA/USB

The items allow you to assign an IRQ line to the VGA card and USB device separately. Options: *Enabled, Disabled.*

PCI Latency Timer (PCI CLK)

This feature controls how long each PCI device can hold the bus before another takes over. The larger the value, the longer the PCI device can retain control of the bus. As each access to the bus comes with an initial delay before any transaction can be made, low values for the PCI Latency Timer will reduce the effective PCI bandwidth while higher values improve it. Key in a DEC number between 0 and 255.

PC Health Status

This section shows the status of your CPU, fan, overall system status, etc. Monitor function is available only if there is hardware monitoring mechanism onboard.

```
            Phoenix - Award WorkstationBIOS CMOS Setup Utility
                          PC Health Status
   CPU Warning Temperature    [Disabled]              Item Help
   System Temperature.
   CPU Temperature                               Menu Level    ▶
   IGP Temperature
   System Fan Speed
   CPU Fan Speed
   Vcore(V)
   VTT(V)
   3.3V
   + 5 V
   +12 V
   -12 V
   - 5 V
   VBAT(V)
   5VSB(V)
   Shutdown Temperature      [Disabled]


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

CPU Warning Temperature
This item is used to specify a thermal limit for CPU. If CPU temperature reaches the specified limit, the system will issue a warning which allows you to prevent the CPU overheat problem. Settings: *Disabled, 50ºC/122ºF, 53ºC/127ºF, 56ºC/133ºF, 60ºC/140ºF, 63ºC/145ºF, 66ºC/151ºF* and *70ºC/158ºF*.

System/CPU/IGP Temperature, System/CPU Fan Speed, Vcore, VTT, 3.3V, +5V, +12V, -12V, -5V, Battery, 5VSB(V)
These items display the current status of all of the monitored hardware devices/components such as CPU voltages, temperatures and all fans' speeds.

Shutdown Temperature
If the CPU temperature reaches the upper limit preset in this setting, the system will be shut down automatically. This helps you to prevent the CPU overheating problem. This item is available only when your OS supports this function, such as Windows ME. Settings: *Disabled, 60ºC/140ºF, 65ºC/149ºF, 70ºC/158ºF, 75ºC/167ºF*.

Frequency/Voltage Control

Use this menu to specify your settings for frequency/voltage control.

```
        Phoenix - Award WorkstationBIOS CMOS Setup Utility
                     Frequency/Voltage Control

     Current CPU FSB Clock                              Item Help
     PCI Clock Auto Detect      [Enabled]
     DRAM Power Voltage         [2.6  V]          Menu Level    ▶
     AGP/IGP Power Voltage      [1.5  V]
     Spread Spectrum            [Enabled]         Auto detect PCI device
     CPU FSB Clock              [100MHz]          and set PCI slot clock






     ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
          F5: Previous Values      F7: BIOS Setup Defaults
```
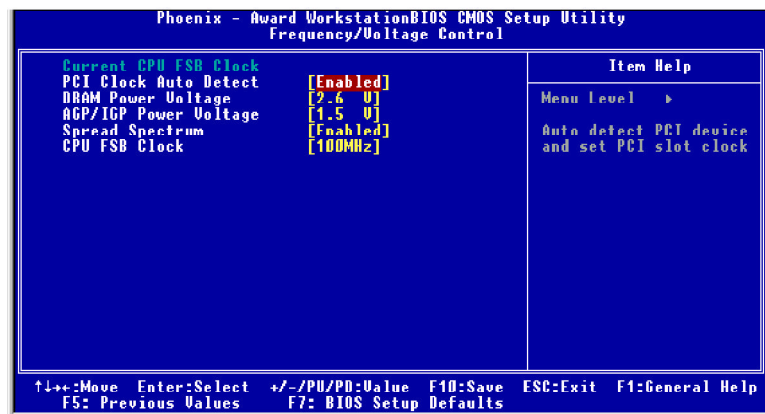
Current CPU FSB Clock
This shows the current front side bus clock frequency of the processor.

PCI Clock Auto Detect
This feature enables the BIOS to auto detect PCI device and set PCI slot clock.
Options are: *Enabled, Disabled*.

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

IGP/AGP Power Voltage
This field allows you to adjust the IGP and AGP voltage for better performance
of your IGP/AGP display card when overclocking. Any changes made to this
setting may cause a stability issue, so ***changing the IGP/AGP voltage for
long-term purpose is NOT recommended***.

Spread Spectrum
When the motherboard's clock generator pulses, the extreme values (spikes)
of the pulses creates EMI (Electromagnetic Interference). The Spread Spec-
trum function reduces the EMI generated by modulating the pulses so that the

spikes of the pulses are reduced to flatter curves. 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 *Enabled* for EMI reduction. Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clockspeed which may just cause your overclocked processor to lock up. Available options: *Enabled, Disabled.*

CPU FSB Clock
This item allows you to select the CPU clock frequency (in MHz) and overclock the processor by adjusting the clock to a higher frequency. Key in a DEC number between *100~232*.

Load High Performance/BIOS Setup Defaults

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

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

```
Load High Performance (Y/N)? N
WARNING! This default might have
    potential reliability risk.
```

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

> **MSI** **MSI Reminds You...**
> ***The option is for power or overclocking users only****. Use of high performance defaults will tighten most timings to increase the system performance. Therefore, a high-end system configuration is a must, which means you need high-quality VGA adapter, RAM and so on.* **We don't recommend that users should apply the high performance defaults in their regular systems.** *Otherwise, the system may become unstable or even crash. If the system crashes or hangs after enabling the feature, please CLEAR CMOS DATA to resolve the problem. For more information, refer to "Clear CMOS Jumper:JBAT1" in Chapter 2.*

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

```
Load BIOS Setup Defaults (Y/N)? N
```

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

Set Supervisor/User Password

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

```
Enter Password:
```

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

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

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

Additionally, when a password is enabled, you can also have BIOS to request a password each time the system is booted. This would prevent unauthorized use of your computer. The setting to determine when the password prompt is required is the Security Option of the Advanced BIOS Feature menu. If the Security Option is set to *System*, the password is required both at boot and at entry to Setup. If set to *Setup*, password prompt only occurs when you try to enter Setup.

MSI

MSI Reminds You...
About Supervisor Password & User Password:

Supervisor password: *Can enter and change the settings of the setup menu.*

User password: *Can only enter but do not have the right to change the settings of the setup menu.*

Appendix A: Using 2-, 4- & 6-Channel Audio Function

The mainboard is equipped with Realtek ALC655 chip, which provides support for 6-channel audio output, including 2 Front, 2 Rear, 1 Center and 1 Subwoofer channel. ALC655 allows the board to attach 4 or 6 speakers for better surround sound effect. The section will tell you how to install and use the 2-/4-/6-channel audio function on the board.

Installing the Audio Driver

You need to install the driver for Realtek ALC655 chip to function properly before you can get access to 2-/4-/6-channel audio operations. Follow the procedures described below to install the drivers for different operating systems.

Installation for Windows 98SE/ME/2000/XP

For Windows® 2000, you must install Windows® 2000 Service Pack2 or later before installing the driver.

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

1. Insert the companion CD into the CD-ROM drive. The setup screen will automatically appear.

2. Click **Realtek AC97 Audio Drivers**.
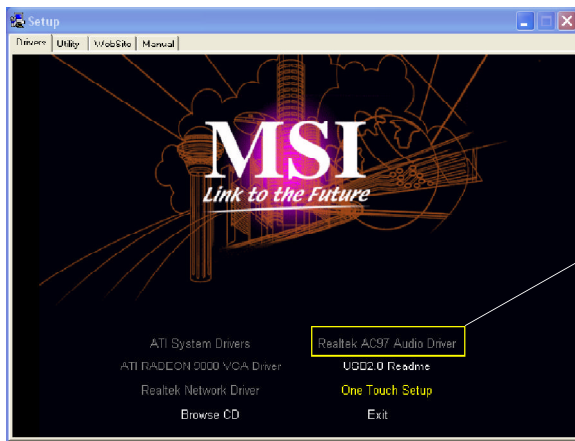
Click here

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

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

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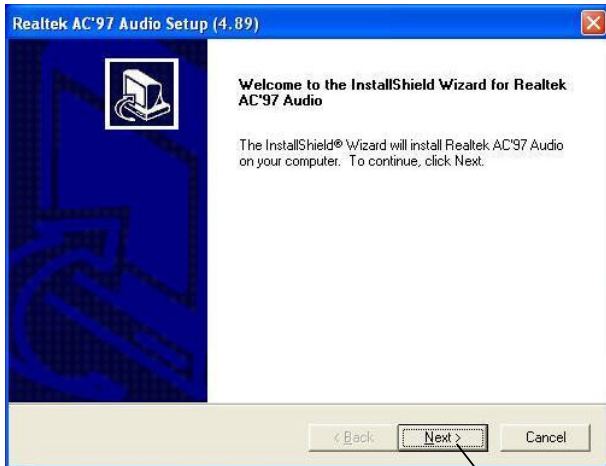
4. Click **Finish** to restart the system.

Select this option

Click here

Software Configuration

After installing the audio driver, you are able to use the 2-/4-/6-channel audio feature now. Click the audio icon 🔊 from the window tray at the lower-right corner of the screen to activate the **AC97 Audio Configuration**.

Sound Effect

Here you can select a sound effect you like from the **Environment** list.
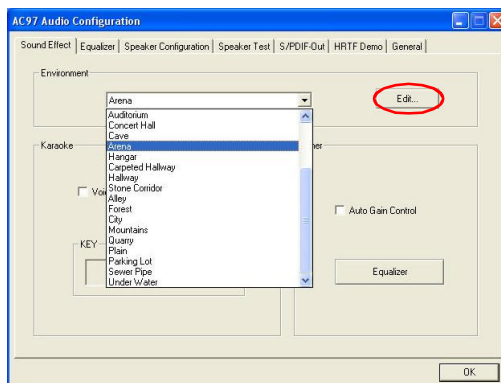
You may also edit the properties for an environment as you wish by clicking the **Edit** button, then just scroll the bar in the bottom for each property to adjust.
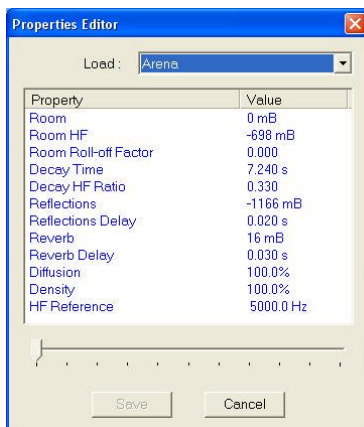
Here it provides the Karaoke function which will automatically remove human voice (lyrics) and leave melody for you to sing the song. Note that this function applies only for 2-channel audio operation.

Just check the **Voice Cancellation** box and then click **OK** to activate the Karaoke function.
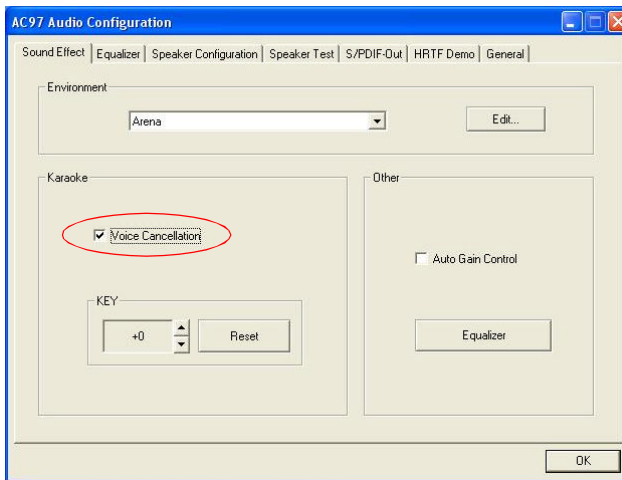
Equalizer

Here you regulate each equalizer for current playing digital sound sources.
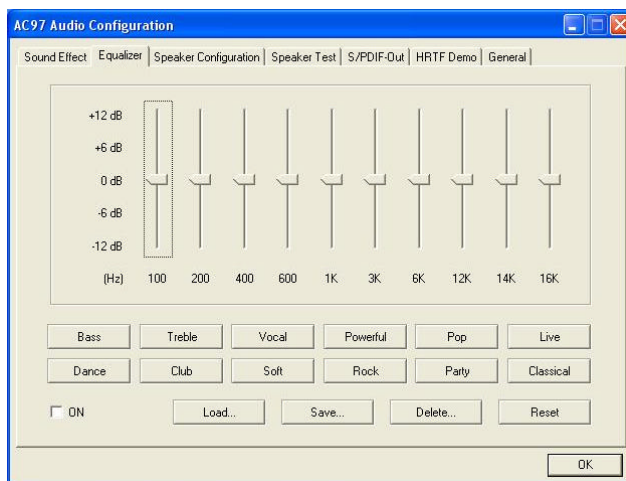
You may choose the provided sound effects, and the equalizer will adjust automatically. If you like, you may also load an equalizer setting or make an new equalizer setting to save as an new one by using the buttons **Load** and **Save**. Or you may click **Reset** to use the default value.

Speaker Configuration

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

1. Select a desired multi-channel operation from *Number of Speakers*.

   a. Headphone for the common headphone

   b. 2-Channel Mode for Stereo-Speaker Output

   c. 4-Channel Mode for 4-Speaker Output

   d. 6-Channel Mode for 5.1-Speaker Output

2. Select or clear the *Default Phonejack* check box to decide which audio devices you wish to use for audio outputs.

   NOTE: If you intend to use the S-Bracket, select *Default Phonejack*.

3. The audio output selections listed under *S-Bracket (OPTION)* are available only when S-Bracket is connected to the mainboard.

4. Then click **OK** to apply the configuration.
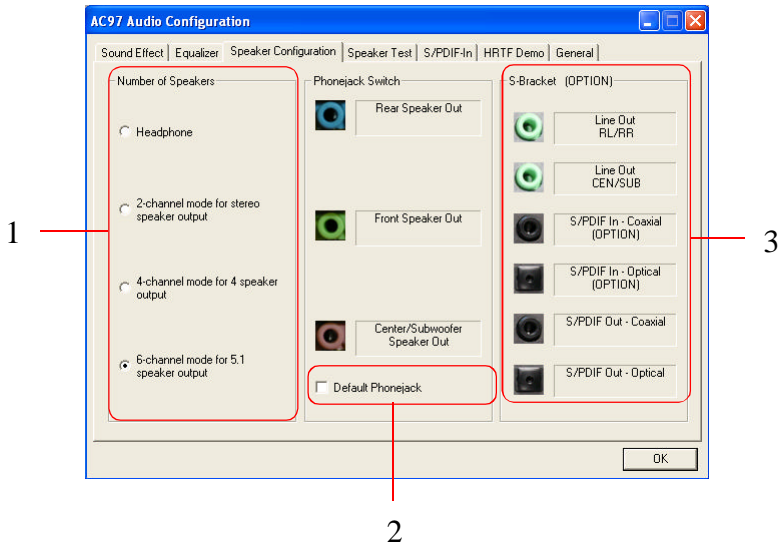
Speaker Test

You can use this tab to test each connected speaker to ensure if 4- or 6-channel audio operation works properly. 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.
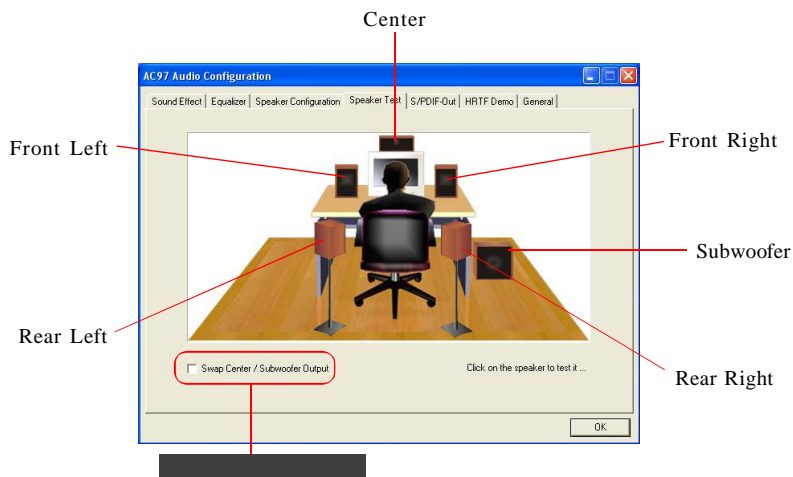
Select the speaker by clicking it to test its functionality. The one you select will light up and make testing sound.
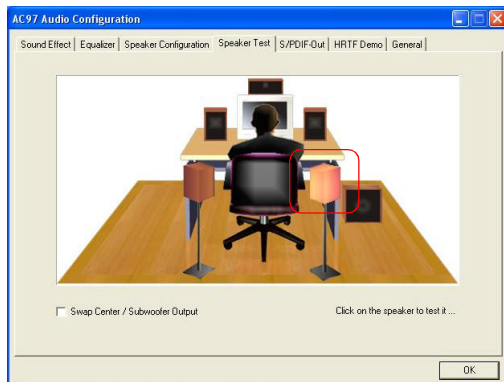
S/PDIF-Out

In this tab you may slelect the format of SPDIF out.
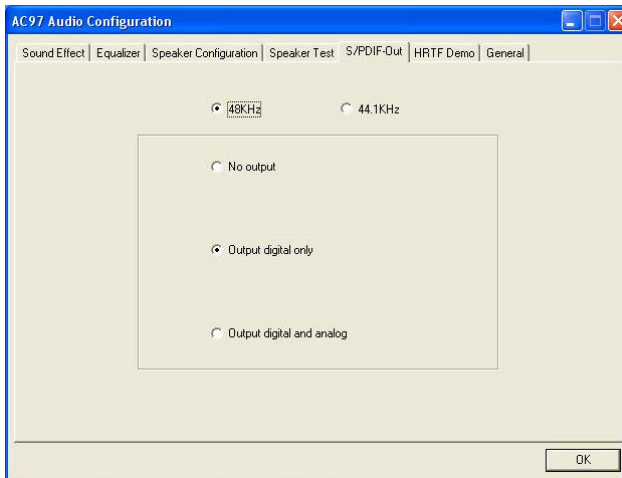
MSI Reminds You...

1. *6 speakers appear on the "Speaker Test" tab only when you select "**6-Channel Mode**" in the "Number of Speakers" column in "Speaker Configuration" tab. If you select "4-Channel Mode", only 4 speakers appear on the window.*

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

HRTF Demo

In this tab you may adjust your HRTF (Head Related Transfer Functions) 3D positional audio before playing 3D audio applications like gaming. You may also select different environment to choose the most suitable environment you like.
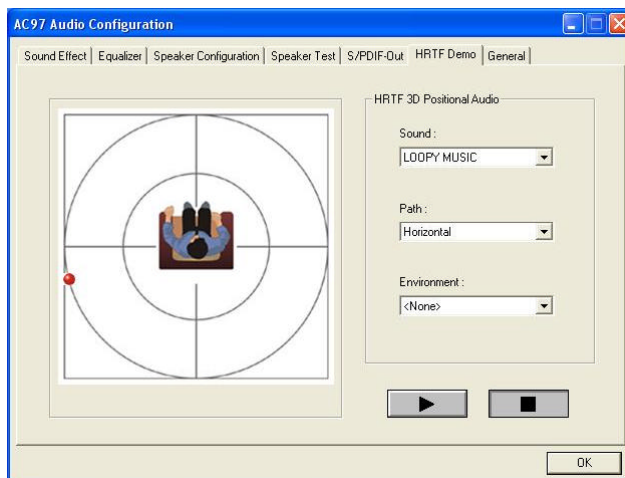
General

In this tab it provides some information about the AC97 Audio Configuration utility, including Audio Driver Version, DirectX Version, Audio Controller & AC97 Codec. You may also select the language of this utility by choosing from the **Language** list.
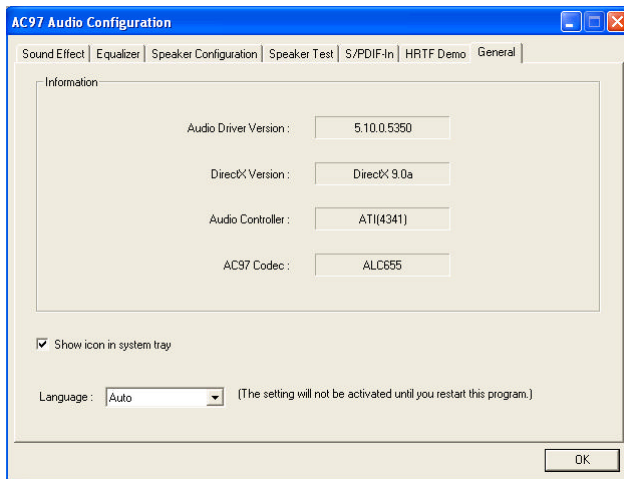
Using 2-, 4- & 6- Channel Audio Function

After installing the audio driver, you are able to use the 4-/6-channel audio feature now. To enable 4- or 6-channel audio operation, first connect 4 or 6 speakers to the appropriate audio connectors, and then select 4- or 6-channel audio setting in the software utility.

There are two ways to utilize the function and connect the speakers to your computer:

■ **Using the optional S-Bracket**
   If your motherboard supports S-Bracket and you have installed S-Bracket in the computer, you can connect two speakers to back panel's Line-Out connector, and the rest of speakers to S-Bracket.

■ **Using the back panel only**
   If you do not have a S-Bracket, you can connect all speakers to the audio connectors on the back panel.

Using the Optional S-Bracket

S-Bracket integrates the SPDIF (Sony & Philips Digital Interface) and analog LINE OUT connectors together. With this optional accessory, users will be able to decide either analog or digital audio output when applying the speakers to the connectors.

Read the following instructions to have the Multi-Channel Audio Function mode properly set in the software configuration, and then have your speakers correctly connected to the S-Bracket.

> **MSI Reminds You...**
> If you intend to use the S-Bracket, select *Default Phonejack* in the Speaker Configuration tab.

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 configuration.

■ **2-Channel Mode for Stereo-Speaker Output**

When this mode is selected, it is recommended to attach the speakers to the Line Out connector on the back panel instead of the Line Out connector on the S-Bracket.

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

Select "Default Phone jack"

1	MIC
2	Line In
3	Line Out *(Front channels)*
4	Optical SPDIF jack
5	Coaxial SPDIF jack

Back Panel

S-Bracket

■ **4-Channel Mode for 4-Speaker Output**

When this mode is selected, plug the two front speakers to the Line Out connector on the back panel, and the other two rear speakers to the Line Out connector on the S-Bracket.

Refer to the following diagram and caption for the function of each phone jack on the back panel and S-Bracket when 4-Channel mode is selected.

Select "Default Phone jack"

1   MIC
2   Line In
3   Line Out *(Front channels)*
4   Optical SPDIF jack
5   Coaxial SPDIF jack
6   Line Out *(Reserved for Center and Subwoofer channel, but it is not functioning here)*
7   Line Out *(Rear channels)*

Back Panel   **S-Bracket**
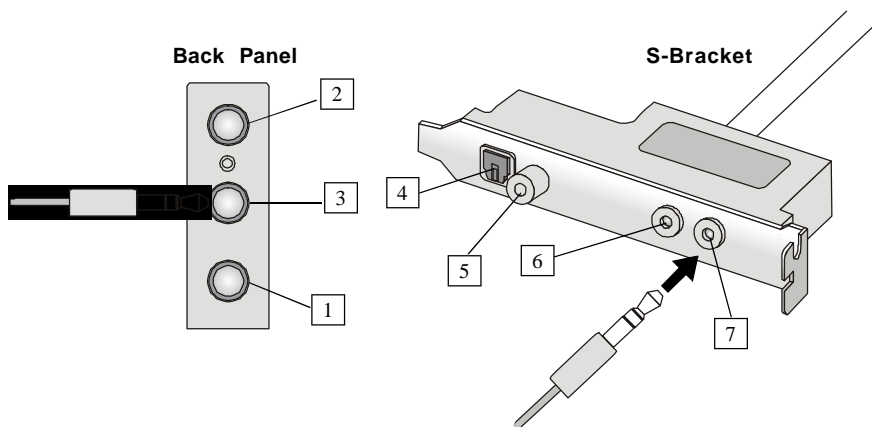
■ **6-Channel Mode for 6-Speaker Output**

When this mode is selected, plug the two front speakers to the Line Out connector on the back panel, and the other two rear speakers to the Line Out connector on the S-Bracket.

Refer to the following diagram and caption for the function of each phone jack on the back panel and S-Bracket when 6-Channel mode is selected.

Select "Default Phone jack"

1	MIC
2	Line In
3	Line Out *(Front channels)*
4	Optical SPDIF jack
5	Coaxial SPDIF jack
6	Line Out *(Center and Subwoofer channels)*
7	Line Out *(Rear channels)*
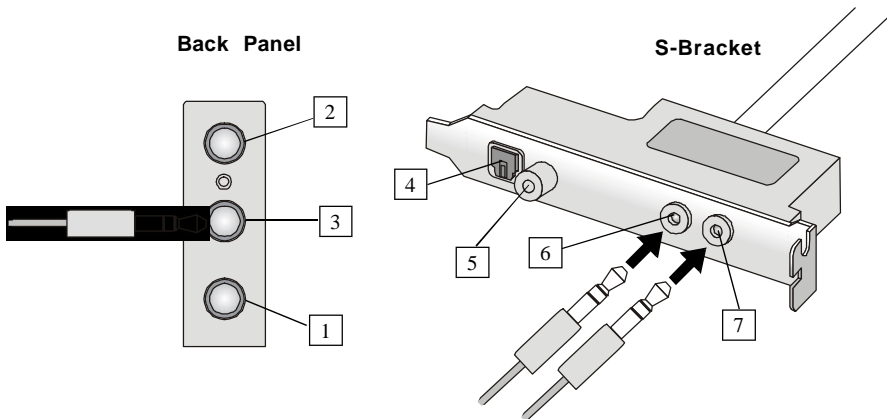
Back Panel   **S-Bracket**

MSI Reminds You...

If the Center and Subwoofer speaker exchange their audio channels when you play video or music on the computer, a converter may be required to exchange center and subwoofer audio signals. You can purchase the converter from a speaker store.

■ **Digital Audio Output**

When any Multi-Channel Audio Function mode is selected, you may also connect your speakers to the Optical or Coaxial SPDIF phone jack on the S-Bracket to exprience digital surround sound effect.

Remove the plug from the optical SPIDF phone jack before inserting the fiber-optic cable, and read the following diagram and captions for the function of each phone jack on the S-Bracket.

1 Optical SPDIF jack
2 Coaxial SPDIF jack

S-Bracket
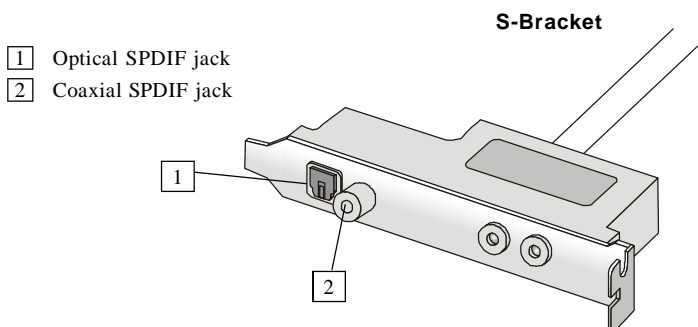
Using the Back Panel only

In addition to a default 2-channel analog audio output function, the audio connectors on the Back Panel also provide 4- or 6-channel analog audio output function if a proper setting is made in the software utility.

Read the following steps to have the Multi-Channel Audio Function properly set in the software utility, and have your speakers correctly connected to the Back Panel.

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 configuration.
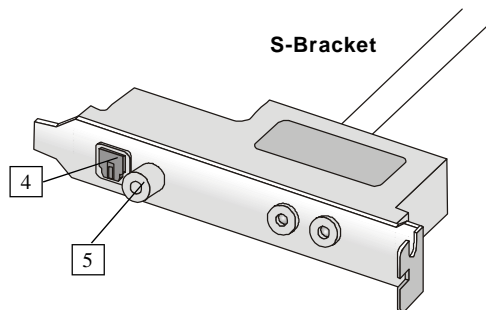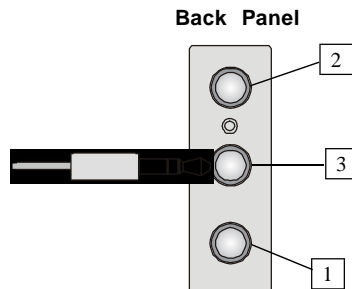
■ **2-Channel Mode for Stereo-Speaker Output**

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

1 MIC
2 Line In
3 Line Out *(Front channels)*
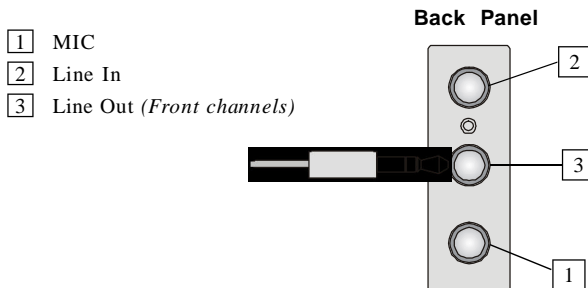
Back Panel

■ **4-Channel Mode for 4-Speaker Output**

The audio jacks on the back panel always provide 2-channel analog audio output function, however these audio jacks can be transformed to 4- or 6- channel analog audio jacks by selecting the corresponding multi-channel operation from **No. of Speakers**.

Refer to the following diagram and caption for the founction of each jack on the back panel when 4-Channel Mode is selected.

Back Panel

1 MIC
2 * Line Out *(Rear channels)*
3 Line Out *(Front channels)*
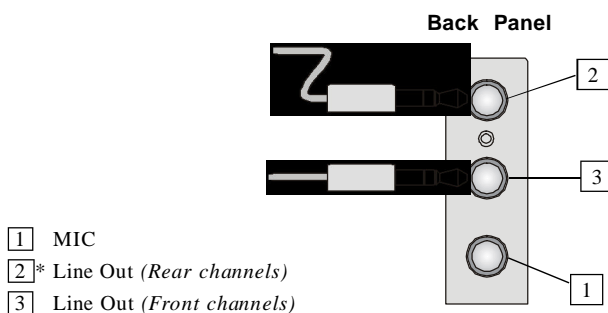
* Line In function is converted to Line Out function when 4-Channel Mode for 4-Speaker Output is selected.

■ **6-Channel Mode for 6-Speaker Output**

Refer to the following diagram and caption for the function of each jack on the back panel when 6-Channel Mode is selected.

1 * Line Out *(Center and Subwoofer channel)*

2 * Line Out *(Rear channels)*

3 Line Out *(Front channels)*

Back Panel
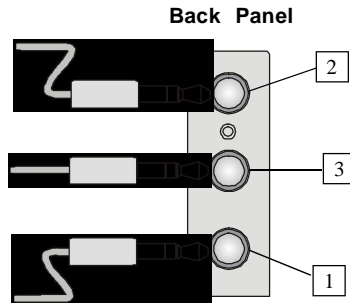
* Both Line In and MIC function are converted to Line Out function when 6-Channel Mode for 6-Speaker Output is selected.

MSI **MSI Reminds You...**

If the Center and Subwoofer speaker exchange their audio channels when you play video or music on the computer, a converter may be required to exchange center and subwoofer audio signals. You can purchase the converter from a speaker store.

Appendix B: Recommended Memory Modules

PC2100 DDR RAM (DDR266)

System Configuration			
	Manufacturer	Model No.	Spec.
Processor	*Intel*	*P-4*	*2.0G 400MHz*
Memory	*As Follows*		
VGA Card	*On Board*		
Lan Card	*On Board*		
Sound Card	*On Board*		
Hard Drive	*Maxtor*	*Diamond Max Plus & 6E030L0-1A*	*UDMA 133 30GB*
CD-ROM	*MSI*	*MS8216*	*16X DVD-ROM*
Floppy Drive	*TEAC*	*FD-235HF*	
Power Supply	*JOU-JYE*	*JJ-300T(12V)*	
Mouse	*Acer*	*MS69*	
Keyboard	*Acer*	*6511-)OX*	
Monitor	*Acer*	*AcerView 77C*	
VGA BIOS			
VGA Driver			*(from OM- CD)*

Device Configuration appears as a vertical label on the left of the Device Configuration rows.
*SW Info* appears as a vertical label on the left of the VGA BIOS/VGA Driver rows.

Model	Size	Memory Slot				Memory Bendwidth	R.S.T
		1	2	3	4	Benchmark	
Hyundai (TwinMOS)	128MB	✓	✓			OK	OK
HY5DU28822T-H		✓				OK	OK
Micron (MT4VDDT1664AG-265B1 US)	128MB	✓	✓			OK	OK
MT46V16M16TG-75B			✓			OK	OK
Micron (MT8VDDT1664AG-265B1 SG)	128MB	✓				OK	OK
MT46V16M8TG-75B			✓			OK	OK
Micron (MT8VDDT3264AG-265B1 SG)	256MB	✓	✓			OK	OK
MT46V32M8TG-75B		✓				OK	OK
Winbond (Kingston KVR266X64C25/256)	256MB	✓				OK	OK
W942508BH-75			✓			OK	OK
PSC Mira	512MB	✓				OK	OK
P2S56D30TP-11590A00-75			✓			OK	

Model	Size	Memory Slot				Memory Bandwidth Benchmark	R.S.T
		1	2	3	4		
Micron MT46V16M8TG-75B	256MB	▓				OK	OK
Nanya NT5DS32M8BT-75B	256MB		▓				
Toshiba TC59WM807BFT-70	256MB						
Micron MT46V16M8TG-75B	256MB		▓			OK	OK
Nanya NT5DS32M8BT-75B	256MB						
Toshiba TC59WM807BFT-70	256MB	▓					
Micron MT46V16M8TG-75B	256MB		▓			OK	OK
Nanya NT5DS32M8BT-75B	256MB						
SEC K4H280838D-TCB0	256MB	▓					
Micron MT46V16M8TG-75B	256MB					OK	OK
Nanya NT5DS32M8BT-75B	256MB	▓					
SEC K4H280838D-TCB0	256MB						
PSC Mira P2S56D30TP-75	512MB					OK	OK
Infineon HYB25D256800AT-7A	512MB	▓					
SEC K4H560838D-TCBO	512MB		▓				
SEC K4H280838D-TCB0	256MB	▓				OK	OK
SEC K4H280838D-TCB0	256MB						
SEC K4H560838D-TCBO	512MB		▓				

PC2100 DDR RAM (DDR266)

System Configuration				
		Manufacturer	Model No.	Spec.
Device Configuration	Processor	*Intel*	*P-4*	*2.4G (533)MHz*
	Memory	*As Follows*		
	VGA Card	*On Board*		
	Lan Card	*On Board*		
	Sound Card	*On Board*		
	Hard Drive	*Maxtor*	*Diamond Max Plus & 6E030L0-1A*	*UDMA 133 30GB*
	CD-ROM	*MSI*	*MS8216*	*16X DVD-ROM*
	Floppy Drive	*TEAC*	*FD-235HF*	
	Power Supply	*JOU-JYE*	*JJ-300T(12V)*	
	Mouse	*Acer*	*MS69*	
	Keyboard	*Acer*	*6511-)OX*	
	Monitor	*Acer*	*AcerView 77C*	
SW Info	VGA BIOS			
	VGA Driver			*(from OM- CD)*

Model	Size	Memory Slot				Memory Bendwidth	R.S.T
		1	2	3	4	Benchmark	
Hyundai (TwinMOS)	128MB	✓	✓			OK	OK
HY5DU28822T-H		✓				OK	OK
Micron (MT4VDDT1664AG-265B1 US)	128MB	✓	✓			OK	OK
MT46V16M16TG-75B			✓			OK	OK
Micron (MT8VDDT1664AG-265B1 SG)	128MB	✓				OK	OK
MT46V16M8TG-75B			✓			OK	OK
Micron (MT16VDDT3264AG-265B1 SG)	256MB	✓				OK	OK
MT46V16M8TG-75B			✓			OK	OK
Micron (MT8VDDT3264AG-265B1 SG)	256MB	✓	✓			OK	OK
MT46V32M8TG-75B		✓				OK	OK
Winbond (Kingston KVR266X64C25/256)	256MB	✓				OK	OK
W942508BH-75			✓			OK	OK
PSC Mira	512MB	✓				OK	OK
P2S56D30TP-11590A00-75			✓			OK	OK

Model	Size	Memory Slot				Memory Bandwidth Benchmark	R.S.T
		1	2	3	4		
Micron MT46V16M8TG-75B	256MB	■				OK	OK
Nanya NT5DS32M8BT-75B	256MB		■				
Toshiba TC59WM807BFT-70	256MB						
Micron MT46V16M8TG-75B	256MB		■			OK	OK
Nanya NT5DS32M8BT-75B	256MB						
Toshiba TC59WM807BFT-70	256MB	■					
Micron MT46V16M8TG-75B	256MB		■			OK	OK
Nanya NT5DS32M8BT-75B	256MB						
SEC K4H280838D-TCB0	256MB	■					
Micron MT46V16M8TG-75B	256MB					OK	OK
Nanya NT5DS32M8BT-75B	256MB	■					
SEC K4H280838D-TCB0	256MB		■				
PSC Mira P2S56D30TP-75	512MB					OK	OK
Infineon HYB25D256800AT-7A	512MB	■					
SEC K4H560838D-TCBO	512MB		■				

Model	Size	Memory Slot				Memory Bandwidth Benchmark	R.S.T
SEC K4H280838D-TCB0	256MB	■				OK	OK
SEC K4H280838D-TCB0	256MB						
SEC K4H560838D-TCBO	512MB		■				

PC2700 DDR RAM (DDR333)

System Configuration				
		Manufacturer	Model No.	Spec.
Device Configuration	Processor	*Intel*	*P-4*	*2.4G (533)MHz*
	Memory	*As Follows*		
	VGA Card	*On Board*		
	Lan Card	*On Board*		
	Sound Card	*On Board*		
	Hard Drive	*Maxtor*	*Diamond Max Plus & 6E030L0-1A*	*UDMA 133 30GB*
	CD-ROM	*MSI*	*MS8216*	*16X DVD-ROM*
	Floppy Drive	*TEAC*	*FD-235HF*	
	Power Supply	*JOU-JYE*	*JJ-300T(12V)*	
	Mouse	*Acer*	*MS69*	
	Keyboard	*Acer*	*6511-)OX*	
	Monitor	*Acer*	*AcerView 77C*	
SW Info	VGA BIOS			
	VGA Driver			*(from OM- CD)*

Model		Size	Memory Slot				Memory Bandwidth	R.S.T
			1	2	3	4	Benchmark	
Hynix	HYMD116645B8J-J	128MB	✓	✓			OK	OK
*	(Hynix HY5DU28822BT-J)		✓				OK	OK
Infineon	HYS64D16301GU-6-B	128MB	✓	✓			OK	OK
*	(Infineon HYB25D256160BT-6B)			✓			OK	OK
Micron	MT4VDDT1664AG-335C3 SG	128MB	✓	✓			OK	OK
*	(Micron MT46V16M16TG-6T C)		✓				OK	OK
Nanya	NT128D64SH4B1G-6K	128MB	✓	✓			OK	OK
*	(Nanya NT5DS16M16BT-6K)			✓			OK	OK
SEC	M368L1713DTM-CB3	128MB	✓	✓			OK	OK
*	(SEC K4H280838D-TCB3)		✓				OK	OK
CORSAIR	CMX256A-2700C2 XMS2700V1.1	256MB	✓	✓			OK	OK
*				✓			OK	OK
Hynix	HYMD232646A8J-J	256MB	✓	✓			OK	OK
*	(Hynix HY5DU56822AT-J)		✓				OK	OK
Hynix	HYMD232646B8J-J	256MB	✓	✓			OK	OK
*	(Hynix HY5DU56822BT-J)			✓			OK	OK
Hynix	HYMD132645B8J-J	256MB	✓	✓			OK	OK
*	(Hynix HY5DU28822BT-J)		✓				OK	OK
Infineon	HYS64D32300GU-6-B	256MB	✓	✓			OK	OK
*	(Infineon HYB25D256800BT-6B)			✓			OK	OK
Kingston	KVR333X64C25/256 (9905192-001)	256MB	✓	✓			OK	OK
	(Winbond W942508BH-6)		✓				OK	OK
Micron	MT8VDDT3264AG-335C4 US	256MB	✓	✓			OK	OK
*	(Micron MT46V32M8TG-6T C)			✓			OK	OK

Model		Size	Memory Slot				Memory Bandwidth	R.S.T
			1	2	3	4	Benchmark	
Nanya	NT256D64S88B1G-6K	256MB	✔	✔			OK	OK
*	(Nanya NT5DS32M8BT-6K)		✔				OK	OK
Nanya	NT256D64S8HA1G-6K	256MB	✔	✔			OK	OK
*	(Nanya NT5DS16M8AT-6K)			✔			OK	OK
SEC	M368L3223DTM-CB3	256MB	✔	✔			OK	OK
*	(SEC K4H560838D-TCB3)		✔				OK	OK
SEC	M368L3223ETN-CB3	256MB	✔	✔			OK	OK
*	(SEC K4H560838E-TCB3)			✔			OK	OK
Spectek	P32M648HHC-6A	256MB	✔	✔			OK	OK
	(Spectek AES80032VMCTW-6A)		✔				OK	OK
Transcend		256MB	✔				OK	OK
	(SEC K4H280838D-TCB3)			✔			OK	OK
Transcend	TS32MLD64V3F5	256MB	✔	✔			OK	OK
	(Mosel V58C2256804SAT6)		✔				OK	OK
Apacer	77.10728.460	512MB	✔				OK	OK
	(SEC K4H560838D-TCB3)			✔			OK	OK
Crucial/Micron	BG111DR.7G	512MB	✔	✔			OK	OK
	(Micron MT46V32M8TG-6T)		✔				OK	OK
GeIL	GE5122700	512MB	✔	✔			OK	OK
	(GL3LC32G88TG-6)			✔			OK	OK
Hynix	HYMD264646A8J-J	512MB	✔	✔			OK	OK
*	(Hynix HY5DU56822AT-J)		✔				OK	OK
Hynix	HYMD264646B8J-J	512MB	✔	✔			OK	OK
*	(Hynix HY5DU56822BT-J)			✔			OK	OK
Infineon	HYS64D64320GU-6-B	512MB	✔	✔			OK	OK
*	(Infineon HYB25D256800BT-6B)		✔				OK	OK
Micron	MT16VDDT6464AG-335C4 US	512MB	✔	✔			OK	OK
*	(Micron MT46V32M8TG-6T C)		✔				OK	OK
Nanya	NT512D64S8HB1G-6K	512MB	✔	✔			OK	OK
*	(Nanya NT5DS32M8BT-6K)			✔			OK	OK
SEC	M368L6423DTM-CB3	512MB	✔	✔			OK	OK
*	(SEC K4H560838D-TCB3)		✔				OK	OK
SEC	M368L6423ETN-CB3	512MB	✔	✔			OK	OK
*	(SEC K4H560838E-TCB3)			✔			OK	OK
Spectek	P64M6416HHB-6A	512MB	✔	✔			OK	OK
	(Spectek AHS40064VMBTW-6A)		✔				OK	OK
Transcend	TS64MLD64V3F5	512MB	✔	✔			OK	OK
	(Mosel V58C2256804SAT6)			✔			OK	OK

PC2700 DDR RAM (DDR333)

System Configuration				
		Manufacturer	Model No.	Spec.
Device Configuration	Processor	*Intel*	*P-4*	*2.8G (800)MHz*
	Memory	*As Follows*		
	VGA Card	*On Board*		
	Lan Card	*On Board*		
	Sound Card	*On Board*		
	Hard Drive	*Maxtor*	*Diamond Max Plus & 6E030L0-1A*	*UDMA 133 30GB*
	CD-ROM	*MSI*	*MS8216*	*16X DVD-ROM*
	Floppy Drive	*TEAC*	*FD-235HF*	
	Power Supply	*JOU-JYE*	*JJ-300T(12V)*	
	Mouse	*Acer*	*MS69*	
	Keyboard	*Acer*	*6511-)OX*	
	Monitor	*Acer*	*AcerView 77C*	
SW Info	VGA BIOS			
	VGA Driver			*(from OM- CD)*

	Model	Size	Memory Slot				Memory Bandwidth	R.S.T
			1	2	3	4	Benchmark	
Hynix	HYMD116645B8J-J	128MB	✓	✓			OK	OK
*	(Hynix HY5DU28822BT-J)		✓				OK	OK
Infineon	HYS64D16301GU-6-B	128MB	✓	✓			OK	OK
*	(Infineon HYB25D256160BT-6B)			✓			OK	OK
Micron	MT4VDDT1664AG-335C3 SG	128MB	✓	✓			OK	OK
*	(Micron MT46V16M16TG-6T C)		✓				OK	OK
Nanya	NT128D64SH4B1G-6K	128MB	✓	✓			OK	OK
*	(Nanya NT5DS16M16BT-6K)			✓			OK	OK
SEC	M368L1713DTM-CB3	128MB	✓	✓			OK	OK
*	(SEC K4H280838D-TCB3)		✓				OK	OK
CORSAIR	CMX256A-2700C2 XMS2700V1.1	256MB	✓	✓			OK	OK
*				✓			OK	OK
Hynix	HYMD232646A8J-J	256MB	✓	✓			OK	OK
*	(Hynix HY5DU56822AT-J)		✓				OK	OK
Hynix	HYMD232646B8J-J	256MB	✓	✓			OK	OK
*	(Hynix HY5DU56822BT-J)			✓			OK	OK
Hynix	HYMD132645B8J-J	256MB	✓	✓			OK	OK
*	(Hynix HY5DU28822BT-J)		✓				OK	OK
Infineon	HYS64D32300GU-6-B	256MB	✓	✓			OK	OK
*	(Infineon HYB25D256800BT-6B)			✓			OK	OK
Kingston	KVR333X64C25/256 (9905192-001)	256MB	✓	✓			OK	OK
	(Winbond W942508BH-6)		✓				OK	OK
Micron	MT8VDDT3264AG-335C4 US	256MB	✓	✓			OK	OK
*	(Micron MT46V32M8TG-6T C)			✓			OK	OK

PC3200 DDR RAM (DDR400)

System Configuration				
		Manufacturer	Model No.	Spec.
Device Configuration	Processor	*Intel*	*P-4*	*2.8G (800)MHz*
	Memory	*As Follows*		
	VGA Card	*On Board*		
	Lan Card	*On Board*		
	Sound Card	*On Board*		
	Hard Drive	*Maxtor*	*Diamond Max Plus & 6E030L0-1A*	*UDMA 133 30GB*
	CD-ROM	*MSI*	*MS8216*	*16X DVD-ROM*
	Floppy Drive	*TEAC*	*FD-235HF*	
	Power Supply	*JOU-JYE*	*JJ-300T(12V)*	
	Mouse	*Acer*	*MS69*	
	Keyboard	*Acer*	*6511-)OX*	
	Monitor	*Acer*	*AcerView 77C*	
SW Info	VGA BIOS			
	VGA Driver			*(from OM- CD)*

	Model	Size	Memory Slot				Memory Bandwidth	R.S.T
			1	2	3	4	Benchmark	
Infineon	HYS64D16301GU-5-B	128MB	✓	✓			OK	OK
*	(Infineon HYB25D256160BT-5)		✓				OK	OK
Nanya	NT128D64SH4B1G-5	128MB	✓	✓			OK	OK
*	(Nanya NT5DS16M16BT-5)			✓			OK	OK
A-DATA	MD0M05F3G31JB1EAZ	256MB	✓	✓				OK
	(Mosel V58C2256804SAT5)		✓					OK
Apacer	77.10636.115	256MB	✓	✓				OK
	(Infineon HYB25D256800BT-5B)		✓					OK
ATP	AG32L72T8SQC4S	256MB	✓	✓				OK
*	(SEC K4H560838D-TCC4) ECC			✓				OK
CORSAIR	CMX256A-3500C2PT XMS3502 V1.1	256MB	✓	✓			OK	OK
*				✓			OK	OK
CORSAIR	CMX256A-3200LL XMS3205V1.2	256MB	✓	✓			OK	OK
				✓			OK	OK
Crucial/Micron	BQ1118L.FT	256MB	✓	✓			OK	OK
	(Micron MT46V32M8TG-5B)			✓			OK	OK
GeIL	GE2563200B	256MB	✓	✓			OK	OK
				✓			OK	OK
Hynix	HYMD232646A8J-D43	256MB	✓	✓			OK	OK
*	(Hynix HY5DU56822AT-D43			✓			OK	OK
Hynix	HYMD232646B8J-D43	256MB	✓	✓			OK	OK
*	(Hynix HY5DU56822BT-D43			✓			OK	OK

Model		Size	Memory Slot				Memory Bandwidth Benchmark	R.S.T
			1	2	3	4		
Infineon	HYS64D32300GU-5-B	256MB	✔	✔			OK	OK
*	(Infineon HYB25D256800BT-5)		✔				OK	OK
Infineon	HYS64D32300HU-5-C	256MB	✔	✔			OK	OK
*	(Infineon HYB25D256800CE-5C)			✔			OK	OK
Kingston	KVR400X64C25/256	256MB	✔	✔			OK	OK
	(Winbond W942508BH-5)		✔				OK	OK
LEGEND	L3264D37-643HDC9B	256MB						
	(Hynix HY5DU56822BT-D43)							
Micron	MT8VDDT3264AG-40BC4	256MB	✔	✔			OK	OK
*	(Micron MT46V32M8TG-5B C)		✔				OK	OK
PSC	AL5D8A53TK1-5B	256MB	✔	✔			OK	OK
*	(PSC A2S56D30ATP-5)			✔			OK	OK
PSC	AL5D8B53T-5B1K	256MB	✔	✔			OK	OK
*	(PSC A2S56D30BTP -5)		✔				OK	OK
Siemens	SDU03264B4B31MT-50	256MB	✔	✔			OK	OK
	(Micron MT46V32M8TG-5B)			✔			OK	OK
TwinMos	M2G9108AFATT9F0811DDT	256MB						
	(TwinMos TMD7608F8E50B)							
TwinMos	M2S9I08AF APS9F0811A-T	256MB	✔	✔			OK	OK
	(PSC A2S56D30ATP-5)			✔			OK	OK
Winbond	W9425GCDB-5	256MB	✔	✔			OK	OK
*	(WinBond W942508CH-5)			✔			OK	OK
Apacer	77.10736.583	512MB	✔	✔			OK	OK
	(Winbond W942508BH-5)		✔				OK	OK
ATP	AG64L64T8SQC4S	512MB						
*	(SEC K4H560838D-TCC4)							
CORSAIR	CMX512-3500C2PT XMS3502 V1.1	512MB	✔	✔			OK	OK
*			✔				OK	OK
Crucial/Micron	BG111DB.FB	512MB	✔	✔			OK	OK
	(Micron MT46V32M8TG-5B) ECC			✔			OK	OK
GeIL	GE5123200B	512MB	✔				OK	OK
				✔			OK	OK
Hynix	HYMD264646A8J-D43	512MB	✔				OK	OK
*	(Hynix HY5DU56822AT-D43)			✔			OK	OK
Hynix	HYMD264646B8J-D43	512MB	✔	✔			OK	OK
*	(Hynix HY5DV56822BT-D43)		✔				OK	OK
Infineon	HYS64D64320UH-5-C	512MB	✔	✔			OK	OK
*	(Infineon HYB25D256800CE-5C)			✔			OK	OK

	Model	Size	Memory Slot				Memory Bandwidth	R.S.T
			1	2	3	4	Benchmark	
Kingston	KVR400X64C25/512	512MB	✓				OK	OK
	(Winbond W942508BH-5)			✓			OK	OK
Micron	MT16VDDT6464AG-40BC4	512MB	✓	✓			OK	OK
*	(Micron MT46V32M8TG-5B C)		✓				OK	OK
*	(Nanya NT5DS32M8BT-5T)			✓			OK	OK
PSC	AL6D8A53TK1-5B	512MB	✓				OK	OK
*	(PSC A2S56D30ATP-5)			✓			OK	OK
PSC	AL6D8B53T-5B1K	512MB	✓	✓			OK	OK
*	(PSC A2S56D30BTP -5)		✓				OK	OK
*	(SEC K4H560838D-TCC4)			✓			OK	OK
SEC	M368L6423ETM-CCC	512MB	✓	✓			OK	OK
*	(SEC K4H560838E-TCCC)		✓				OK	OK
Siemens	SDU03264B4B31MT-50	512MB	✓	✓			OK	OK
	(Micron MT46V32M8TG-5B)			✓			OK	OK
Siemens	SDU06464H1B22IN-50	512MB	✓	✓			OK	OK
	(Infineon HYB25D256800BT-5B)		✓				OK	OK
Transcend	TS64MLD64V4F3	512MB	✓	✓			OK	OK
	(SEC K4H560838D-TCCC)			✓			OK	OK