**MSI**

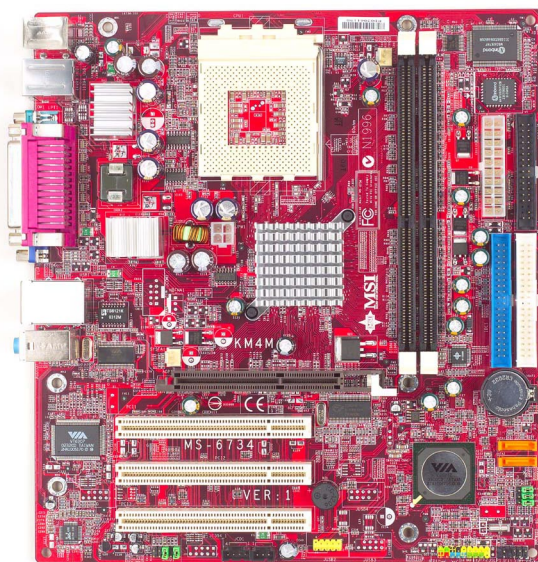# KM4M Series

# MS-6734 (v1.X) M-ATX Mainboard



**Version 1.0**
**G52-M6734X1**

Manual Rev: 1.0
Release Date: June 2003

$$CE \quad \text{N1996}$$

## 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 equip-
ment is operated in a commercial environment. This equipment generates, uses
and can radiate radio frequency energy and, if not installed and used in accor-
dance 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
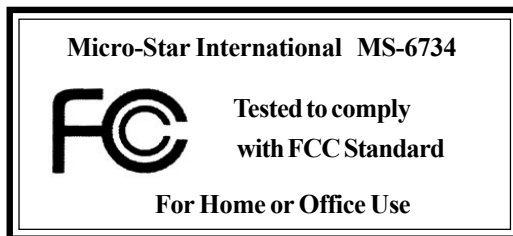the interference at his own expense.

**Notice 1**
The changes or modifications not expressly approved by the party respon-
sible 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-6734**
>
> **FC** **Tested to comply
> with FCC Standard**
>
> **For Home or Office Use**

## Copyright Notice

The material in this document is the intellectual property of **MICRO-STAR INTERNATIONAL**. We take every care in the preparation of this document, but no guarantee is given as to the correctness of its contents. Our products are under continual improvement and we reserve the right to make changes without notice.

## Trademarks

All trademarks are the properties of their respective owners.

AMD, Athlon™, Athlon™ XP, Thoroughbred™, and Duron™ are registered trademarks of AMD Corporation.
PS/2 and OS®/2 are registered trademarks of International Business Machines Corporation.
Windows® 95/98/2000/NT/XP are registered trademarks of Microsoft Corporation.
Netware® is a registered trademark of Novell, Inc.
Award® is a registered trademark of Phoenix Technologies Ltd.
AMI® is a registered trademark of American Megatrends Inc.

## Revision History

| Revision | Revision History | Date |
|----------|------------------|------|
| V1.0 | First release | June 2003 |

## Technical Support

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

- Visit the MSI website for FAQ, technical guide, BIOS updates, driver updates, and other information: **http://www.msi.com.tw/**

- Contact our technical staff at: **support@msi.com.tw**

## Safety Instructions

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

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

# CONTENTS

# 1

# *Getting Started*

Thank you for purchasing the MS-6734 v1.X M-ATX mainboard. The MS-6734 v1.X M-ATX mainboard is based on VIA® Apollo KM400/400A North Bridge & VT8235/8237 South Bridge chipset for optimal system efficiency. Designed to fit the advanced AMD® Athlon™, Athlon™ XP or Duron™ processors, the MS-6734 delivers a high performance and professional desktop platform solution.

# **Mainboard Specifications**

**CPU**
➤ Supports Socket A (Socket-462) for AMD® Athlon™/Athlon™ XP /Duron™ processors
➤ Supports AMD Athlon XP 2800+ & Barton

**Chipset**
➤ VIA® KM400/400A  North Bridge
   - Supports 200/266/333/400*MHz front side bus (*for KM400A only)
   - Supports DDR200/266/333/400* (*for KM400A only)
   - Supports AGP 4X and AGP 8X
➤ VIA® VT8235/8237  South Bridge
   - Integrated Direct Sound AC97 audio
   - Dual channel Ultra DMA 33/66/100/133 master mode EIDE controller
   - ACPI & PC2001 compliant enhanced power management
   - Integrated USB 2.0 controller
       * 8235 supporting 6 ports
       * 8237 supporting 8 ports
   - Integrated S-ATA 150 supporting 2 ports (8237 only)

**Main Memory**
➤ Supports four memory banks using two 184-pin DDR DIMMs
➤ Supports up to 2GB PC1600/2100/2700/3200* DDR SDRAMs

**Slots**
➤ One AGP (Accelerated Graphics Port) 1.5V 8x/4x slot
➤ Three 32-bit PCI bus slots (support 3.3v/5v PCI bus interface)

**On-Board IDE**
➤ An IDE controller on the VT8235/8237 chipset provides IDE HDD/CD-ROM with PIO, Bus Master and Ultra DMA133/100/66/33 operation modes
➤ Can connect up to four IDE devices

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

- 1 serial port and 1 VGA port
- 1 parallel port
- Vertical audio ports
- 1 RJ-45 LAN Jack
- 1 SPDIF output (1 x 3 pin) with housing
- 8 USB ports (Front USB header x 2 set; USB connector x 4 on rear IO)
- 3 ports with VIA 6306 PCI 1394 controller (2 ports on front; 1 port on rear)

**Audio**
➤ RealTek ALC655 6-channel audio

**IEEE1394**
➤ VIA VT6306

**LAN**
➤ VIA VT6103 LAN controller

**BIOS**
➤ The mainboard BIOS provides "Plug & Play" BIOS which detects the pe-
   ripheral devices and expansion cards of the board automatically.
➤ The mainboard provides a Desktop Management Interface (DMI) function
   which records your mainboard specifications.

**Dimension**
➤ ATX Form Factor: 9.6 in. (L)  x  8.85 in. (W)

**Mounting**
➤ 6 mounting holes

**Others**
➤ Suspend to RAM/Disk (S3/S4)
➤ PC2001 compliant
➤ WHQL HCT 11.0 compliant

# Mainboard Layout

Top : mouse
Bottom: keyboard

T:1394 port
B:USB ports

Top : LPT

Bottom:
COM A
VGA port

T: RJ45 LAN jack
B: USB ports

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

SOCKET 462

CPUFA1

Winbond
83697HF

BIOS

FDD1

ATX
Power Supply

JPW1

VIA
KM400/400A

DIMM 1

DIMM 2

IDE 1

IDE 2

VIA
VT6103

SYSFA1

AGP Slot

BATT
+

VIA
VT6306

PCI  Slot 1

J1

PCI  Slot 2

VIA
VT8235/8237

JBAT1
SW1
SW2

J1394_2

PCI  Slot 3

JUSB4
(reserved)

Codec

J1394_1  JCD1  JSP1

JFP1  JFP2  JCI1  JIR1

JAUD1

JUSB2    JUSB3

**MS-6734 v1.X M-ATX Mainboard**

**MAC address Label**
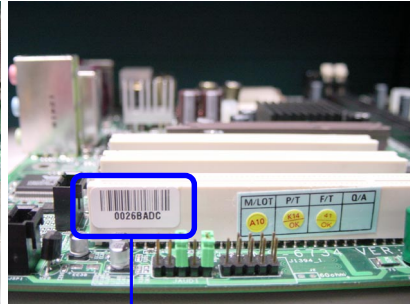
**1394 GUID address Label (optional)**

**MSI**

**MSI Reminds You...**

*1. Each board will be given a unique MAC address or/and 1394 GUID.*

*2. Both MAC address & 1394 GUID are unique from the manufacturer's default settings in the system BIOS.*

*3. Use the flash utility from MSI or Live Update from MSI's website for BIOS update. In case the MAC address or 1394 GUID is lost, enter the MAC address or 1394 GUID in the utility from MSI's website to recover the original one.*

*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.  Also, it 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

JPW1, *p.2-9*    CPU, *p.2-3*    CPUFA1, *p.2-18*

DDR DIMMs, *p.2-7*

CONN1, *p.2-9*

FDD1, *p.2-16*

Back Panel I/O, *p.2-10*

IDE1 IDE2, *p.2-17*

SYSFA1, *p.2-18*

J1, *p.2-25*

JBAT1, *p.2-26*

SW1/2, *p.2-27*

J1394_2, *p.2-22*

JAUD1, *p.2-20*

JIR1, *p.2-24*

J1394_1, *p.2-22*

JUSB1/2/3, *p.2-21*

JCI1, *p.2-24*

JCD1, *p.2-23*

JFP1 & JFP2, *p.2-19*

JSP1, *p.2-23*
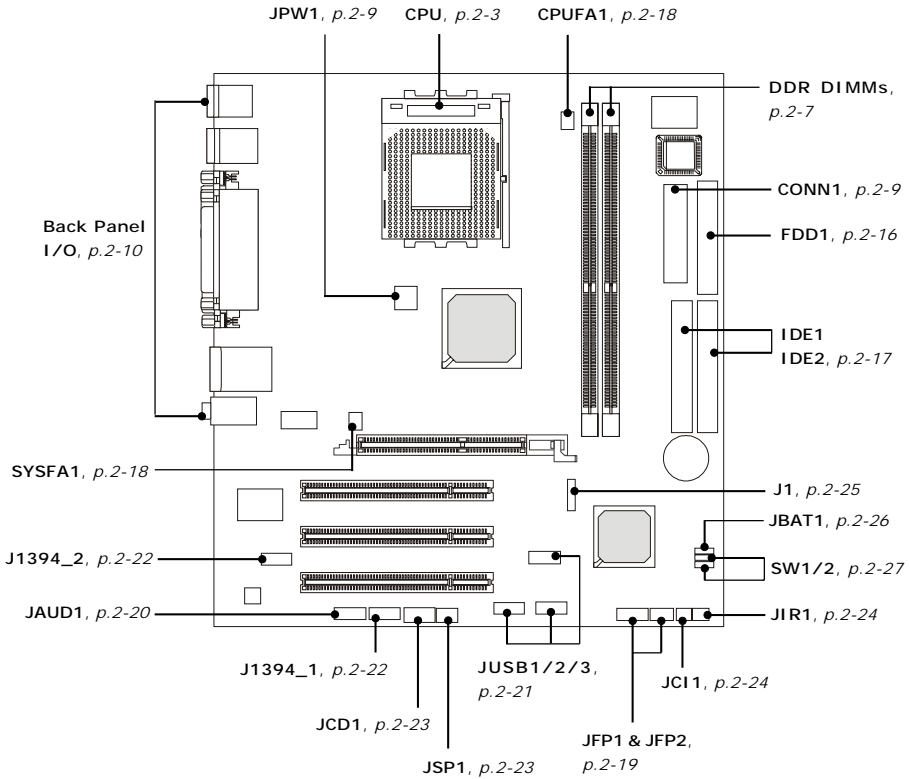
# Central Processing Unit: CPU

The mainboard supports AMD® Athlon™, Athlon™ XP and Duron™ processors in the 462 pin package. The mainboard uses a CPU socket called Socket A 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 | = | 14 |
| **then** | CPU core speed | = | Host Clock x Core/Bus ratio |
| | | = | 100MHz  x  14 |
| | | = | 1.4 GHz |

**STOP**

**WARNING!**   **Thermal Issue for CPU**

As processor technology pushes to faster speeds and higher performance, thermal management becomes increasingly crucial when building computer systems. Maintaining the proper thermal environment is key to reliable operation. As such, the processor must be maintained in the specified thermal requirements.

AMD Athlon™/Duron™/Athlon™ XP processor with a speed of **600MHz and above** requires a LARGER heatsink and fan. You also need to add thermal grease between the CPU and heatsink to improve heat dissipation. Then, make sure that the CPU and heatsink are securely fastened and in good contact with each other. These are needed to prevent damaging the processor and ensuring reliable operation. If you want to get more information on the proper cooling, you can visit AMD's website for reference.

## CPU Installation Procedures for Socket 462

*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

Gold arrow    Correct CPU placement

O

Gold arrow    Incorrect CPU placement

X

Press down the CPU

Close Lever
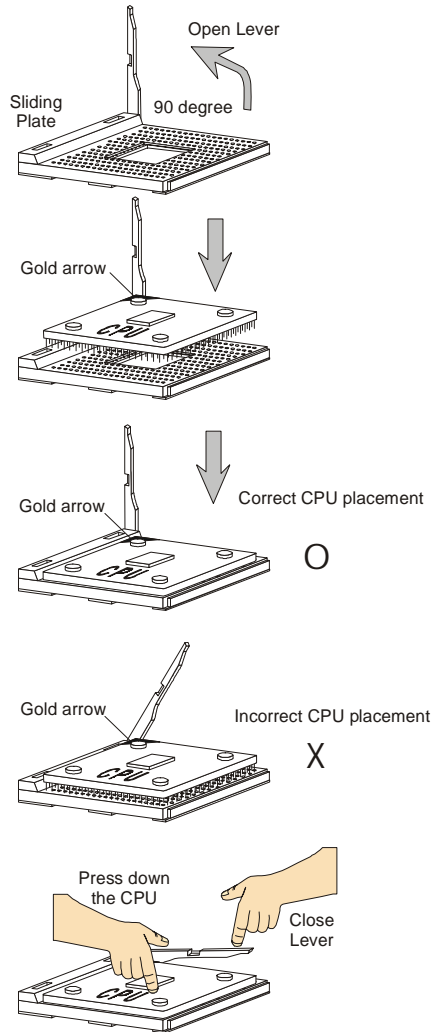
## Installing AMD Athlon CPU (Socket 462) Cooler Set

The following instructions will guide
you through the heat sink installation
procedures.  Please consult your agent
for the proper CPU cooler set.

Apply some heat
sink paste

1. Position your CPU cooler set onto
   the CPU.

2. Use one end of the clip to hook
   the latch of the CPU sliding plate.

3. Hook the other latch to fix the
   cooling fan set. You may need a
   screw drive to press down the
   other side of the clip.

4. Connect the fan to the power sup-
   ply connector provided on your
   mainboard.

MSI
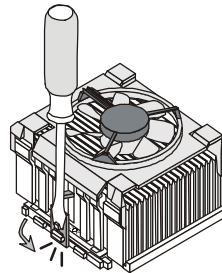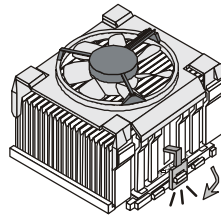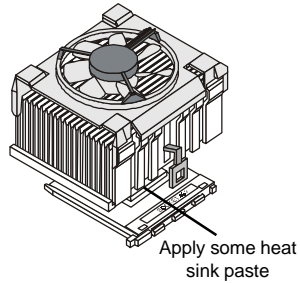
**MSI Reminds You...**
*Please apply some heat sink paste on top of your CPU to*
*dissipate the heat more effectively.*

## CPU Clock Frequency Selection through BIOS

The hardware configuration for CPU clock frequency of the motherboard is set to 100MHz by default. Therefore, to make a 133MHz CPU run at 133MHz when it is installed on the board, you have to adjust the CPU clock frequency in the BIOS setup utility.

To set the clock frequency for the installed CPU, refer to *Frequency/ Voltage Control* in *Chapter 3. BIOS Setup*.

**MSI**

**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.*

*Overclocking*
*This motherboard is designed to support overclocking. However, please make sure your components are able to tolerate such abnormal setting, while doing overclocking. Any attempt to operate beyond product specifications is not recommended. **We do not guarantee the damages or risks caused by inadequate operation or beyond product specifications.***

# Memory

The mainboard provides 2 slots for 184-pin DDR SDRAM DIMM (Double In-Line Memory Module) modules and supports the memory size up to 2GB. You can install PC2700/DDR333, PC2100/DDR266 or PC1600/DDR200 modules on the DDR DIMM slots.



**DDR DIMM Slots
(DIMM1 & 2)**
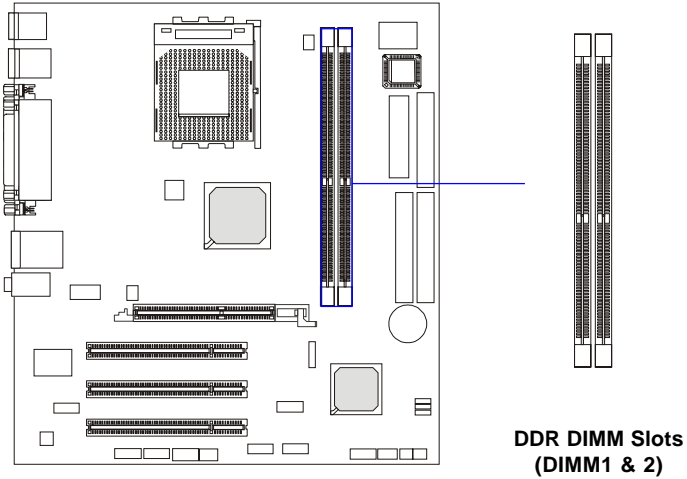
## Memory Speed/CPU FSB Support Matrix

**For KM400**

|  | DDR266 | DDR333 |
|---|---|---|
| FSB266 | V | V |
| FSB333 | V | V |

**For KM400A**

|  | DDR266 | DDR333 | DDR400 |
|---|---|---|---|
| FSB266 | V | V | X |
| FSB333 | V | V | X |
| FSB400 | V | V | V |

## DIMM Module Combination

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

Memory modules can be installed in any combination as follows:

| Slot | Memory Module | Total Memory |
|------|---------------|--------------|
| DIMM 1 (Bank 0 & 1) | DDR S/D | 64MB~1GB |
| DIMM 2 (Bank 2 & 3) | DDR S/D | 64MB~1GB |
| **Maximum System Memory Suppported** | | 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
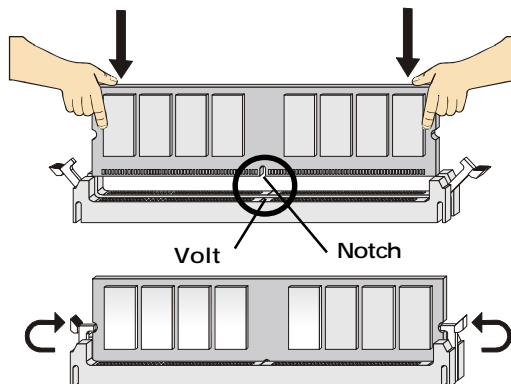
**MSI Reminds You...**
*You can barely see the golden finger if the module is properly inserted in the socket.*

# 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: CONN1

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.
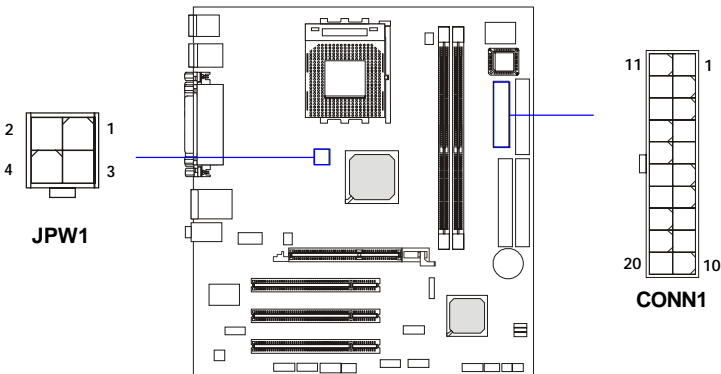
**JPW1 Pin Definition**

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

**CONN1 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**   **IEEE1394**   **Parallel**   **LAN**
(Optional)

**MIC**

**L-in**

**L-out**

**Keyboard**   **USB**   **COM**   **VGA**   **USB**
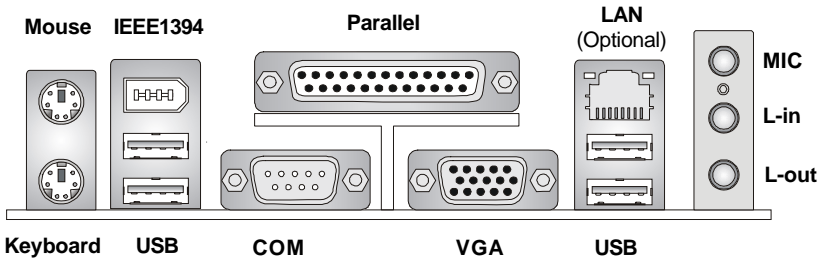
## Mouse Connector

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:
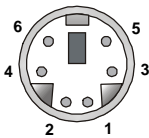
**PS/2 Mouse (6-pin Female)**

**Pin Definition**

| 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.
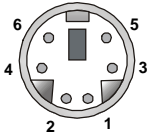
**Pin Definition**

**PS/2 Keyboard (6-pin Female)**

| 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 |

# USB Connectors

The mainboard provides a UHCI (Universal Host Controller Interface) Universal Serial Bus root for attaching USB devices such as keyboard, mouse or other USB-compatible devices. You can plug the USB device directly into the connector.
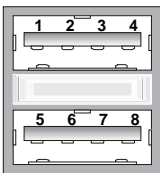
**USB Port Description**

**USB Ports**

| 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 |

## 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.
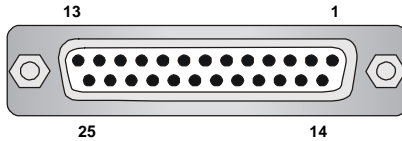


**Pin Definition**

| 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 | Paper End |
| 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 |

## Serial Port Connector: COM 1

The mainboard offers one 9-pin male DIN connector as serial port COM 1. The port is a 16550A high speed communication port that sends/receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

**Pin Definition**

1  2  3  4  5

6  7  8  9
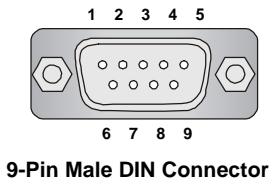
**9-Pin Male DIN Connector**

| 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 |

## RJ-45 LAN Jack (Optional)

The mainboard provides a RJ-45 connector that allows your computer to be connected to a network environment.

Activity
Indicators
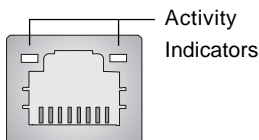
**LAN Jack**
(RJ-45)

| 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 |

## IEEE1394 Port

The back panel provides one standard IEEE 1394 port. The standard IEEE1394 port connects to IEEE1394 devices without external power. The IEEE1394 high-speed serial bus complements USB by providing enhanced PC connectivity for a wide range of devices, including consumer electronics audio/video (A/V) appliances, storage peripherals, other PCs, and portable devices.
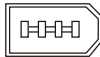
IEEE1394 Port

## VGA DB 15 Pin Connector

The DB 15-pin VGA connector is supplied for connection to a VGA monitor.
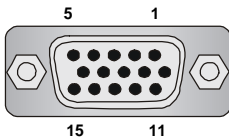
**Pin Definition**

**DB 15-Pin Female Connector**

| Analog Video Display Connector (DB-15S) | |
|---|---|
| PIN | SIGNAL DESCRIPTION |
| 1 | Red |
| 2 | Green |
| 3 | Blue |
| 4 | Not used |
| 5 | Ground |
| 6 | Ground |
| 7 | Ground |
| 8 | Ground |
| 9 | Power |
| 10 | Ground |
| 11 | Not used |
| 12 | SDA |
| 13 | Horizontal Sync |
| 14 | Vertical Sync |
| 15 | SCL |

## 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**
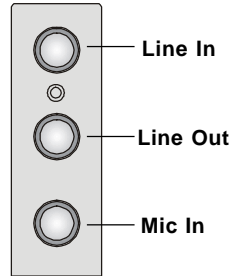
**MSI Reminds You...**
*For advanced audio application, **RealTek ALC655 audio chip is provided as an option** to offer support for **6-channel audio operation** and can turn rear audio connectors from 2-channel to 4-/6-channel audio. For more information on **6-channel audio operation**, please refer to Appendix. Using 4- or 6-Channel Audio Function.*

# **Connectors**

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



**FDD1**
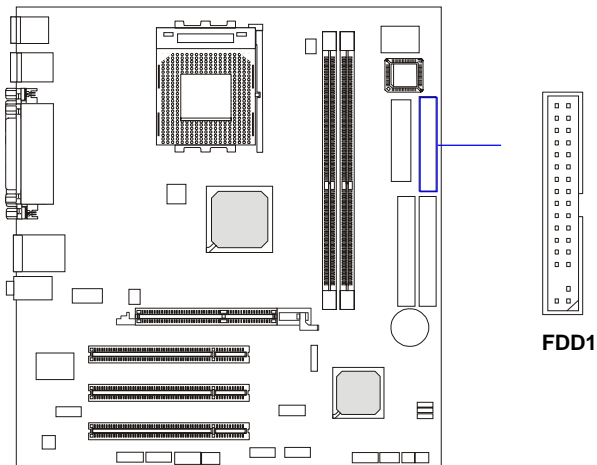
## Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 33/66/100/133 function. You can connect up to four hard disk drives, CD-ROM, 120MB Floppy (reserved for future BIOS) and other devices.
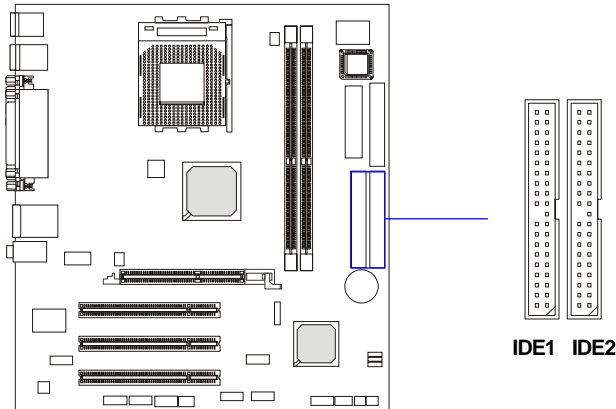


IDE1  IDE2

**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.*

## Fan Power Connectors: CPUFA1/SYSFA1

The CPUFA1 (processor fan) and SYSFA1 (system fan) support system cooling fan with +12V. It supports 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.



GND
+12V
SENSOR

**CPUFA1**

GND
+12V
SENSOR

**SYSFA1**

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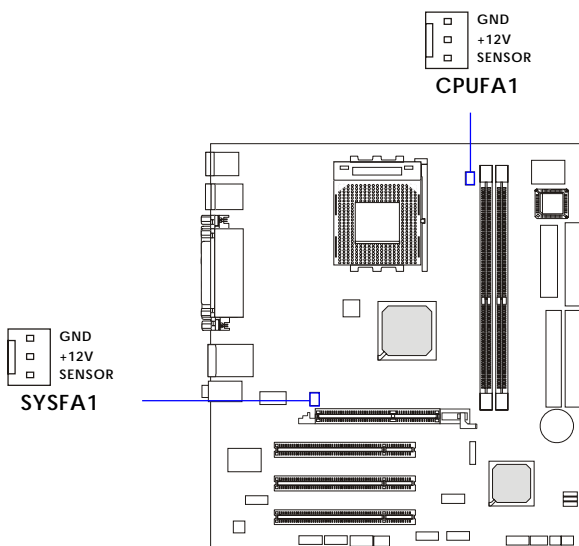
**MSI Reminds You...**

*1. Always consult the vendors for proper CPU cooling fan.*
*2. CPUFA1 supports the fan control. You can install the PC Alert utility that will automatically control the CPU fan speed according to the actual CPU temperature.*

# Front Panel Connectors: JFP1 & JFP2

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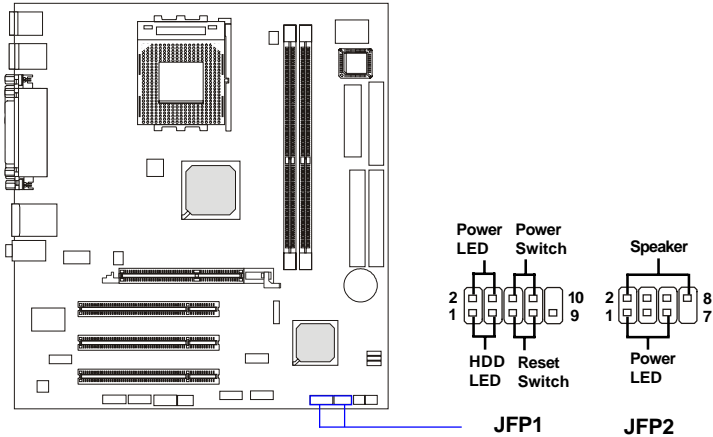


**JFP1 Pin Definition**

| 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. |

**JFP2 Pin Definition**

| PIN | SIGNAL | PIN | SIGNAL |
|-----|--------|-----|--------|
| 1 | GND | 2 | SPK- |
| 3 | SLED | 4 | BUZ+ |
| 5 | PLED | 6 | BUZ- |
| 7 | NC | 8 | SPK+ |

## Front Panel Audio Connector: JAUD1

The JAUD1 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.
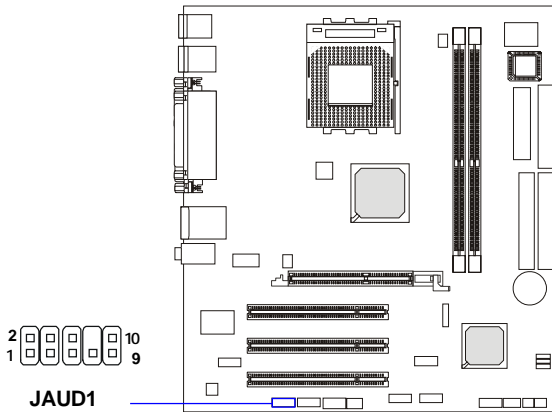


**JAUD1 Pin Definition**

| PIN | SIGNAL | PIN | SIGNAL |
|-----|--------|-----|--------|
| 1 | MIC | 6 | Front Next (R) |
| 2 | GND | 7 | NC |
| 3 | NC | 8 | (No Pin) |
| 4 | +5V | 9 | Front Line Out (L) |
| 5 | Front Line Out (R) | 10 | Front Next (L) |

**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.*
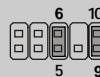
## Front USB Connectors: JUSB2, JUSB3 & JUSB4(reserved)

The mainboard provides two USB 2.0 pin headers *JUSB2/3* that are compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.



**JUSB4
(reserved)**

**JUSB2/JUSB3**
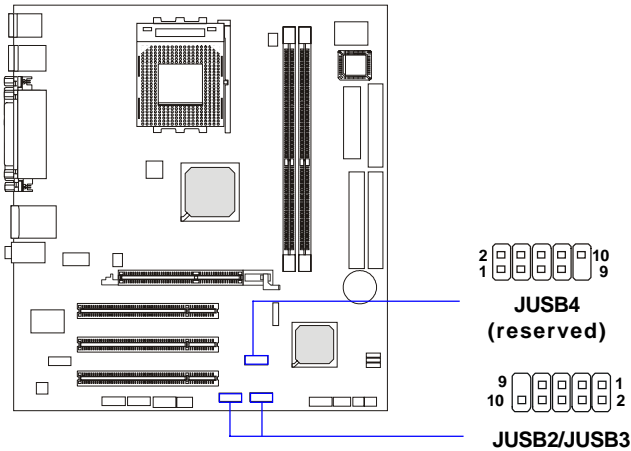
**Pin Definition**

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

Connected to JUSB2
or JUSB3

**USB 2.0 Bracket**
(Optional)

# IEEE 1394 Connectors: J1394_1 & J1394_2

The mainboard provides two 1394 pin headers that allow you to con-nect optional IEEE 1394 ports.



**9** **1**
**10** **2**

**J1394_2**

**9** **1**
**10** **2**

**J1394_1**
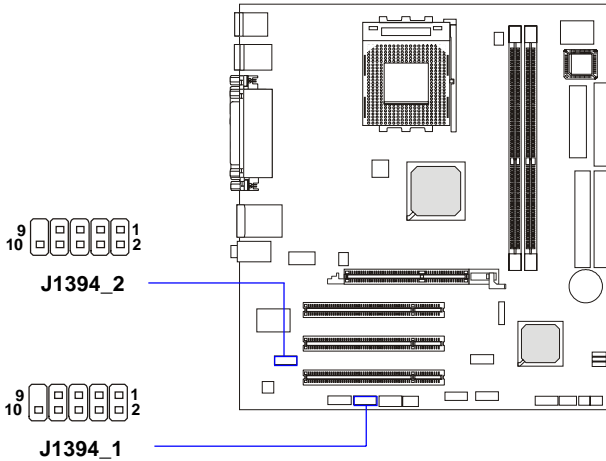
**Pin Definition**

| 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 |

**IEEE1394 Bracket (Optional)**



Foolproof
Design

## CD-In Connector: JCD1

The connector is for CD-ROM audio connector.

## SPDIF-Out Connector: JSP1

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



R — L          VCC — GND

GND          SPDIF

**JCD1**          **JSP1**

Connected to JSP1

**SPDIF Bracket (optional)**
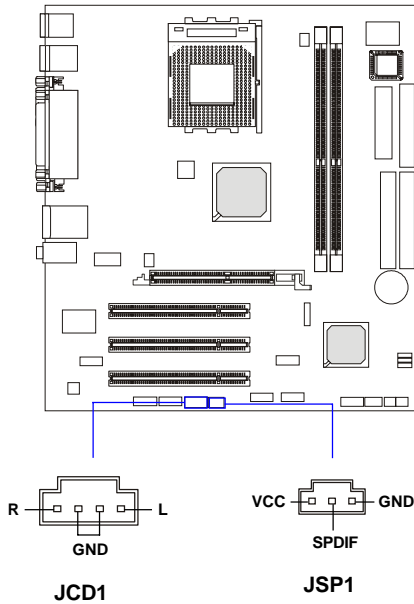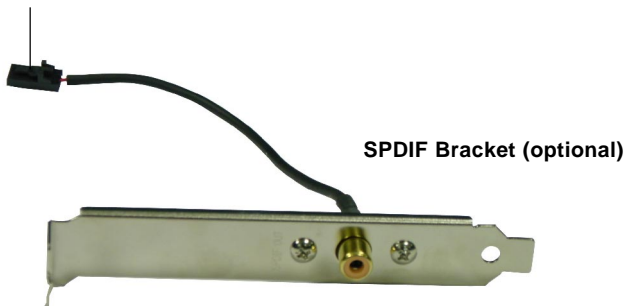
## IrDA Infrared Module Header: JIR1

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

**JIR1 Pin Definition**

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

5 1
6 2

**JIR1**
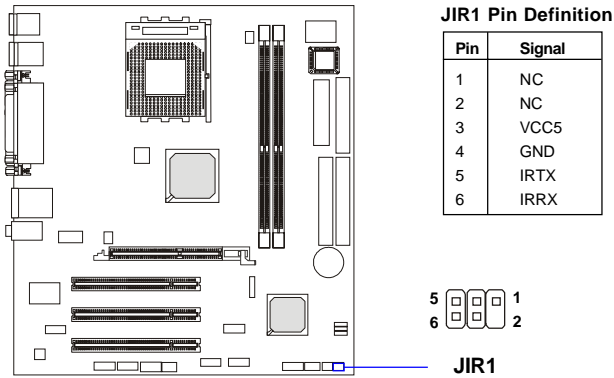
## Chassis Intrusion Switch Connector: JCI1

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

CINTRU 1
GND 2

**JCI1**
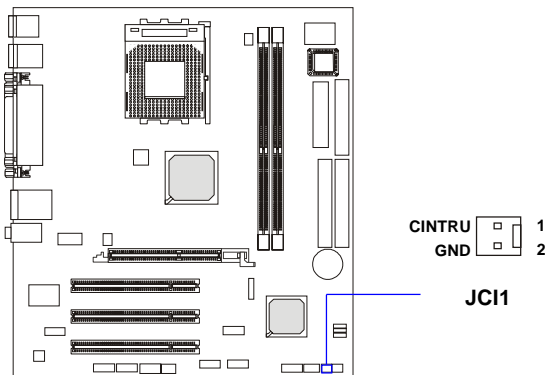
## SM Bus Connector: J1

The mainboard provides one I2C (also known as I²C) Bus connector for users to connect to System Management Bus (SMBus) interface.



**J1 Pin Definition**

| PIN | SIGNAL |
|-----|--------|
| 1 | SMBDATA |
| 2 | SMBCLK |
| 3 | INT# (reserved) |
| 4 | Cut pin |
| 5 | PWR OK |

**J1**
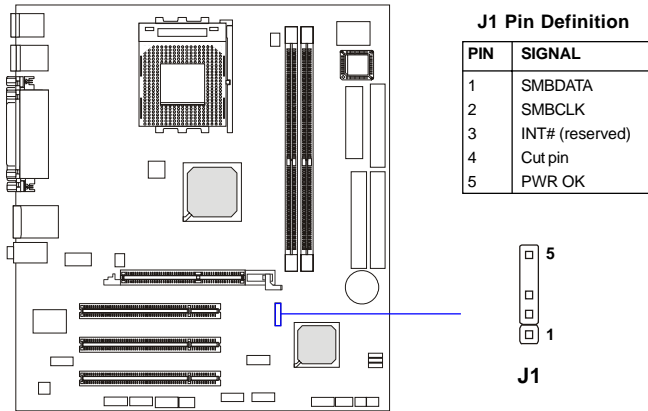
# Jumpers

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:



**3  1**       **3  1**

Clear Data    Keep Data

**3** ▢ ▢▢ **1**

**JBAT1**
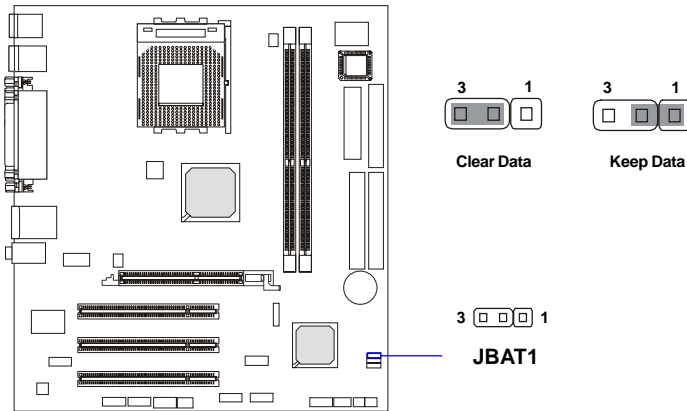
**MSI Reminds You...**
*You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.*

## CPU Frequency Jumpers: SW1 & SW2

These jumpers allow you to set the CPU frequency.



3 ☐ ☐☐ 1

SW1 & SW2

**3      1**

**Short PIN#2-3**

**3      1**
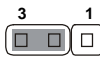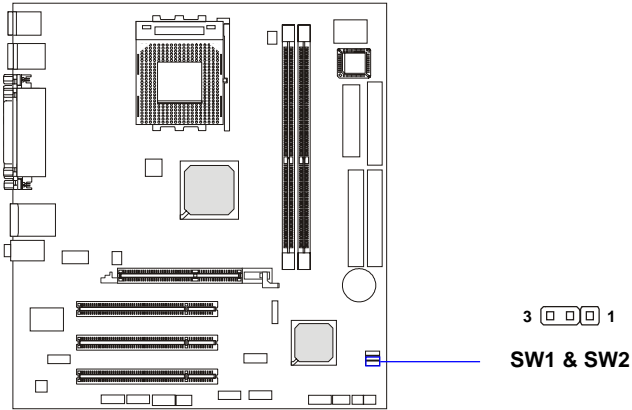
**Short PIN#1-2**

| CPU Frequency | SW1 | SW2 |
|---------------|-----|-----|
| 166MHz | 2-3 | 1-2 |
| 133MHz | 1-2 | 1-2 |
| 100MHz | 1-2 | 2-3 |

# Slots

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



**AGP Slot**

**PCI Slots**
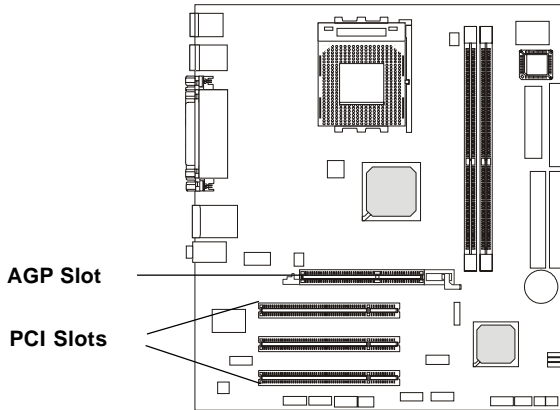
## AGP (Accelerated Graphics Port) Slot

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. The mainboard supports 4x/8x 1.5V AGP card.

## 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.

## PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor.

The PCI IRQ pins are typically connected to the PCI bus 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 - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features       ▶ Frequency/Voltage Control

   ▶ Advanced BIOS Features         Load Fail-Safe Defaults

   ▶ Advanced Chipset Features      Load Optimized 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 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 Fail-Safe Defaults**
Use this menu to load the BIOS values for the best system performance, but the system stability may be affected.

**Load Optimized 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 - AwardBIOS CMOS Setup Utility
                            Standard CMOS Features
┌─────────────────────────────────────────────────┬──────────────────────────┐
│  Date (mm:dd:yy)            Thu, May 22 2003      │       Item Help          │
│  Time (hh:mm:ss)            16 : 35 : 56          ├──────────────────────────┤
│                                                   │  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.]      │                          │
│  Drive B                    [None]                │                          │
│                                                   │                          │
│  Video                      [EGA/VGA]             │                          │
│  Halt On                    [All , But Keyboard]  │                          │
│                                                   │                          │
│  Base Memory                640K                  │                          │
│  Extended Memory            65472K                │                          │
│  Total Memory               1024K                 │                          │
│                                                   │                          │
├─────────────────────────────────────────────────┴──────────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
│    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized 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:/B:**
This item allows you to set the type of floppy drives installed. Available options: *None*, *360K 5.25, 1.2 MB 5.25*, *720 KB 3.5*, *1.44 MB 3.5* and *2.88 MB 3.5*.

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

**Base/Extended/Total Memory**
The three items show the memory status of your system (read only).

# Advanced BIOS Features

```
             Phoenix - AwardBIOS CMOS Setup Utility
                   Advanced BIOS Features
   Quick Boot               [Enabled]          ┌──────────────────┐
   Anti-Virus Protection    [Disabled]         │     Item Help     │
 ▶ Boot Sequence            [Press Enter]       ├──────────────────┤
   CPU Internal Cache       [Enabled]           │ Menu Level   ▶   │
   External Cache           [Enabled]           │                  │
   CPU L2 Cache ECC Checking [Enabled]          │ Allows the system to│
   Swap Floppy              [Disabled]          │ skip certain tests│
   Seek Floppy              [Disabled]          │ while booting. This│
   Boot Up NumLock Status   [On]                │ will decrease the time│
   Typematic Rate Setting   [Disabled]          │ needed to boot the│
 x Typematic Rate (Chars/Sec) 6                 │ system            │
 x Typematic Delay (Msec)    250                │                  │
   Security Option          [Setup]             │                  │
   APIC Mode                [Enabled]           │                  │
   MPS Table Version        [1.4]               │                  │
   HDD S.M.A.R.T. Capability [Disabled]         │                  │
                                                └──────────────────┘
 ↑↓++:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```

**Quick Boot**

Setting the item to *Enabled* allows the system to boot within 5 seconds since it will skip some check items.  Available options: *Enabled*, *Disabled*.

**Anti-Virus Protection**

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*.

**Boot Sequence**

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. The settings are:

| | |
|---|---|
| *Floppy* | The system will boot from floppy drive. |
| *LS120* | The system will boot from LS-120 drive. |
| *HDD-0* | The system will boot from the first HDD. |
| *SCSI* | The system will boot from the SCSI. |
| *CDROM* | The system will boot from the CD-ROM. |
| *HDD-1* | The system will boot from the second HDD. |
| *HDD-2* | The system will boot from the third HDD. |
| *HDD-3* | The system will boot from the fourth HDD. |
| *ZIP100* | The system will boot from ATAPI ZIP drive. |

> | *USB-FDD* | The system will boot from USB-interfaced floppy drive. |
> | *USB-ZIP* | The system will boot from any USB-interfaced ATAPI ZIP drive |
> | *USB-CDROM* | The system will boot from the USB-interfaced CD-ROM. |
> | *USB-HDD* | The system will boot from the USB-interfaced HDD. |
> | *LAN* | The system will boot from the Network drive. |
> | *Disabled* | Disable this sequence. |

**Boot Other Device**
Setting the option to *Enabled* allows the system to try to boot from other devices if the system fails to boot from the 1st/2nd/3rd boot device. Settings: *Enabled, Disabled*.

**MSI**

**MSI Reminds You...**
*Available settings for "1st/2nd/3rd Boot Device" vary depending on the bootable devices you have installed. For example, if you did not install a floppy drive, the setting "Floppy" does not show up.*

**CPU Internal Cache & External Cache**
The item allows you to turn on or off CPU's internal (L1) and external (L2) cache. Settings: *Enabled* and *Disabled*.

**CPU L2 Cache ECC Checking**
This setting allows you to enable or disable the ECC (Error-Correcting Code) feature for error detection and correction when data passes through L2 cache memory. Setting options: *Enabled*, *Disabled*.

**SwapFloppy**
Setting to *Enabled* will swap floppy drives A: and B:.

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

**Boot Up NumLock Status**
This setting is to set the Num Lock status when the system is powered on. Setting to *On* will turn on the Num Lock key when the system is powered on. Setting to *Off* will allow users to use the arrow keys on the numeric keypad.

Setting options: *On*, *Off*.

**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. |

**APICMode**
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 Table Version**
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system. Settings: *1.4*, *1.1*.

**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 opportunity 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*.

# Advanced Chipset Features
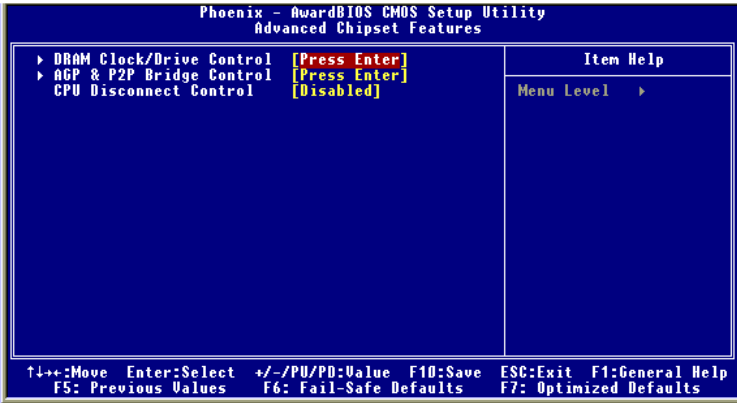


**MSI Reminds You...**
*Change these settings only if you are familiar with the chipset.*

**DRAM Clock/Drive Control**
Press <Enter> and the following sub-menu appears.
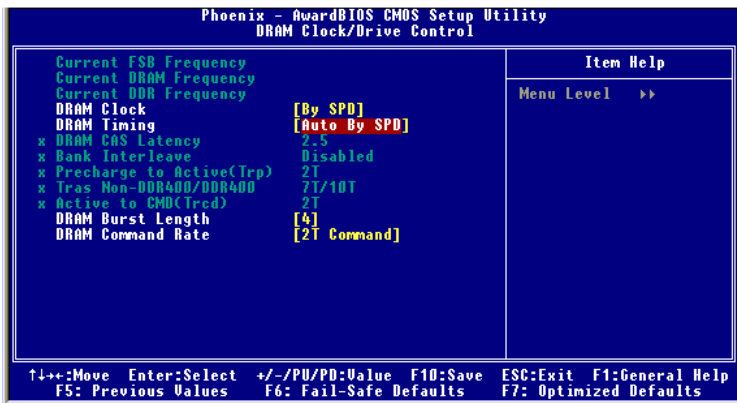
**Current FSB/DRAM/DDR Frequency**
These items show the current FSB/DRAM/DDR frequency. (read only)

**DRAM Clock**
This item is used to configure the clock frequency of the installed DRAM. Settings: *By SPD, 100MHz, 133MHz, 166MHz.*

**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. Options: By SPD, Manual, Turbo, Ultra.

**DRAM CAS Latency**
When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. The settings are: *1.5, 2, 2.5, 3*.

**Bank Interleave**
This field selects 2-bank or 4-bank interleave for the installed SDRAM. Disable the function if 16MB SDRAM is installed. Settings: *Disabled*, *2 Bank* and *4 Bank*.

**Precharge To Active (tRP)**
This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refresh may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Available settings: *2T, 3T*.

**Trans Non-DDR400/DDR400**
This controls the timing delay (in clock cycles) before non-DDR400 and DDR400 starts a write command after receiving it. Settings: *6T/8T, 7T/10T, 5T/6T, 8T/12T*. 12T increases the delay time while 5T provides the least timing delay. This option is effective only if DDR400 is running.

**Active to CMD (Trcd)**
When DRAM is refreshed, both rows and columns are addressed

separately.  This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe).  The less the clock cycles, the faster the DRAM performance.  Setting options: *2T, 3T*.

**DRAM Burst Length**

This setting allows you to set the size of Burst-Length for DRAM.  Bursting feature is a technique that DRAM itself predicts the address of the next memory location to be accessed after the first address is accessed.  To use the feature, you need to define the burst length, which is the actual length of burst plus the starting address and allows internal address counter to properly generate the next memory location.  The bigger the size, the faster the DRAM performance.  Settings: *4*, *8*.

**DRAM Command Rate**

This setting controls the SDRAM command rate.  Selecting *1T* allows SDRAM signal controller to run at 1T (T=clock cycles) rate.  Selecting *2T* makes SDRAM signal controller run at 2T rate.  *1T* is faster than *2T*.  Setting options: *1T Command, 2T Command.*

## AGP & P2P Bridge Control

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

```
          Phoenix - AwardBIOS CMOS Setup Utility
                  AGP & P2P Bridge Control

   AGP Aperture Size      [128M]              ┌─────────────────┐
   AGP Mode               [4X]                │    Item Help    │
   AGP Driving Control    [Auto]              ├─────────────────┤
 x AGP Driving Value       DA                 │ Menu Level   ▶▶ │
   AGP Fast Write         [Disabled]          │                 │
   AGP 3.0 Calibration cycle [Enabled]        │                 │
   VGA Share Memory Size  [32M]               │                 │




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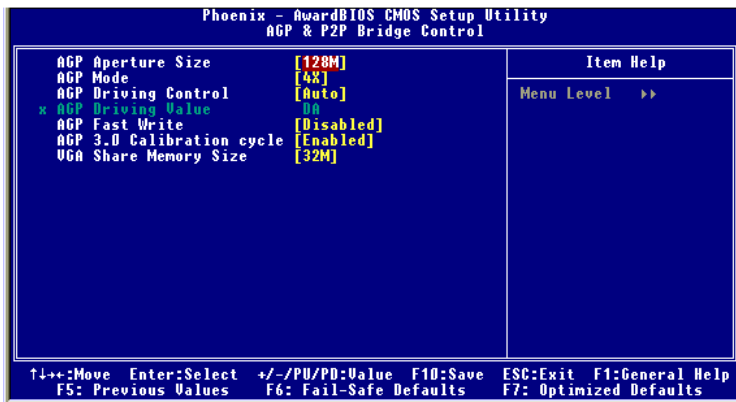
**AGP Aperture Size**

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 *4MB, 8MB, 16MB, 32MB, 64MB, 128MB, 256MB, 512MB and 1G*.

**AGP Mode**
The item sets an appropriate mode for the installed AGP card. Setting options: *1x*, *2x*, *4x*. Select *4x* only if your AGP card supports it.

**AGP Driving Control**
This field is used to adjust the AGP driving force. Selecting *Manual* allows you to select an AGP driving force in AGP Driving Value. It is strongly suggested to select *Auto* to avoid causing any system error.

**AGP Driving Value**
This item specifies an AGP driving force.

**AGP Fast Write**
This option enables or disables the AGP Fast Write feature. The Fast Write technology allows the CPU to write directly to the graphics card without passing anything through the system memory and improves the AGP 4X speed. Select *Enabled* only when your AGP card supports the feature. Options: *Disabled, Enabled*.

**AGP 3.0 Calibration cycle**
This setting disables/enables the AGP auto calibration. Setting options: *Disabled*, *Enabled*.

**VGA Share Memory Size**
The system shares memory to the onboard VGA card. This setting controls the exact memory size shared to the VGA card. Setting options: *16MB, 32MB, 64MB*.

**CPU Disconnect Control**
The item is to reduce the power consumption of the AMD K7 system. When set to *Enabled*, the processor is allowed to disconnect the s2k interface when the AMD k7 system is in some power saving states. Options: *Enabled, Disabled.*

# Integrated Peripherals

```
              Phoenix - AwardBIOS CMOS Setup Utility
                       Integrated Peripherals
   Onboard 1394 Chip          [Enabled]          ┌─────────────────┐
 ▶ VIA OnChip IDE Device      [Press Enter]      │    Item Help    │
 ▶ VIA OnChip PCI Device      [Press Enter]      │                 │
 ▶ SuperIO Device             [Press Enter]      │ Menu Level   ▶  │
   Init Display First         [PCI Slot]         │                 │


 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5: Previous Values   F6: Fail-Safe Defaults  F7: Optimized Defaults
```
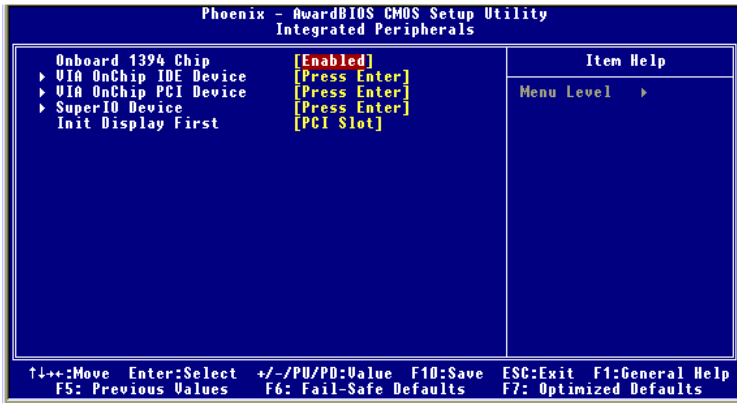
**Onboard 1394 Chip (optional)**
This item allows you to enable/disable the onboard IEEE1394 controller.  Setting options: *Enabled* and *Disabled*.

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

```
              Phoenix - AwardBIOS CMOS Setup Utility
                       VIA OnChip IDE Device
   IDE DMA transfer access    [Enabled]          ┌─────────────────┐
   OnChip IDE Channel0        [Enabled]          │    Item Help    │
   OnChip IDE Channel1        [Enabled]          │                 │
   Primary Master    PIO      [Auto]             │ Menu Level   ▶▶ │
   Primary Slave     PIO      [Auto]             │                 │
   Secondary Master  PIO      [Auto]             │                 │
   Secondary Slave   PIO      [Auto]             │                 │
   Primary Master    UDMA     [Auto]             │                 │
   Primary Slave     UDMA     [Auto]             │                 │
   Secondary Master  UDMA     [Auto]             │                 │
   Secondary Slave   UDMA     [Auto]             │                 │


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

**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 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**

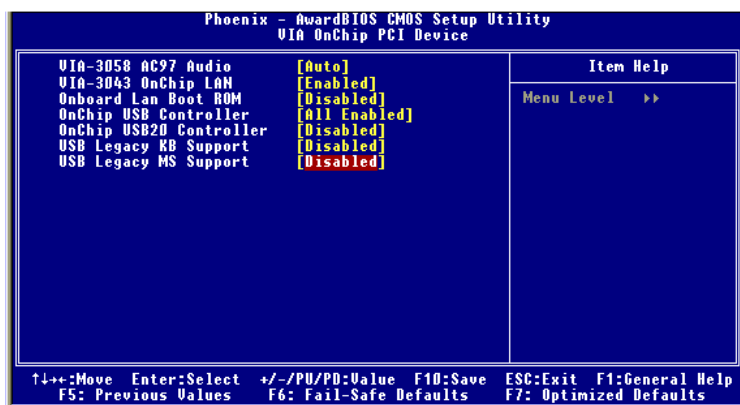Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, Ultra DMA/66 and Ultra DMA/100 select Auto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

## VIA OnChip PCI Device

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

```
                Phoenix - AwardBIOS CMOS Setup Utility
                        VIA OnChip PCI Device

   VIA-3058 AC97 Audio        [Auto]              ┌─────────────────┐
   VIA-3043 OnChip LAN        [Enabled]           │   Item Help     │
   Onboard Lan Boot ROM       [Disabled]          │                 │
   OnChip USB Controller      [All Enabled]       │ Menu Level   ▶▶ │
   OnChip USB20 Controller    [Disabled]          │                 │
   USB Legacy KB Support      [Disabled]          │                 │
   USB Legacy MS Support      [Disabled]          │                 │
                                                  │                 │
                                                  │                 │
                                                  │                 │
                                                  │                 │
                                                  │                 │
                                                  │                 │
                                                  │                 │
                                                  │                 │
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values     F6: Fail-Safe Defaults   F7: Optimized Defaults
```

**VIA-3058 AC97 Audio**
*Auto* allows the motherboard's BIOS to detect whether you're using any audio device. If so, the onboard audio controller will be enabled. If not, the onboard audio controller will be disabled. If you want to use different controller cards to connect audio connectors, set the field to *Disabled*. Setting options: *Disabled, Auto*.

**VIA-3043 OnChip LAN**
Setting to [Auto] allows the BIOS to auto-detect the LAN controller and enable it. Setting options: *Auto* and *Disabled*.

**Onboard Lan Boot ROM**
The item enables or disables the initialization of the onboard LAN Boot ROM during bootup. Selecting *Disabled* will speed up the boot process.

**OnChip USB Controller**
This setting is used to enable/disable the onboard USB1.1 controller. Setting options: *Disabled*, *Enabled*.
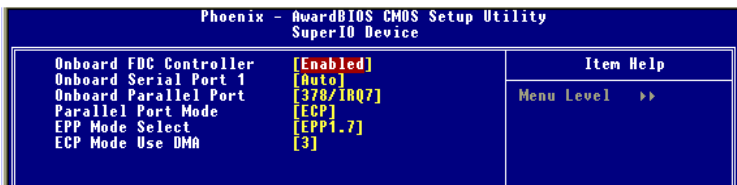
**OnChip USB2.0 Controller**
This setting is used to enable/disable the onboard USB2.0 controller. Setting options: *Disabled*, *Enabled*.

**USB Legacy Keyboard/MS Support**
Select *Enabled* if you need to use a keyboard/mouse in the operating system. Setting options: *Enabled, Disabled*.

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

**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 the first serial port. The
settings are: *3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto*.
directional transmission/reception is allowed. Under Half Duplex mode,
only asynchronous, bi-directional transmission/reception is allowed.

**Onboard Parallel Port**
There is a built-in parallel port on the on-board Super I/O chipset that
provides Standard, ECP, and EPP features. It has the following options:

> *Disabled*
> *3BC/IRQ7*    Line Printer port 0
> *278/IRQ5*    Line Printer port 2
> *378/IRQ7*    Line Printer port 1

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

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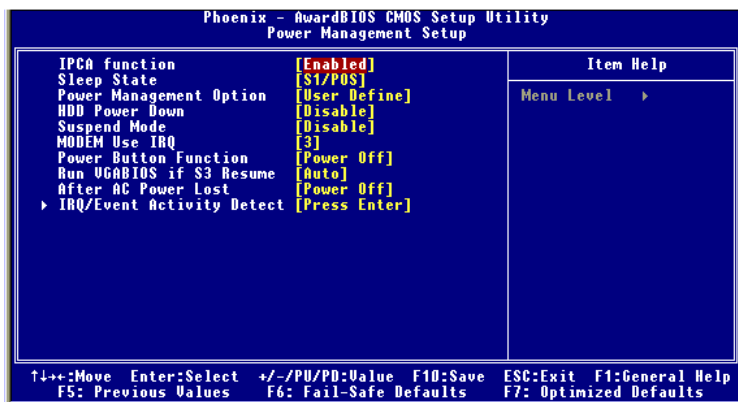
**ECP Mode Use DMA**
The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature.  After selecting it, the following message will appear:   "ECP Mode Use DMA." At this time, the user can choose between DMA channel *3* or *1*.

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

# Power Management Setup

```
                Phoenix - AwardBIOS CMOS Setup Utility
                        Power Management Setup

   IPCA function              [Enabled]              Item Help
   Sleep State                [S1/POS]
   Power Management Option     [User Define]       Menu Level  ▶
   HDD Power Down             [Disable]
   Suspend Mode               [Disable]
   MODEM Use IRQ               [3]
   Power Button Function      [Power Off]
   Run VGABIOS if S3 Resume    [Auto]
   After AC Power Lost        [Power Off]
 ▶ IRQ/Event Activity Detect  [Press Enter]




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

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

**IPCA Function**

This item is to activate the ACPI (Advanced Configuration and Power Management Interface) function. If your operating system is ACPI-aware, such as Windows 98SE/2000/ME, select *Yes*. Available options: *Yes*, *No*.

**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.

**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**
If system activity is not detected for the length of time specified in this field, all devices except CPU will be shut off.  Settings: *Disabled, 1 Min, 2 Min, 4 Min, 8 Min, 10 Min, 20 Min, 30 Min, 40 Min, 1 Hour.*

**MODEM Use IRQ**
This determines the IRQ in which the MODEM can use.  Activity of the selected IRQ always awakens the system.   Settings: *3, 4, 5, 7, 9, 10, 11, NA..*

**Power Button Function**
This feature sets the function of the power button. Settings are:
> *Power Off*   The power button functions as normal  power off button.
> *Suspend*    When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

**Run VGABIOS if S3 Resume**
When *ACPI Suspend Mode* is set to S3 or S1&S3, users can select the options in this field.  Selecting [Yes] allows BIOS to call VGABIOS to initialize the VGA card when system wakes up (resumes) from S3 sleep state.  The system resume time is shortened when you disable the function, but system will need an AGP

driver to initialize the VGA card.  Therefore, if the AGP driver of the card does not support the initialization feature, the display may work abnormally or not function after resuming form S3.  Options: *Auto, Yes, No.*

**After AC Power Lost**
This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

|  |  |
|---|---|
| *Power Off* | Leaves the computer in the power off state. |
| *Power On* | Leaves the computer in the power on state. |
| *Last State* | Restores the system to the previous status before power failure or interrupt occurred. |

**IRQ/Event Activity Detect**
Press <Enter> and the following sub-menu appears.
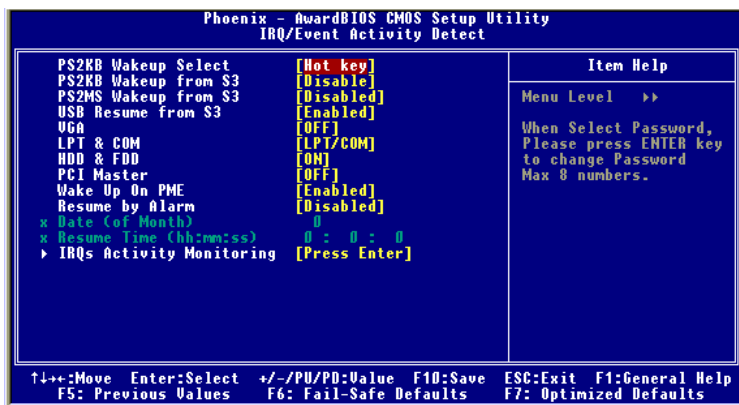


**PS2KB Wakeup Select**
The item specify how the system will be awakened from power saving mode when input signal of the keyboard is detected.  If set to *Hot Key*, it allows you to select the options in PS2 KB Wake UP from S3.  If set to *Password*, please press <Enter> to input password and its maximum password is 8 numbers.  Options are: *Hot Key, Password.*

**PS2KB Wake Up from S3**

This setting allows you to enter "Hot Key" (max. 8 numbers) to wake up the system from S3 state. Settings are: *Disable, Ctrl+F1~Ctrl+F12, Power, Wake, Any Key*.

**PS2MS Wake Up from S3**

This setting allows the activity of the mouse to wake up the system from S3 state. Settings are: *Enabled* and *Disabled*.

**USB Resume from S3**

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*.

**VGA, LPT & COM, HDD & FDD, PCI Master**

These fields specify whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected.

**Wake Up On PME**

When set to *Enabled*, the feature allows your system to be awakened from the power saving modes through any event on PME (Power Management Event). Settings are: *Enabled* and *Disabled*.

**Resume By Alarm**

The field is used to enable or disable the feature of booting up the system on a scheduled time/date.

**Date(of Month) Alarm**

The field specifies the date for *Resume By RTC Alarm*. Settings: 0~31.

**Time(hh:mm:ss) Alarm**

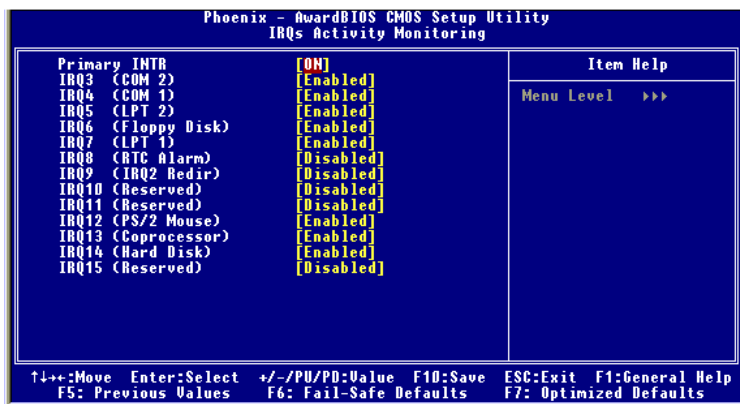The field specifies the time for *Resume By RTC Alarm*. Format is <hour><minute><second>.

**MSI Reminds You...**

MSI

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

```
          Phoenix - AwardBIOS CMOS Setup Utility
                 IRQs Activity Monitoring
  Primary INTR          [ON]                    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   F6: Fail-Safe Defaults   F7: Optimized Defaults
```

**Primary INTR**
Selecting *ON* will cause the system to wake up from power saving modes
if activity is detected from any enabled IRQ channels.  Settings: *ON, OFF*.

**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
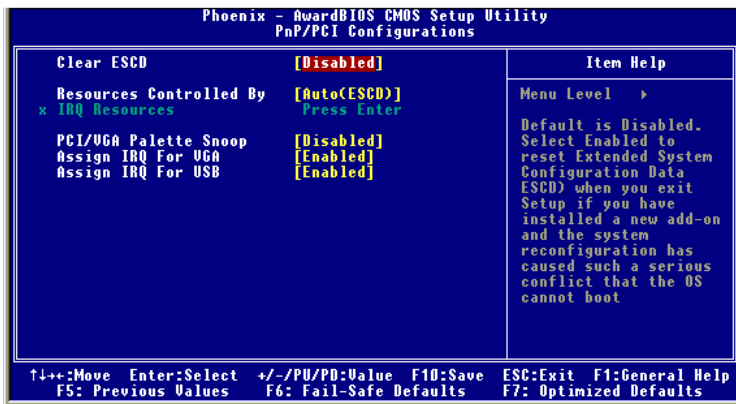system from entering power saving modes or awaken it from power saving modes.

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

# 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.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      PnP/PCI Configurations
  ┌──────────────────────────────────────┬───────────────────────┐
  │ Clear ESCD            [Disabled]      │      Item Help         │
  │                                       ├───────────────────────┤
  │ Resources Controlled By  [Auto(ESCD)] │ Menu Level   ▶         │
  │ x IRQ Resources       Press Enter     │                       │
  │                                       │ Default is Disabled.  │
  │ PCI/VGA Palette Snoop  [Disabled]     │ Select Enabled to     │
  │ Assign IRQ For VGA     [Enabled]      │ reset Extended System │
  │ Assign IRQ For USB     [Enabled]      │ 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 OS  │
  │                                       │ cannot boot           │
  │                                       │                       │
  ├───────────────────────────────────────┴───────────────────────┤
  │ ↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
  │    F5: Previous Values   F6: Fail-Safe Defaults   F7: Optimized Defaults     │
  └──────────────────────────────────────────────────────────────┘
```

**Clear ESCD**
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.*

# 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 - AwardBIOS CMOS Setup Utility
                          PC Health Status
 ┌──────────────────────────────────────────┬───────────────────────┐
 │ CPU Warning Temperature   [Disabled]      │      Item Help        │
 │ System Temperature                        │                       │
 │ CPU Temperature                           │  Menu Level    ▶      │
 │ System Fan Speed                          │                       │
 │ CPU Fan Speed                             │                       │
 │ Vcore                                     │                       │
 │ +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    F6: Fail-Safe Defaults   F7: Optimized 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 Temperature, System/CPU Fan Speed, Vcore, +3.3V, +5V, +12V, -12V, -5V, VBAT(V), 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**
When the processor reaches the preset temperature, the ACPI-aware system will be shut down. 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 - AwardBIOS CMOS Setup Utility
                 Frequency/Voltage Control
┌─────────────────────────────────────────┬─────────────────┐
│ Auto Detect DIMM/PCI Clk  [Enabled]      │    Item Help    │
│ Spread Spectrum           [+/-0.25%]     ├─────────────────┤
│                                          │ Menu Level   ▶  │
│                                          │                 │
│                                          │                 │
│                                          │                 │
│                                          │                 │
│                                          │                 │
│                                          │                 │
│                                          │                 │
│                                          │                 │
├──────────────────────────────────────────┴─────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│    F5: Previous Values     F6: Fail-Safe Defaults   F7: Optimized Defaults    │
└─────────────────────────────────────────────────────────────┘
```
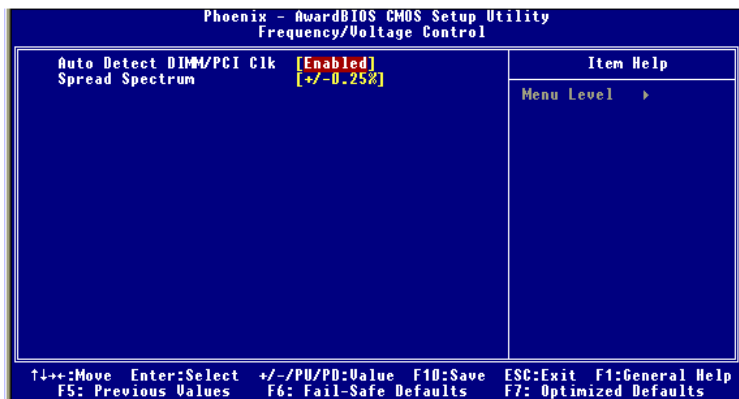
**Auto Detect DIMM/PCI Clk**
This option allows you to enable/disable the feature of auto detecting the clock frequency of the installed DIMM/PCI bus. The settings are: *Enabled, Disabled*.

**Spread Spectrum**
When the motherboard's clock generator pulses, the extreme values (spikes) of the pulses creates EMI (Electromagnetic Interference). The Spread Spectrum function reduces the EMI generated by modulating the pulses so that the spikes of the pulses are reduced to flatter curves. 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, activate the Spread Spectrum 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. Options: *Disabled, +/-0.25%, +/-0.35%, +/-0.50%, +/-0.75%*.

# Load Fail-Safe/Optimized Defaults

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

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

```
Load Fail-Safe Defaults (Y/N)? N
```

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

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

```
Load Optimized Defaults (Y/N)? N
```

Pressing *Y* loads the default factory settings for optimal 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: Using 4- or 6-Channel Audio Function*

The motherboard 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 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 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. (***Please note the screen below might be different depending on the different mainboard you purchased.)***

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



---

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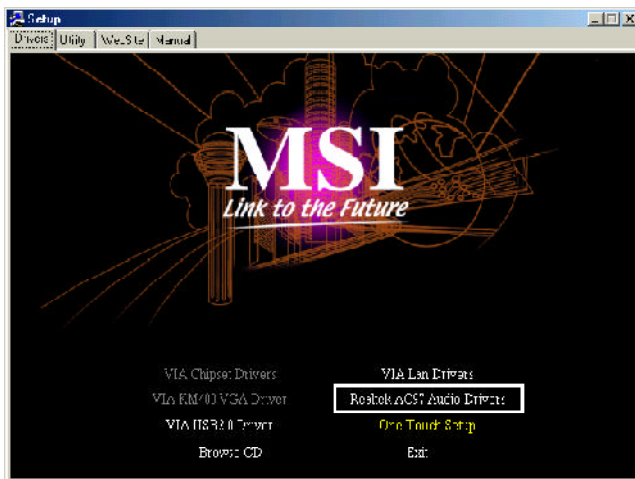
**MSI Reminds You...**

*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 start installing files into the system.
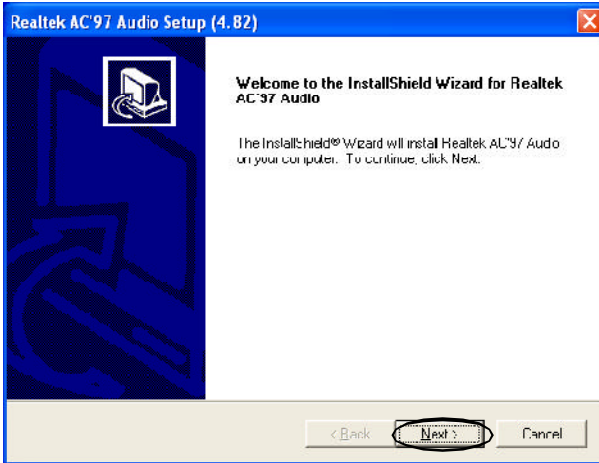


*4.* Click **Finish** to restart the system.



Select this
option
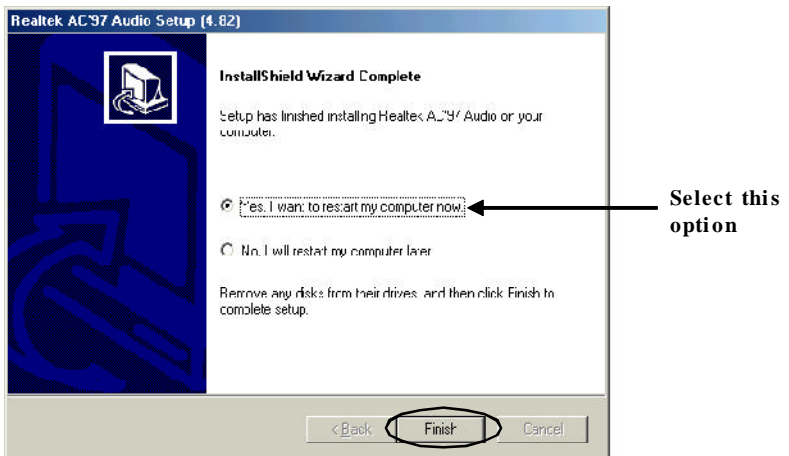
# Using 4- or 6-Channel Audio Function

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.

## Using the Back Panel

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.

### Configuration in the Software Utility

1.  Click the audio icon  from the window tray at the lower-right corner of the screen.
2.  Select a desired surround sound effect from the "Environment" drop-down menu.
3.  Click the **Speaker Configuration** tab.
4.  Select **Synchronize the phonejack switch with the settings**.
5.  Select a desired multi-channel operation from **No. of Speakers**.
    a.  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
6.  Click **OK** to close this window.
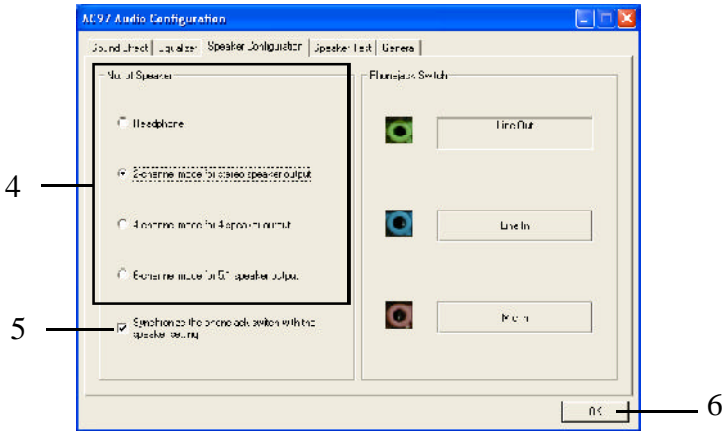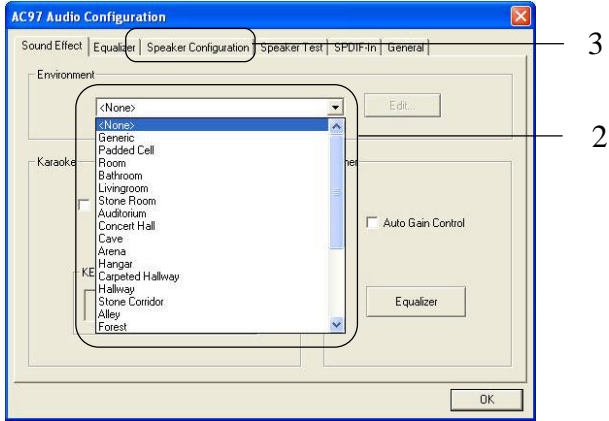
### Connecting the Speakers

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

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

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

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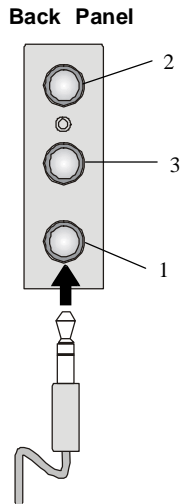
**Back Panel**

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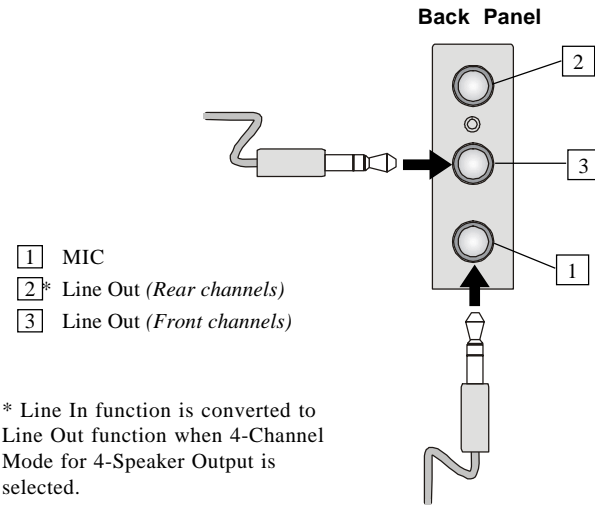
■ **6-Channel Mode for 6-Speaker Output**

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

**Back  Panel**

1  Line Out *(Center and Subwoofer channel)*
2 * Line Out *(Rear channels)*
3 * Line Out *(Front channels)*

\* Both Line In and MIC function are converted to Line Out function when 4-Channel Mode for 6-Speaker Output is selected.

---
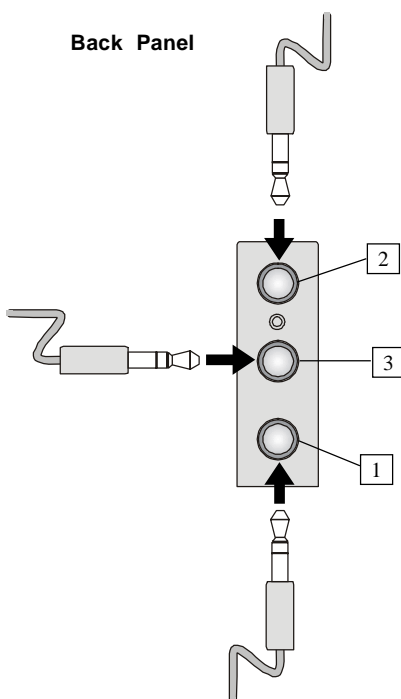
**MSI Reminds You...**

*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.*

# Testing the Connected Speakers

To ensure that 4- or 6-channel audio operation works properly, you may need to test each connected speaker to make sure every speaker work 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.

## Testing Each Speaker

1. Click the audio icon 🔊 from the window tray at the lower-right corner of the screen.
2. Click the **Speaker Test** tab.
3. The following window appears. Select the speaker which you want to test by clicking it.



Center

Front Right

Front Left

Rear Right

Rear Left

Subwoofer
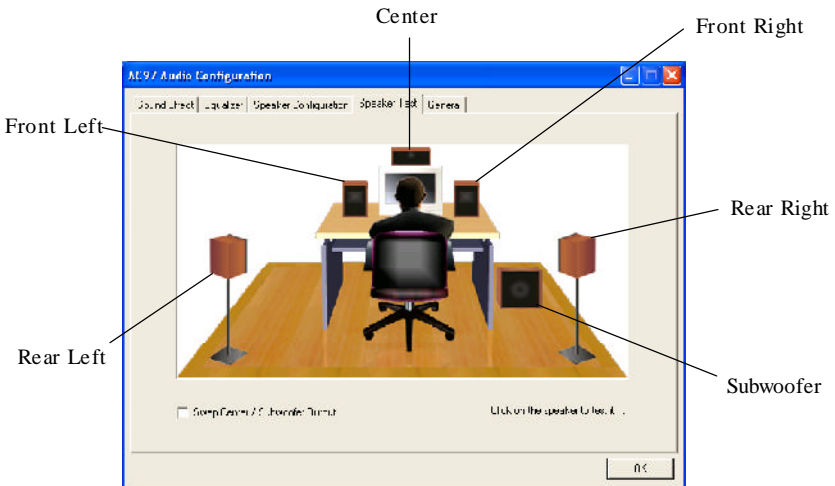
> **MSI Reminds You...**
> *6 speakers appear on the "Speaker Test" window only when you select "6-Channel Mode" in the "No. of Speakers" column. If you select "4-Channel Mode", only 4 speakers appear on the window.*

4. 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**.**
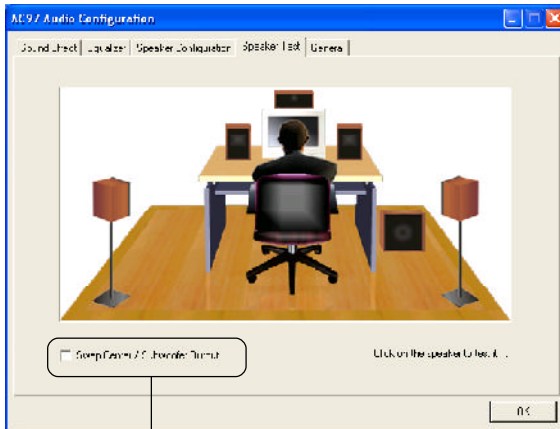


Select this function

# Playing KaraOK

The KaraOK function 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.

### Playing KaraOK

1. Click the audio icon ⊙ from the window tray at the lower-right corner of the screen.
2. In the Sound Effect tab, select **Voice Cancellation** under "KaraOK."
3. Click **OK** to close this window.
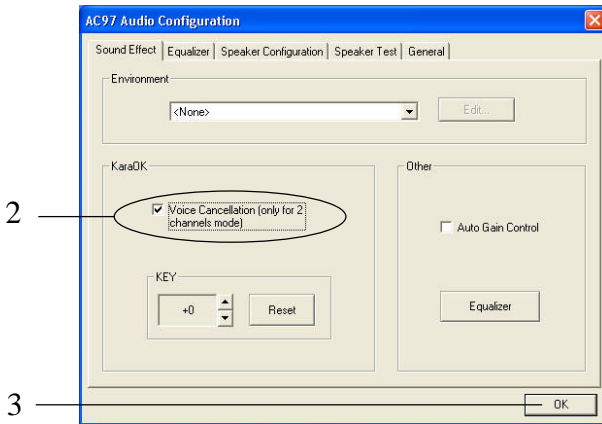
# *Troubleshooting*

**Q:** **How do I know that the product that I have is from MSI?**

**A:** All MSI product starts with the character MS-XXXX or Marketing Name (MS-XXXX) wherein XXXX refers to numbers. You should be able to find the Model number in between the PCI slots. For Example: MS-6368 or 845E Max (MS-6566E).

**Q:** **How do I identify the BIOS version?**

**A:** Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:

A6380MS V1.0 091096 where:

1st digit refers to BIOS maker as A = AMI(R) W = AWARD(R)

2nd - 5th digit refers to the model number.

6th - 7th digit refers to the customer as MS = all standard customers.

V1.0 refers to the BIOS version.

091096 refers to the date this BIOS is released.

**Q:** **Does BIOS update need to be done by one version sequentially (3.0-->3. 1-->3.2-->3.3) or can I update directly to the last version (3.3)?**

**A:** You can update directly to the latest one.

**Q:** **Should I update my BIOS, once a new BIOS is released?**

**A:** A new BIOS is usually released due to the following reasons:

    1. New function is supported

    2. New BIOS source code

    3. Bugs are found

    4. Customer-specific request

When we release a new BIOS, there's usually a release note attached which lists the reason for the release. Refer to this release note and

decide for yourself if upgrading to the new BIOS will be worth it. A word of advice, though, do not upgrade to the new BIOS, unless you really have to.

**Q:** **How can I update my BIOS?**

A: For **Award** BIOS, refer to http://www.msi.com.tw/html/support/bios/note/award.htm.

For **AMI** BIOS, refer to http://www.msi.com.tw/html/support/bios/note/ami.htm.

For user using non-FAT system, refer to http://www.msi.com.tw/html/support/bios/note/ntfs.htm.

**Q:** **After flashing the BIOS, my system for unknown reason don't want to boot, what should I do?**

A: Normally, this should not happen unless you flashed the wrong BIOS or some other reasons.

Suggestions:

    1. Try the BIOS boot recovery feature as described in http://www.msi.com.tw/html/support/bios/note/boot.htm.

    2. Try to clear the CMOS.

If problem still persists, you would need to purchase new BIOS chip from Websites like www.flashbios.org where you can order a new BIOS or you can also contact MSI office near your place to purchase new BIOS chip. Refer to http://www.msi.com.tw/html/contact/contact.htm.

**Q:** **My motherboard BIOS sticker is "Phoenix BIOS", but when I boot up my system I saw that "Award BIOS" is being used. Why is this?**

A: Phoenix & Award already merged as one company. All MSI motherboard using Award BIOS comes with Phoenix logo sticker.

**Q:** **Where can I find the BIOS for my motherboard?**

**A:** 1. For Server motherboard, refer to http://www.msi.com.tw/program/sup
port/bios/bos/spt_bos_list.php?kind=3.

2. For Desktop motherboard, refer to http://www.msi.com.tw/program/
support/bios/bos/spt_bos_list.php?kind=1.
Note: The BIOS is subdivided as Socket478, SocketA, Socket 470 &
Archives.
If your board is socket478 based board, then you should be able to
find your board under the socket478 area.
If in case you cannot find your board, then refer to http://www.msi.
com. tw/program/support/bios/bos/spt_bos_list.php?
kind=1&CHIP=Archives&ID=4 and find your board according to the
CPU type.

3. For Optical product firmware, refer to http://www.msi.com.tw/program/
support/driver/dvr/spt_dvr_list.php?part=4.

**Q:** **Where can I find MSI developed software such as Fuzzy Logic or PC
Alert?**

**A:** Refer to http://www.msi.com.tw/program/support/software/swr/
spt_swr_list.php.

**Q:** **Where can I find the manual?**

**A:** 1. For Desktop motherboard, refer to http://www.msi.com.tw/program/
support/manual/mnu/spt_mnu_list.php.
Note: The manual is subdivided as Socket478, SocketA, Socket 470 &
Archives.
If your board is socket478 based board, then you should be able to
find your board under the socket478 area.
If in case you cannot find your board, then refer to http://www.msi.
com.tw/program/support/manual/mnu/spt_mnu_list.php?

kind=1&CHIP=Archives&ID=4 and find your board according to the CPU type.

2. For VGA card, refer to http://www.msi.com.tw/program/support/ manual/mnu/spt_mnu_list.php?kind=3.

   Note: The manual is subdivided as Geforce4, Geforce3, Geforce2 & Archives.

   If your VGA is Geforce4 based card, then you should be able to find your card under the Geforce4 area.

   If in case you cannot find your card, then refer to http://www.msi.com. tw/program/support/manual/mnu/spt_mnu_list.php? kind=2&CHIP=Archives&ID=4 & find your card according to the chipset type.

3. For Server motherboard, refer to http://www.msi.com.tw/program/sup-port/manual/mnu/spt_mnu_list.php?kind=3.

4. For peripherals like PC2PC bluetooth or TV Tuner, refer to http:// www.msi.com.tw/program/support/manual/mnu/spt_mnu_list.php? kind=7.

**Q: Where can I find the drivers?**

A: Please refer to the following suggestions:

1. Try the BIOS boot recovery feature as described in http://www.msi. com.tw/support/bios/boot.htm.

2. Try to clear the CMOS. If problem still persists, ask your reseller for new BIOS chip or contact one of MSI office near your place for new BIOS chip. Refer to http://www.msi.com.tw/contact/main.htm.

**Q: Should I update my BIOS, once a new BIOS is released?**

A: 1. For Desktop motherboard, refer to http://www.msi.com.tw/program/ support/driver/dvr/spt_dvr_list.php where the drivers are divided ac-cording to chipset, on-board LAN, on-board VGA, on-board audio, on-board IDE, on-board SCSI & etc.

2. For VGA card, refer to http://www.msi.com.tw/program/support/driver/ dvr/spt_dvr_list.php?part=2 where the drivers are divided according to video drivers, capture drivers & others.

3. For Server motherboard, refer to http://www.msi.com.tw/program/sup-port/driver/dvr/spt_dvr_list.php?part=3.

4. For Optical product firmware, refer to http://www.msi.com.tw/program/ support/driver/dvr/spt_dvr_list.php?part=4.

5. For MSI special product like bluetooth or TV tuner, refer to http:// www.msi.com.tw/program/support/driver/dvr/spt_dvr_list.php? part=5.

**Q:    How can I know what CPU my motherboard supports?**

A:    1. For Server motherboard, refer to http://www.msi.com.tw/program/sup-port/cpu_support/cpu/spt_cpu_list.php?kind=3.

2. For Desktop motherboard, refer to http://www.msi.com.tw/program/ support/cpu_support/cpu/spt_cpu_list.php?kind=1.

Note: The BIOS is subdivided as Socket478, SocketA, Socket 470 & Archives.

If your board is socket478 based board, then you should be able to find your board under the socket478 area.

If in case you cannot find your board, then refer to http://www.msi. com.tw/program/support/cpu_support/cpu/spt_cpu_list.php? kind=1&CHIP=Archives&ID=4 & find your board according to the CPU type.

Note: On some CPU table you will see N/A, N/A means not applicable or not supported.

**Q: Where can I get my motherboard repaired since it is not working?**

A: The normal procedure is to contact your reseller (the place you bought the board from) for repair/exchange. If the reseller for some reason cannot be contacted, then contact MSI distributor (http://www.msi.com.tw/program/contact/where2buy/) or MSI office near your place (http://www.msi.com.tw/html/contact/contact.htm).

**Q: My reseller went bankrupt, where can I send back my board for repair?**

A: Contact MSI distributor (http://www.msi.com.tw/program/contact/where2buy/) or MSI office near your place (http://www.msi.com.tw/html/contact/contact.htm).

**Q: How long is MSI motherboard warranty?**

A: MSI normally gives 2 years warranty to its direct customer & distributors. But each distributors & reseller will have a different warranty policy. So it is advisable that you check with your reseller about their warranty policy.

**Q: How can I find MSI distributor in my country?**

A: Refer to http://www.msi.com.tw/program/contact/where2buy/. Select the country & you will find MSI distributor in that country. If in case you cannot find the country listed, then it means MSI still don't have distributor in the said country.

**Q: How can I find MSI office near my country?**

A: Refer to http://www.msi.com.tw/html/contact/contact.htm. For more information of each MSI subsidiary company, please move your mouse arrow to the "+" symbol.

**Q: My system cannot boot up, what shall I do?**

A: There are many possibilities on why the system cannot boot up, please refer to below suggestions to see if it helps or not. If after trying below

suggestions problem still persists, then take the motherboard to the place you bought from & have them take a look to make sure if the motherboard is faulty or not.

**Suggestions:**

- Make sure the motherboard was installed properly to the chassis (the board should not touch the chassis).
- Make sure all the components (memory, CPU, AGP & power supply connectors etc.) are properly installed.
- Clear CMOS.
- Change to another power supply.
- Change to another memory.
- Change to another AGP card.

**Q:** **What should I do if my motherboard have compatibility issue with PCI cards?**

A: **Suggestions:**

- Remove all the unnecessary devices & try to find the source of the problem.
- Disable all onboard devices like audio, RAID or others & see if it is due to resource conflict.
- Move the PCI card to different PCI slots.
- Update the card BIOS or drivers.
- Update the motherboard BIOS.

**Q:** **What should I do if my MSI VGA card have compatibility issue with another brand of motherboard?**

A: Update the video driver.
Update the motherboard driver or BIOS.

# *Glossary*

**ACPI** *(Advanced Configuration & Power Interface)*
This power management specification enables the OS (operating system) to control the amount of power given to each device attached to the computer. Windows 98/98SE, Windows 2000 and Windows ME can fully support ACPI to allow users managing the system power flexibly.

**AGP** *(Accelerated Graphics Port)*
A new, high-speed graphics interface that based on PCI construction and designed especially for the throughput demands of 3-D graphics. AGP provides a direct channel (32-bit wide bus) between the display controller and main memory for high graphics quality and performance.

**Bluetooth**
Bluetooth refers to a worldwide standard for the wireless exchange of data between two devices. Bluetooth requires that a low-cost transceiver chip be included in each device. The tranceiver transmits and receives in a previously unused frequency band of 2.45 GHz that is available globally (with some variation of bandwidth in different countries). In addition to data, up to three voice channels are available. Each device has a unique 48-bit address from the IEEE 802 standard. Connections can be point-to-point or multipoint. The maximum range is 10 meters. Data can be exchanged at a rate of 1 megabit per second (up to 2 Mbps in the second generation of the technology).

**BIOS** *(Basic Input/Output System)*
On PCs, an essential software that contains all the control code of input/output interface (such as keyboard, disk drives, etc.). It executes hardware test on booting the system, starts the OS, and provides an interface between the OS and the components. The BIOS is stored in a ROM chip.

**Bus**
A set of hardware lines within the computer system, through which the data is transferred among different components. In a PC, the term ***bus*** usually refers to a local bus that connects the internal components to the CPU and main memory.

**Cache**
A special memory subsystem that is used to speed up the data transfer. It stores the

contents of frequently accessed RAM locations and the addresses where these data items are stored.

### Chipset

A collection of integrated chips designed to perform one or more related functions.  For example, a modem chipset contains all the primary circuits for transmitting and receiving data;  a PC chipset provides the electronic interfaces between all subsystems.

### Clock Cycle

Clock cycle (or tick) is the smallest unit of time recognized by a device. For personal computers, clock cycles generally refer to the main system clock, which runs at 66 MHz. This means that there are 66 million clock cycles per second. Since modern CPUs run much faster (up to 533 MHz), the CPU can execute several instructions in a single clock tick.

### CMOS *(Complementary Metal-Oxide Semiconductor)*

CMOS is a widely used type of semiconductor, which features high speed and low power consumption.  PCs usually contain a small amount of battery-powered CMOS memory to retain the date, time, and system setup parameters.

### DRAM *(Dynamic RAM)*

A most common type of computer memory.  It usually uses one transistor and a capacitor to represent a bit.  As the development of technology, the memory type and specification used in computer becomes variety, such as SDRAM, DDR SDRAM, and RDRAM.  For further instruction, please see the table below:

| Dynamic RAM (DRAM) Memory Technologies | | | | | |
|---|---|---|---|---|---|
| **Type** | **First Used** | **Clock Rate** | **Bus* Width** | **Peak Bandwidth** | **Volts** |
| FPM (60,70ns) | 1990 | 25MHz | 64 bits | 200 MBps | 5v |
| EDO (50,60,70ns) | 1994 | 40MHz | 64 bits | 320 MBps | 5v |
| SDRAM (66MHz) | 1996 | 66MHz | 64 bits | 528 MBps | 3.3v |
| SDRAM (100MHz) | 1998 | 100MHz | 64 bits | 800 MBps | 3.3v |
| SDRAM (133MHz) | 1999 | 133MHz | 64 bits | 1.1 GBps | 3.3v |
| RDRAM (Direct Rambus) | 1999 | 400MHz | 16 bits | 1.6 GBps | 2.5v |
| DDR SDRAM (100MHz) | 2000 | 100MHz | 64 bits | 1.6 GBps | 3.3v |
| DDR SDRAM (133MHz) | 2000 | 133MHz | 64 bits | 2.1 GBps | 3.3v |
| * Memory channel width (64 bits started with 75MHz Pentium) | | | | | |

*Source: Computer Desktop Encyclopedia*

**ECC Memory** *(Error Correcting Code Memory)*
A type of memory that contains special circuitry for testing the accuracy of data and correcting the errors on the fly.

**EEPROM**
Acronym for Electrically Erasable Programmable Read-Only Memory. An EEPROM is a special type of PROM that can be erased by exposing it to an electrical charge. Like other types of PROM, EEPROM retains its contents even when the power is turned off. Also like other types of ROM, EEPROM is not as fast as RAM. EEPROM is similar to flash memory (sometimes called flash EEPROM). The principal difference is that EEPROM requires data to be written or erased one byte at a time whereas flash memory allows data to be written or erased in blocks. This makes flash memory faster.

**EIDE**
Short for Enhanced IDE, a newer version of the IDE mass storage device interface standard developed by Western Digital Corporation. It supports data rates of between 4 and 16.6 MBps, about three to four times faster than the old IDE standard. In addition, it can support mass storage devices of up to 8.4 gigabytes, whereas the old standard was limited to 528 MB. Because of its lower cost, enhanced EIDE has replaced SCSI in many areas. There are four EIDE modes defined. The most common is Mode 4, which supports transfer rates of 16.6 MBps. There is also a new mode, called ATA-3 or Ultra ATA, that supports transfer rates of 33 MBps.

**EISA** *(Extended Industry Standard Architecture)*
EISA is a standard bus (computer interconnection) architecture that extends the ISA standard to a 32-bit interface. It was developed in part as an open alternative to the proprietary Micro Channel Architecture (MCA) that IBM introduced in its PS/2 computers. EISA data transfer can reach a peak of 33 megabytes per second.

**ESCD** *(Extended System Configuration Data)*
It is a format for storing information about Plug-and-Play (PnP) devices in the BIOS. Windows and the BIOS access the ESCD area each time you re-boot your computer

**External Cache**
Short for Level 2 cache, cache memory that is external to the microprocessor. In general, L2 cache memory, also called the secondary cache, resides on a separate chip from the microprocessor chip. Although, more and more microprocessors are including L2 caches into their architectures.

**GUID** *(Global Unique ID)*
A 1394 device unique identifier which is comprised of a company ID and a chip ID.

**IDE** *(Integrated Drive Electronics)*
A type of disk-drive interface widely used to connect hard disks, CD-ROMs and tape drives to a PC, in which the controller electronics is integrated into the drive itself, eliminating the need for a separate adapter card.  The IDE interface is known as the ATA (AT Attachment) specification.

**IEEE 1394**
A new, high speed external bus standard, also known as *FireWire* or *iLink*, which supports data transfer rates of up to 400 Mbps for connecting up to 63 external devices.

**Internal Cache**
Short for Level 1 cache, a memory cache built into the microprocessor. The L1 cache is also called the primary cache.

**IrDA** *(Infrared Data Association)*
A group of device vendors, including computer, component and telecommunications, who have developed a standard for transmitting data via infrared light waves.  This enables you to transfer data from one device to another without any cables.

**IRQ** *(Interrupt Request Line)*
IRQs are hardware lines over which devices can send interrupt signals to the microprocessor. When you add a new device to a PC, you sometimes need to set its IRQ number by setting a DIP switch. This specifies which interrupt line the device may use. IRQ conflicts used to be a common problem when adding expansion boards, but the Plug-and-Play specification has removed this headache in most cases.

**ISA** *(Industry Standard Architecture)*
ISA is a standard bus (computer interconnection) architecture that is associated with the IBM AT motherboard. It allows 16 bits at a time to flow between the motherboard circuitry and an expansion slot card and its associated device(s).  Also see EISA and MCA.

**LAN** *(Local Area Network)*
A computer network that covers a relatively smaller area, such as in a building or an enterprise.  It is made up of servers, workstations, shared resources, a network operat-

ing system and a communications link. These individual PCs and devices on a LAN are known as "nodes", and are connected by cables to access data and devices anywhere on the LAN, so that many users can share expensive devices and data.

**LBA** *(Logical Block Addressing)*
Logical block addressing is a technique that allows a computer to address a hard disk larger than 528 megabytes. A logical block address is a 28-bit value that maps to a specific cylinder-head-sector address on the disk. 28 bits allows sufficient variation to specify addresses on a hard disk up to 8.4 gigabytes in data storage capacity. Logical block addressing is one of the defining features of Enhanced IDE (EIDE), a hard disk interface to the computer bus or data paths.

**LED** *(Light Emitting Diode)*
A semiconductor device that converts electrical energy into light. Since it lights up (usually red) when electricity is passed through it, it is usually used for the activity lights on computer's component, such as disk drivers.

**LPT** *(Line Printer Terminal)*
Logical device name for a line printer; a name reserved by the MS-DOS for up to three parallel printer ports: LPT1, LPT2, and LPT3. It is frequently used by the OS to identify a printer.

**MAC Address** *(Media Access Control Address)*
The MAC address is a unique identifier which is used by the Media Access Control sublayer of the Data-Link Layer under the network protocol.

**Overclocking**
Overclocking is resetting your computer so that the microprocessor runs faster than the manufacturer-specified speed (for example, setting an Intel 166 MHz (megahertz) microprocessor to run at 200 Mhz).

**PCI** *(Peripheral Component Interconnect)*
A local bus standard developed by Intel that first appeared on PCs in late 1993. PCI provides "plug and play" capability and allows IRQs to be shared. The PCI controller can exchange data with the system's CPU either 32 bits or 64 bits at a time.

**PnP** *(Plug and Play)*
A set of specifications that allows a PC to configure itself automatically to work with peripherals. The user can "plug" in a peripheral device and "play" it without configuring the system manually. To implement this useful feature, both the BIOS that sup-

ports PnP and a PnP expansion card are required.

### POST *(Power On Self Test)*
During booting up your system, the BIOS executes a series of diagnostic tests, include checking the RAM, the keyboard, the disk drives, etc., to see if they are properly connected and operating.

### PS/2 Port
A type of port developed by IBM for connecting a mouse or keyboard to a PC. The PS/2 port supports a mini DIN plug containing just 6 pins. Most modern PCs equipped with PS/2 ports so that the special port can be used by another device, such as a modem.

### RAID
RAID (Redundant Array of Independent Disks; originally Redundant Array of Inexpensive Disks) is a way of storing the same data in different places (thus, redundantly) on multiple hard disks. By placing data on multiple disks, I/O operations can overlap in a balanced way, improving performance. Since multiple disks increases the mean time between failure (MTBF), storing data redundantly also increases fault-tolerance.

### SCSI
Acronym for Small Computer System Interface. Pronounced "scuzzy," SCSI is a parallel interface standard used by Apple Macintosh computers, PCs, and many UNIX systems for attaching peripheral devices to computers. SCSI interfaces provide for faster data transmission rates (up to 80 megabytes per second) than standard serial and parallel ports. In addition, you can attach many devices to a single SCSI port, so that SCSI is really an I/O bus rather than simply an interface.

### USB *(Universal Serial Bus)*
A hardware interface for low-speed peripherals such as the keyboard, mouse, joystick, etc. USB provides a maximum bandwidth of 12 Mbit/sec (Mbps) for connecting up to 127 peripheral devices to PC. USB features hot swap capability and multiple data streams, allows external devices to be plugged in and unplugged without turning the system off.

### WLAN
Acronym for wireless local-area network. Also referred to as LAWN. A type of local-area network that uses high-frequency radio waves rather than wires to communicate between nodes.