MSI

Hermes 845GV Series
MS6243 Barebone

Manual Rev: 2.2
Release Date: Dec. 2002

CE   N1996

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.
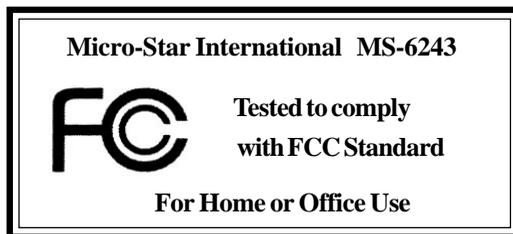
Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and AC. 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-6243

FC

Tested to comply
with FCC Standard

For Home or Office Use

Copyright Notice

Trademarks

Revision History

Revision	Revision History	Date
V1.0	First release	May 2002
V2.0	Changing to Intel 845 GV+ICH4	Oct. 2002
v2.1	Special Edition for Elonex	Dec. 2002
v2.2	Replace v2.0	Dec. 2002

Safety Instructions

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

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

About This Manual

This manual is written based on the idea to make a brief introduction of MS6243 barebone. It is ideal for the end-users to get a complete understanding about this model. The advanced users can also get help while studying this book. This manual contains six sections. Each section mentions the points as follows:

Chapter 1: Getting Started
-- includes barebone specifications, mainboard specifications and mainboard layout. It is useful for the users to get a basic understanding of this model.

Chapter 2: Mainboard Setup
-- tells you how to set up the mainboard; includes components introduction and jumpers setting. It is helpful for the end and advanced users.

Chapter 3: Chassis Installation
-- tells you how to install the chassis and components. It is useful for the users who want to set up the system.

Chapter 4: BIOS Setup
--includes the function introduction of BIOS menu. It is ideal for the advanced users who want to adjust the system.

Appendix: Using 4- or 6- Channel Audio Function
--provides you with the information of 4- or 6- channel audio function for reference.

Glossary
--provides the definition of technical terms mentioned in this manual. It is helpful for the end-users to get a clear understanding of technical terms.

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**

CONTENTS

Introduction *1*

Congratulations for purchasing MS-6243 barebone. The **MS-6243** barebone is your best Slim PC choice. **Based on the "all-in-one" design idea, the MS-6243 provides 2 "1394" ports (option), 6 USB ports, 2 TV-out jacks (option), 1 DVI jack (option) and 1 SPDIF jack**. With the fantastic appearance and small form factor, it can easily be set anywhere in a clean look. The feature packed platform also gives you a exciting PC experience.

Barebone Specifications

Chassis

➤Dimension: 310mm (H) x 84mm (W) x 345mm (D)

➤Minimised screw structure

➤Detachable bay housing

Front Panel

1. **Slim Floppy Drive**
2. **CD-ROM Drive**
3. **Power Switch**
4. **Power LED**
5. **HDD LED**
6. **4-Pin IEEE 1394 Port (option)**
7. **USB Ports**
8. **MIC-in**
9. **Line-out**
10. **SPDIF Jack (optical)**

Back Panel

1. S-Video Port (option)
2. COM A
3. PCI Slots
4. COM B
5. MIC-in
6. Line-in
7. Line-out
8. AV-out (option)
9. Parallel Port
10. DVI Port (option)
11. VGA Port
12. RJ-45 LAN Jack
13. USB Ports
14. PS/2 Mouse
15. PS/2 Keyboard
16. 6-Pin IEEE1394 Port (option)
17. Power Jack
18. Voltage Selector (115/230V)

Power Supply

➤PFC   : Passive PFC

➤Wattage   : 200W max.

➤Safety/EMC Compliant   : FCC, UL, CUL, BSMI, CB, NEMKO, TUV, CCC

➤AC Input Voltage   : 100-127/200-240 VAC, Switch Selectable

➤DC Output Voltage   : 3.3V(14A). 5V(21A), 12V(10A), -12V(0.8A),

                                       5Vsb (2A)

➤Power Supply Fan   : 80 x 80 x 25mm

➤Dimension   : 80 (H) x 120 (W) x 120 (D) mm

Daughter Board

➤PCI Riser Card: 1 to 2 slot PCI Riser Card

Mainboard Specifications

Model: MS-6557

CPU
➤ Supports Socket 478 for Intel® Pentium™ 4 processor up to 2.53GHz and above

Chipset
➤ Intel® 845GV chipset
  - Integrated video accelerator
  - Supports 100/133 MHz FSB
  - Supports 533 /400 MHz Intel® NetBurst micro-architecture bus
  - Supports DDR 200/266 memory.
➤ Intel® ICH4 chipset
  - Hi-Speed USB (USB2.0) controller, 480Mb/sec.
  - 2 channel Ultra ATA 100 bus Master IDE controller.
  - PCI Master 2.2.
  - I/O APIC.
  - AC'97 2.2 interface.
  - 3 UHCI Host controllers and 1 EHCI Host controller.

Main Memory
➤ Two 184-pin DDR DIMMs.
➤ Supports DDR 200/266 memory up to 2GB.

Slot
➤ One 32-bit PCI bus slot
➤ Can connect 2 Riser PCI card

On-Board IDE
➤ Supports P/O, Bus Master, Ultra DMA 66/100 operation
➤ Can connect to 2 IDE devices.

On-Board Peripherals
➤ Rear Panel
  - 1 parallel port
  - PS2 keyboard + PS2 mouse
  - 2 USB ports
  - Rear Audio (Mic_in, Line_in, Line_out)
  - 1 VGA port

- 1 LAN (RJ45) port
- 1 DVI connector for LCD monitor (Optional)
- 2 TV out connectors: AV out & S-video out (Optional)
- 6-pin 1394 connector (Optional)
- 2 serial ports (On-board x1; Header x 1)

➤ Front Panel
- 2 audio ports (Headphone-out, Mic_in)
- 4 USB ports
- 1 SPDIF
- 4-pin 1394 connector (Optional)

➤ Internal Pin-Header
- Intel® standard front panel pin-header
- CPU fan & system fan
- Clear CMOS pin-header
- 2 IDE (ATA66/100)
- 1 standard floppy connector
- 1 on-board COM port pin-header
- Audio (CD-in)
- On-board buzzer
- 1 to 2 PCI riser card

Audio
➤ AC'97 link controller integrated in ICH4
➤ RealTek ALC650 6-channel audio
- Compliance w/AC'97 v2.2 spec.
- Meet PC2001 audio performance requirement

Dimension
➤ 320mm (L) x 195mm (W)

Form Factor
➤ Proprietary (4-layer)

Mounting
➤ 6 mounting holes.

Mainboard Layout
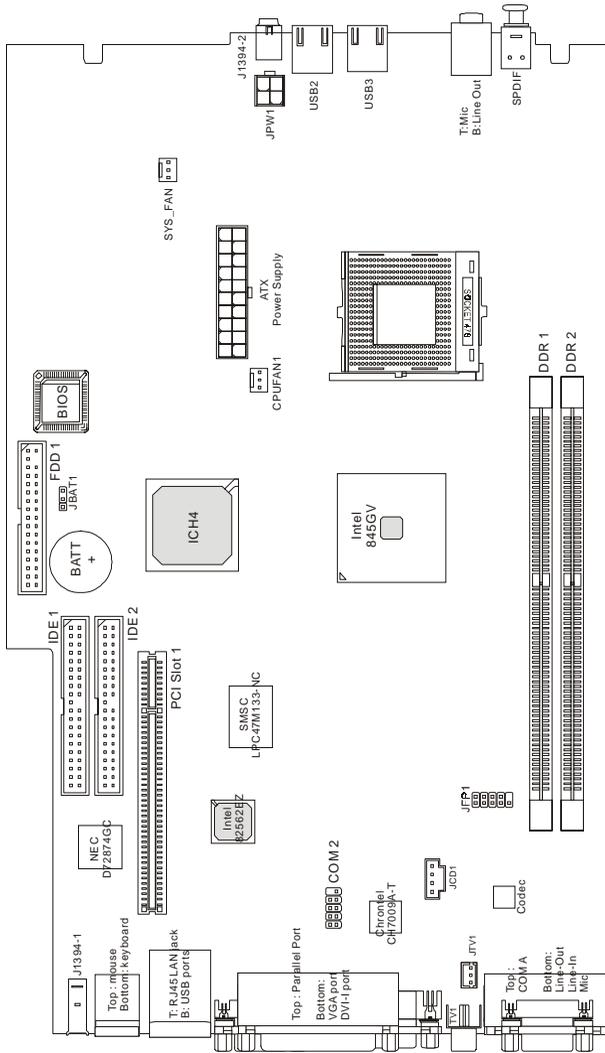
MS-6557 (V3.X) Mainboard

Quick Component Guide

Component	Function	Reference
Socket 478	Installing CPU	See p. 2-2~2-3
DIMM1 & DIMM2	Installing DIMM modules	See p. 2-5~2-6
ATX Power Supply	Connecting to ATX Power Supply	See p. 2-7
IDE1 & IDE2	Connecting to HDD	See p. 2-17
JFP1	Connecting to Front Panel	See p. 2-18
JCD1	Connecting to CD-ROM audio	See p.2-19
CPUFAN/SYS_FAN	Connecting to system fan and CPU fan	See p.2-20
FDD1	Connecting to FDD	See p. 2-21
JTV1	Connecting to TV or video device	See p. 2-21
JBAT1	Setting clear CMOS	See p. 2-22
PCI Slot1	Connecting to PCI card	See p. 2-23

Mainboard Setup *2*

This chapter provides you with the information about hardware setup procedures for MS-6557 mainboard. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

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

Central Processing Unit: CPU

The mainboard supports **Intel® Pentium™ 4 processors (Willimate 478 and Northwood 478).** The mainboard uses a CPU socket called Socket 478 for easy CPU installation. While 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 or purchase them before installing the CPU.

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

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

CPU Installation Procedures

1. 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.

   Any violation of the correct installation procedures may cause permanent damages to your mainboard.

5. Press the CPU down firmly into the socket and close the lever.

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

Open Lever

Sliding Plate

90 degree

Gold arrow

Correct CPU placement

Gold arrow

O

Incorrect CPU placement

Gold arrow

X

Press down the CPU

Close Lever
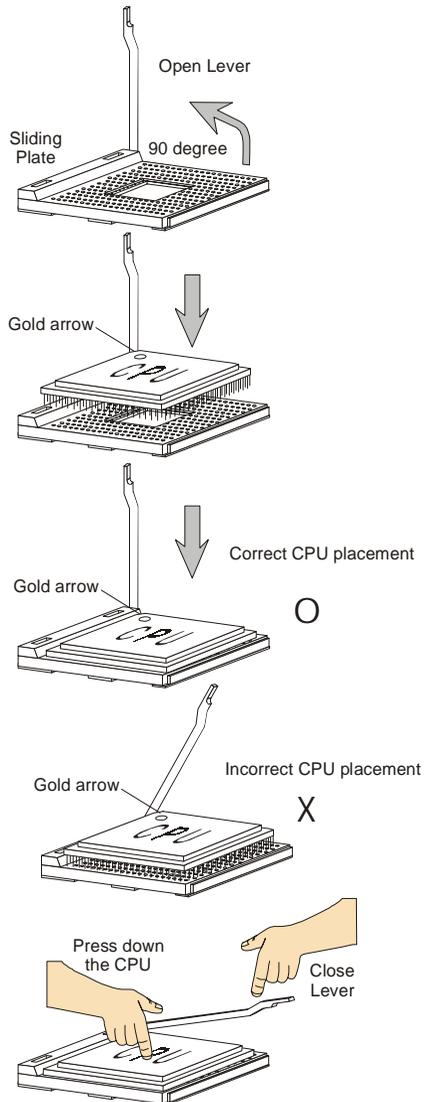
Attaching CPU Cooler

The CPU cooler included in the packing is designed specially for MS-6243 barebone. It is different from other CPU cooler of Pentium™4. See the follows for the features:

● *Copper Material*
The heatsink is made of copper that has better heat-disseminating effect.
● *Shockproof Effect*
The cooler has good shockproof effect through the mechanical combination design of CPU fan and heatsink.
● *Small Size*
Contrast to normal CPU cooler, the small size takes up less space.
● *Special Fan Design*
The CPU fan has ball bearing solution. The reliability is better than sleeve solution. It is suitable for Slim PC.
● *High Density Fan Fins*
The CPU cooler has high density fan fins than normal CPU cooler. It is ideal for heat disseminating.

1. Put the CPU cooler on the CPU.
* *The four screws of CPU cooler are built-in.*
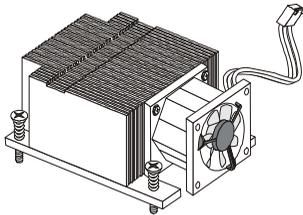
2. Use 4 screws to secure the CPU cooler.
* The front part of screw is designed for shockproof. While securing the cooler, the front part of screw can not be embedded into the hole completely.

shockproof design
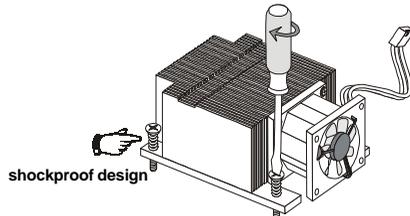
Memory Installation

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

DDR1 DDR2
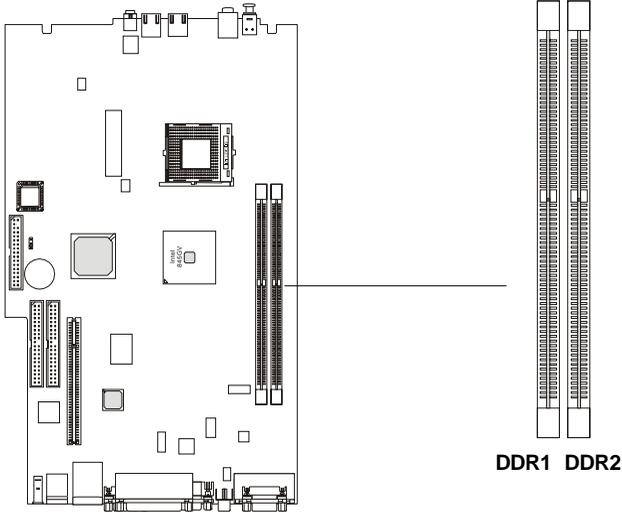
Introduction to DDR SDRAM

DDR (Double Data Rate) SDRAM is similar to conventional SDRAM, but doubles the rate by transferring data twice per cycle. It uses 2.5 volts as opposed to 3.3 volts used in SDR SDRAM, and requires 184-pin DIMM modules rather than 168-pin DIMM modules used by SDR SDRAM. Two types of DDR are available at the time of writing: PC1600 & PC2100. PC1600 DDR SDRAM running at 100MHz will produce about 1.6GB/s memory bandwidth. PC2100 running at 133MHz will produce 2.1GB/s memory bandwidth. High memory bandwidth makes DDR an ideal solution for high performance PC, workstations and servers.

DDR Module Combination

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

Slot	Combination	
	1	**2**
DDR 1	S/D	S/D
DDR 2	S/D	S/D
Total Memory	64MB~2GB	64MB~2GB

S (Single Side): 64MB ~ 512MB   **D** (Double Side): 128MB ~ 1GB

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.

Volt   notch
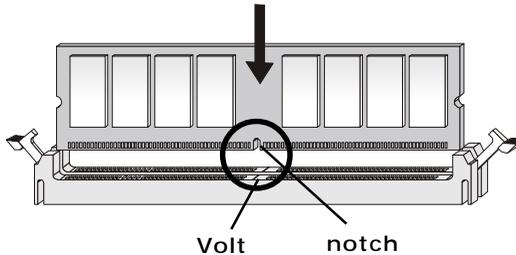
3. The plastic clip at each side of the DIMM slot will automatically close.
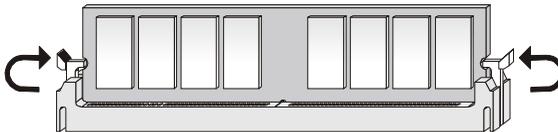
Power Supply

ATX 20-Pin Power Connector: ATX1

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector. The power connector supports **instant power on** function which means that system will boot up immediately when the power supply connector is inserted on the board.

ATX 12V Power Connector: JPW1

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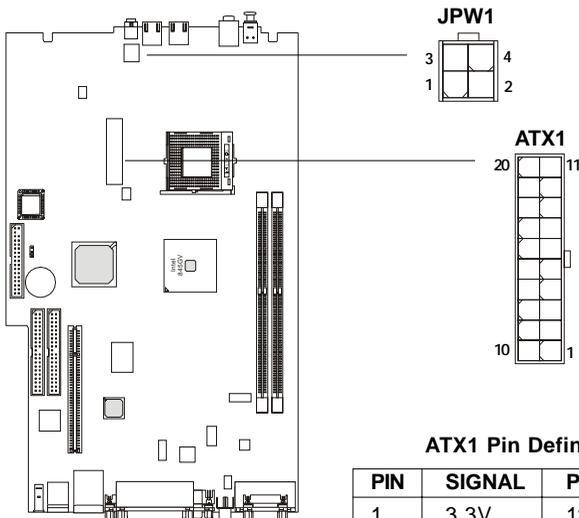
JPW1 Pin Definition

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

ATX1 Pin Definition

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

Front Panel

Audio Port

SPDIF Jack

J1394-2

USB Ports
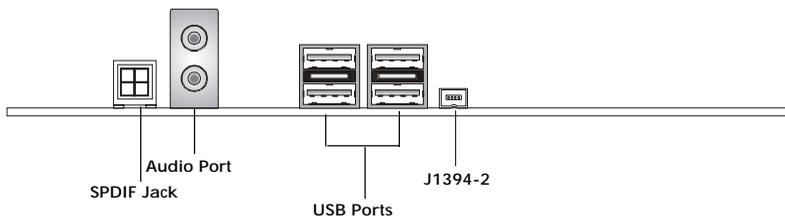
IEEE 1394 Port: J1394-2

The mainboard provides two IEEE 1394 ports. This smaller one is designed for you to connect the IEEE 1394 device with external power. The IEEE 1394 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.
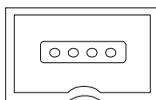
Software Support

IEEE 1394 Driver is provided by Windows® 98 SE, Windows® XP, Windows® ME and Windows® 2000. Just plug in the IEEE 1394 connector into the port. These Operating Systems will install the driver for IEEE 1394.

USB Ports

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 these connectors.

USB Port Description

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

Audio Port

This allows you to connect the front audio device

MIC-in

Line-Out
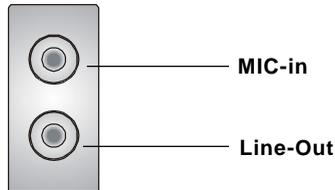
SPDIF Jack

The connector allows you to connect to Sony & Philips Digital Interface (SPDIF), developed jointly by the Sony and Philips corporations . A standard audio file transfer format, SPDIF allows the transfer of digital audio signals from one device to another without having to be converted first to an analog format.

Back Panel

The Rear Panel provides the following connectors:

Mouse — LAN Jack — Parallel Port — COM A

J1394-1 — Keyboard — USB Ports — VGA Port — DVI Port — TV1 — Line-out — Line-in — MIC -in
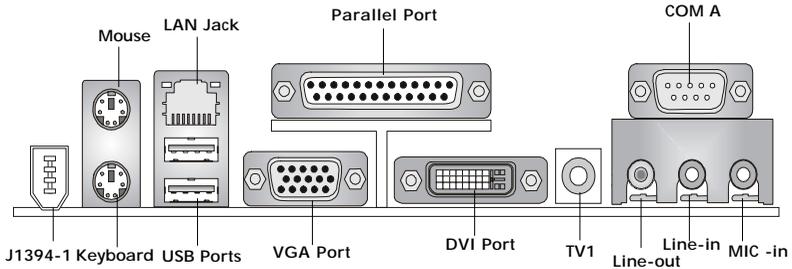
Serial Ports: COM A & COM B

The mainboard offers two 9-pin male DIN connectors as serial port COM A & COM B (COM B is the header *COM2* on the board). The ports are 16550A high speed communication ports that send/receive 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connectors.

1 2 3 4 5

6 7 8 9

9-Pin Male DIN Connector

9
8   7
6   5
4   3
2   1
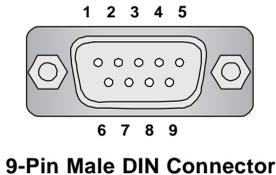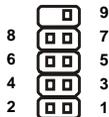
COM2 (COM B)

Pin Definition

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

Audio Port

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

1/8" Stereo Audio Connectors

Line Out   Line In   MIC-in
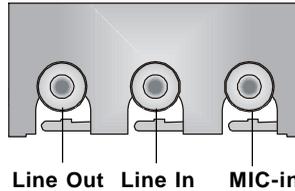
Note: The mainboard supports 4- or 6- channel audio function. For more information, refer to Appendix.

AV-out Connector: TV1

You can connect to a TV or video device to TV1 connector for video-out function which allows you to output the image to a TV or video device.
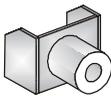
TV1
Connector

TV

Projector

RJ45 LAN Jack

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

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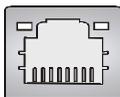
PIN	SIGNAL	DESCRIPTION
1	TDP	Transmit Differential Pair
2	TDN	Transmit Differential Pair
3	RDP	Receive Differential Pair
4	NC	Not Used
5	NC	Not Used
6	RDN	Receive Differential Pair
7	NC	Not Used
8	NC	Not Used

Parallel Port

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.
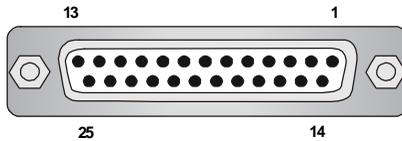
Pin Definition

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

DVI Port

The mainboard provides a DVI (Digital Visual Interface) connector which allows you to connect an LCD monitor. The DVI connector provides a high-speed digital interconnection between the computer and its display device.
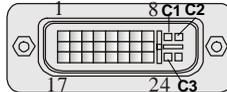
DVI-I Connector			
Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S.* Data2-	13	T.M.D.S. Data3+
2	T.M.D.S. Data2+	14	+5V
3	T.M.D.S. Data2/4 Shield	15	GND (for +5V)
4	T.M.D.S. Data4-	16	Hot Plug Detect
5	T.M.D.S. Data4+	17	T.M.D.S. Data0-
6	DDC Clock	18	T.M.D.S. Data0+
7	DDC Data	19	T.M.D.S. Data0/5 Shield
8	N/C	20	T.M.D.S. Data5-
9	T.M.D.S. Data1-	21	T.M.D.S. Data5+
10	T.M.D.S. Data1+	22	T.M.D.S. Clock Shield
11	T.M.D.S. Data1/3 Shield	23	T.M.D.S. Clock+
12	T.M.D.S. Data3-	24	T.M.D.S. Clock-

C 1	Analog Red		
C 2	Analog Green		
C 3	Analog Blue		

*T.M.D.S. Technology
The graphics data sent to the digital monitor use Transition Minimized Differential Signaling (T.M.D.S.) technology. TMDS uses an encoding algorithm to 8-bit of data into a 10-bit transition minimized, DC balanced character, which are transition-minimized to reduce EMI with copper cables and DC-balanced for transmission over fiber optic cables. The TMDS algorithm also provides robust clock recovery for greater skew tolerance with longer cables or low cost short cables.

IEEE 1394 Port: J1394-1

The bigger 6-pin IEEE 1394 Port on the back panel is designed for you to connect to IEEE 1394 devices without external power. That means the mainboard can provide the power for the devices connected to this port.
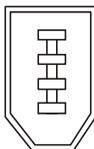
Software Support

IEEE 1394 Driver is provided by Windows® 98 SE, Windows® XP, Windows® ME and Windows® 2000. Just plug in the IEEE 1394 connector into the port. These Operating Systems will install the driver for IEEE 1394.

VGA Port

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

5   1

15   11
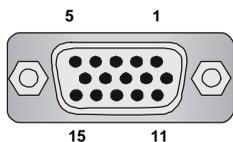
DB 15-Pin Female Connector

Pin Definition

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

USB Ports

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.
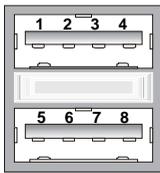
USB Port Description

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

USB Ports

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.

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

PS/2 Mouse (6-pin Female)

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

Connectors

.

Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA/33/66/100 function. The two connectors on the motherboard allows you to connect to **only two** IDE devices. As the MS-6243 Barebone is a slim PC, there is no extra space for you to connect two more IDE devices. Also, please be careful the two connectors can only connect to the specific IDE devices as below:

> **IDE1** (Primary IDE Connector)
>
> The hard drive should always be connected to IDE1.
>
> **IDE2** (Secondary IDE Connector)
>
> IDE2 can only connect a CD-ROM drive.
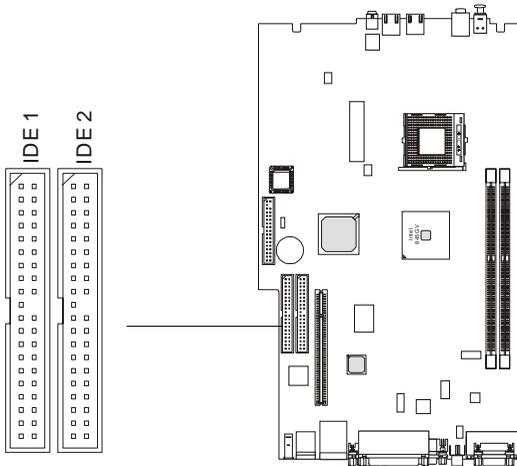
Front Panel Connector: JFP1

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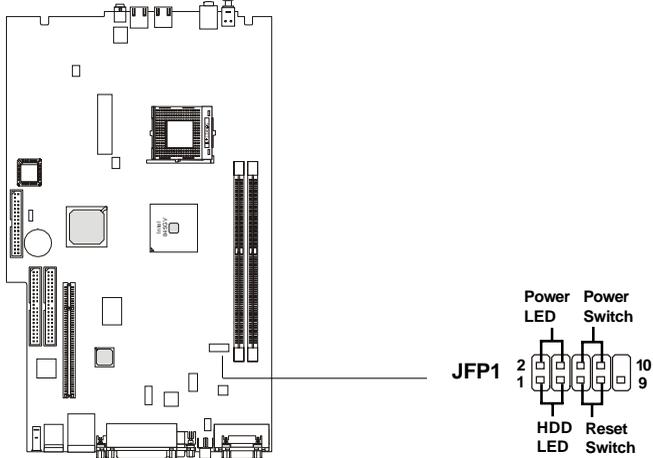
JFP1 Pin Definition

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.

CD-In Connector: JCD1

The connector is for CD-ROM audio connector.
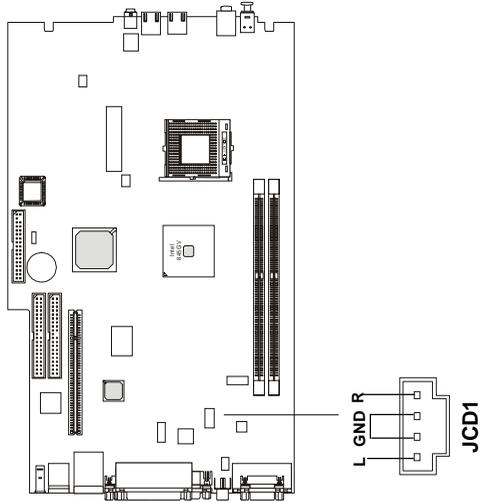
Fan Power Connectors: CPUFAN1/SYS_FAN

The CPUFAN1 (CPU fan) & SYS_FAN (system fan) support system cooling fans with +12V that is controlled by PWM. When connecting the wire to the three-pin head connectors, always note that the red wire is the positive and should be connected to the +12V (that is controlled by PWM), 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.

SYS_FAN

GND
+12V
SENSOR

CPUFAN1

GND
+12V
SENSOR
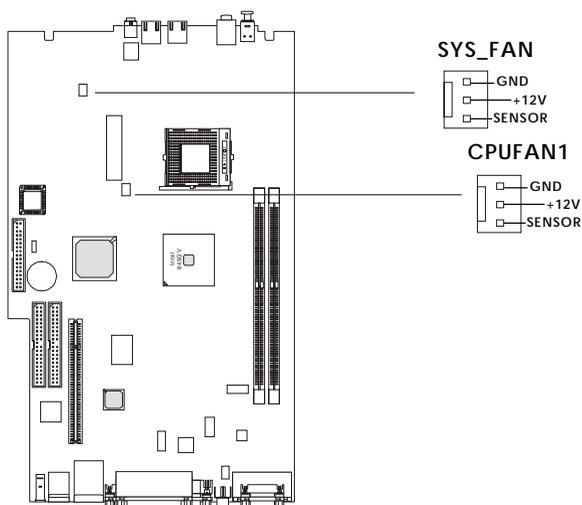
1. Always consult the vendor for proper CPU cooling fan.
2. CPU Fan supports the fan control. You can install the PC Alert utility that will automatically control the CPU Fan speed according to the actual CPU temperature.

FDD Connector:FDD1

The mainboard provides you with a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types
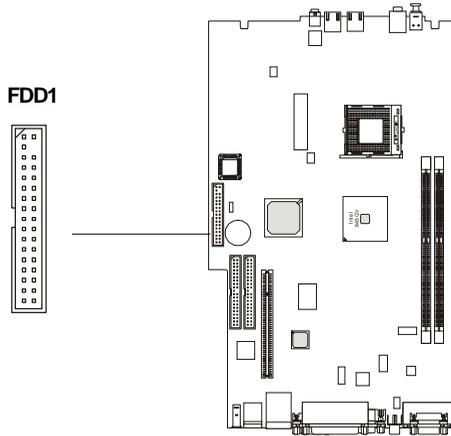
TV-Out Connector:JTV1

The mainboard provides an onboard TV-out connector for you to connect to a TV or video device.
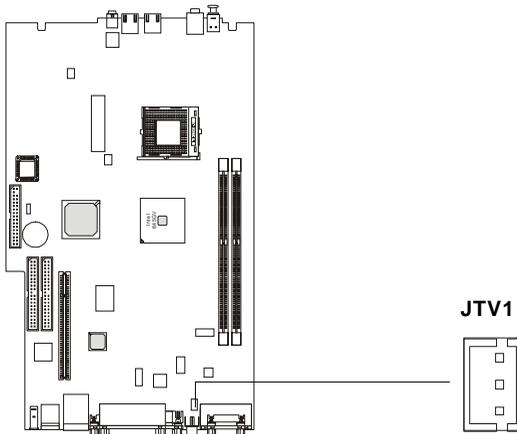
Jumper

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

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. That battery has long life time for at least 5 years. 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:

JBAT1

3 **1** Keep CMOS
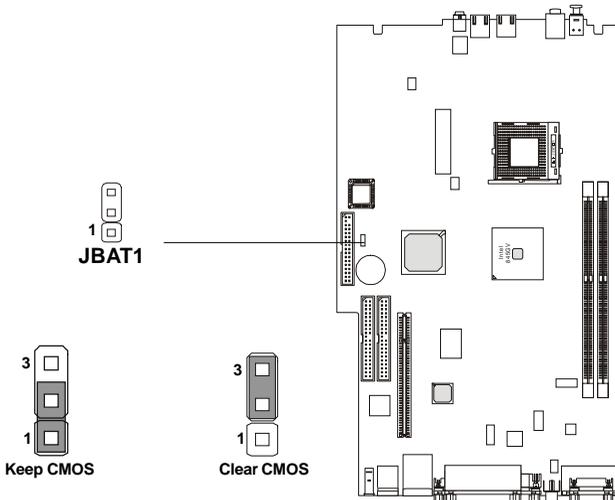
3 **1** Clear CMOS

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.

Slot

The mainboard provides one 32-bit Master PCI bus slot.
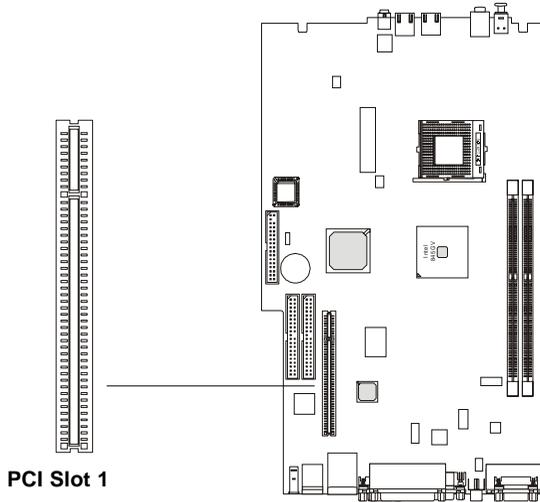
PCI Slot 1

PCI Riser Card

PCI Slot

The PCI slot allows you to insert PCI Riser Card. The PCI Riser Card is included in the MS-6243 Barebone. The Riser Card allows you to insert two expansion cards. You can insert any type of PCI 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.

PCI Interrupt Request Routing

The IRQ, abbreviation of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The "AGP/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
1394	INT E#			
PCI Slot	INT B#	INT C#	INT D#	INT A#

Chassis Installation 3

This chapter provides you with the installation procedures of the MS-6243 chassis. It is useful for you to read the information of mainboard setup before assembling the whole system.

Overview

The built-in MS-6557 mainboard is designed for MS-6243 barebone only. Except MS-6557 mainboard, the built-in components of MS-6243 barebone include power supply and PCI riser card. In this chapter we'll show you how to install CPU, FDD, HDD, CD-ROM and CPU Cooler.

Installation Tools

Screw Driver   **Pliers**   **Forceps**   **Rubber gloves**

Screws

Four types of screws are provided by MS-6243 Barebone: Round-headed screws, Hexagonal screw with washer and two kinds of Flat-headed screws. The screws that have been installed in the barebone are not listed.

Round-headed screw: This type of screw is used to attach the HDD to the chassis.

Hexagonal screw with washer: The screw is used to fasten the mainboard, cover, and CD-ROM to the chassis.

Flat-headed screw: This type of screw is used to fasten the Standard FDD to the Front Panel Bezel.

Installation Flowchart

```
                    START

  Remove Chassis Cover          Install HDD Module

  Remove Front Panel Bezel      Install FDD Module

  Install DIMM Module           Install CD-ROM Module

  Install CPU                   Replace Front Panel Bezel

  Install CPU Cooler            Replace Cover

                                    FINISH
```
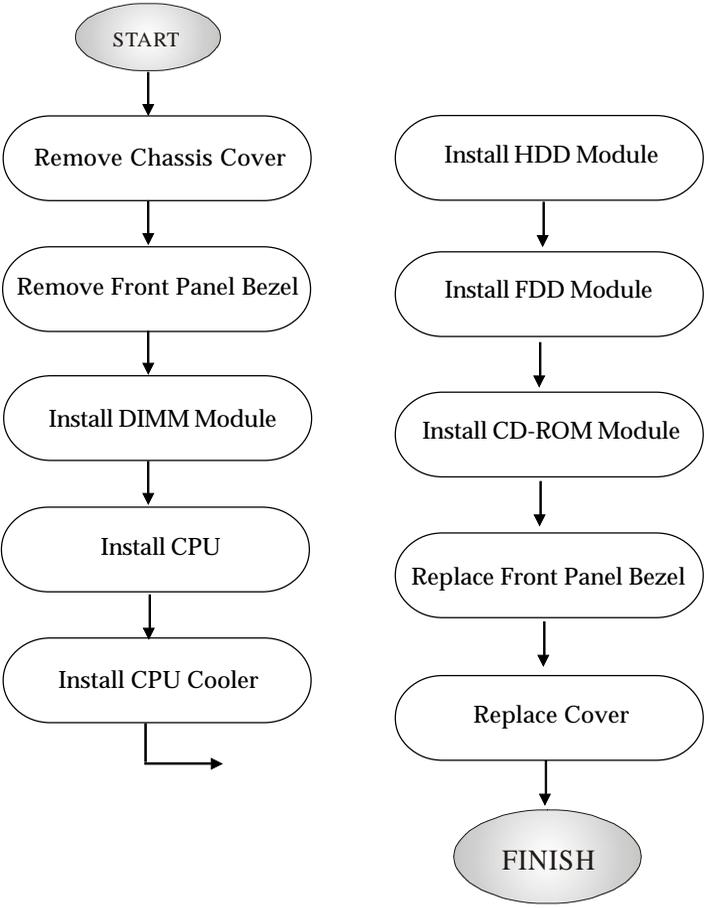
Checking the Items

Before installing chassis, check the items that are used. Some items are included in packing whereas some are not. ***Check with your dealer for the real and complete packing list.***

The Cables

CPU Cooler

Riser Card

HDD Tray
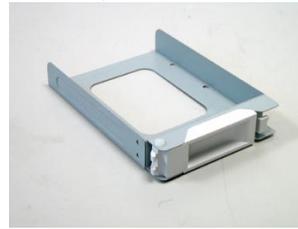
Footstand

CD-ROM Module (Option)

FDD Module (Option)

Installation Procedures

Removing Cover & Front Panel Bezel

Remove the two screws on the cover.
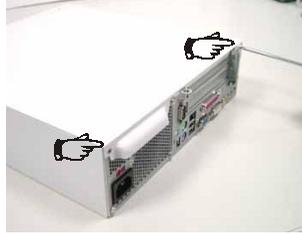
Take out the cover.

Use your two hands to press the place indicated.

Remove the Front Panel Bezel.

Installing Ram/CPU/CPU Cooler

The barebone without cover and
Front Panel Bezel.

Install the DIMM module.
(Refer to p. 2-6 for
more information.)

Put the CPU on the CPU
socket.

Close the lever to finish the
installation of CPU. (Refer to
p. 2- 3 for more information.)
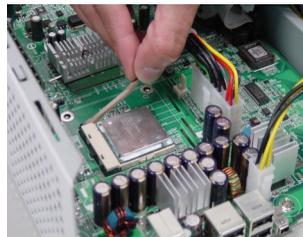
Put the CPU cooler on the CPU.

Use screws to secure the CPU
cooler.

Installing HDD Module

Flip the tray lever to release the tray.

Pull the lever in the direction indicated to take out the tray.

Insert the HDD module into the tray.   Using 4 screws to secure the HDD module.

Insert the HDD tray into the chassis.

Connect the cables (including HDD cable and power cord).

Power Cord   HDD Cable
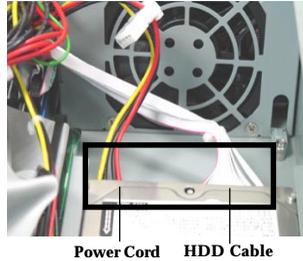
Push the lever back into place.
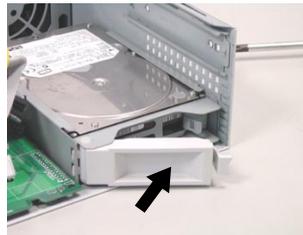
Finish the HDD installation.

Installing FDD

Flip the place indicated to take out the bracket of Front Panel Bezel.

Reverse the Front Panel Bezel.

Insert the FDD module into the Front Panel Bezel.
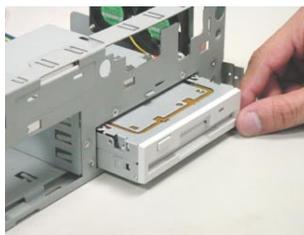
Using screws to secure the FDD module.

Installing CD-ROM

Insert the CD-ROM into the
Front Panel Bezel.

Secure the CD-ROM using
the two screws on the top.
*Note: There are three holes: I, E
and S. Please insert the screw into
the third hole "S".*
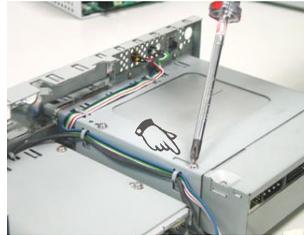
Secure the CD-ROM using the
two screws on the right side.
*Note: There are three holes: I, E and
S. Please insert the screw into the
third hole "S".*

Finish the FDD & CD-ROM
installation.

Connecting the Cables; Replacing Bezel & Cover

Connect the System Fan cable.

Replace the Front Panel Bezel.

Connect the LED indicator cable.
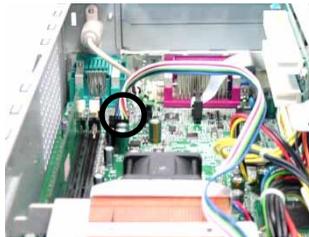
Connect the CD-ROM cable.

Connect the FDD cable.

Use screws to secure the
Front Panel Bezel.

Replace the cover and use screws
to secure it
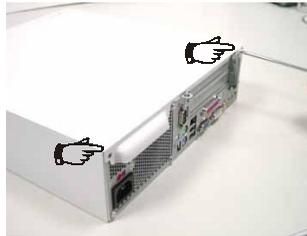
Place the barebone on the
Footstand.

AMI® BIOS Setup *4*

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.

DEL:Setup   F12:Network boot   TAB:Logo

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.

Selecting the First Boot Device

You are allowed to select the 1st boot device without entering the BIOS setup utility by pressing <F11>. When the same message as listed above appears on the screen, press <F11> to trigger the boot menu.

The POST messages might pass by too quickly for you to respond in time. If so, restart the system and press <F11> after around 2 or 3 seconds to activate the boot menu similar to the following.

Select First Boot Device		
Floppy	: 1st Floppy	
IDE-0	: IBM-DTLA-307038	
CD-ROM	: ATAPI CD-ROM DRIVE 40X M	
[Up/Dn] Select	[RETURN] Boot	[ESC] cancel

The boot menu will list all the bootable devices. Select the one you want to boot from by using arrow keys and then pressing <Enter>. The system will boot from the selected device. The selection will not make changes to the settings in the BIOS setup utility, so next time when you power on the system, it will still use the original first boot device to boot up.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item on the left-hand side
<→>	Move to the item on the right-hand side
<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
<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 utility, the first screen you see is the Main Menu.

Main Menu

The main menu displays the setup categories the BIOS supplies. You can use the arrow keys (↑↓) to select the item. The on-line description for the selected setup category is displayed at the bottom of the screen.

Default Settings

The BIOS setup program contains two kinds of default settings: the BIOS Setup and Optimal defaults. BIOS Setup defaults provide stable performance settings for all devices and the system, while High Performance defaults provide the best system performance but may affect the system stability.

The Main Menu

Once you enter AMIBIOS EASY SETUP UTILITY, the Main Menu will appear on the screen. The Main Menu displays twelve configurative functions and two exit choices. Use arrow keys to move among the items and press <Enter> to enter the sub-menu.

```
AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

▶ Standard CMOS Features          ▶ Frequency/Voltage Control
▶ Advanced BIOS Features             Set Supervisor Password
▶ Advanced Chipset Features          Set User Password
▶ Power Management Features          Load Fail Safe Defaults
▶ PNP/PCI Configurations            Load Optimal Defaults
▶ Integrated Peripherals            Save & Exit Setup
▶ PC Health Status                  Exit Without Saving

 F1:Help       ↑↓:Select Item    +/-:Change Values      F7:Optimal Deafults
 Esc:Exit      ↔:Select Menu     Enter:Select ▶Sub-Menu F10:Save & Exit

   Set 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 AMI® special enhanced features.

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

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

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

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

PC Health Status
This entry shows your PC health status.

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

Set Supervisor Password
Use this menu to set Supervisor Password.

Set User Password
Use this menu to set User Password.

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

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

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

Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

The items inside STANDARD CMOS FEATURES menu are divided into 9 categories. Each category includes none, one or more setup items. Use the arrow keys to highlight the item you want to modify and use the <PgUp> or <PgDn> keys to switch to the value you prefer.

```
            AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

     Standard CMOS Features                  [  Setup Help  ]

  System Date                Oct 05 2002 Sat   Month:  Jan - Dec
  System Time                17:50:47          Day:   01 - 31
  ▶ Primary IDE Master                         Year: 1901 - 2099
  ▶ Primary IDE Slave
  ▶ Secondary IDE Master
  ▶ Secondary IDE Slave

  Floppy Drive A             1.44 MB 3½
  Floppy Drive B             Not Installed

  Boot Sector Virus Protection   Disabled




  F1:Help      ↑↓:Select Item    +/-:Change Values    F7:Opioaml Defaults
  Esc:Previous Menu              Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```

System 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.

System Time

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

Primary/Secondary IDE Master/Slave
Press PgUp/<+> or PgDn/<-> to select the hard disk drive type. The specification of hard disk drive will show up on the right hand according to your selection.

TYPE   Type of the device.
CYL   Number of cylinders.
HD   Number of heads.
WPCOM   Write precompensation.
SEC   Number of sectors.
SIZE   Capacity of the device.

Floppy Drive A:/B:
This item allows you to set the type of floppy drives installed. Available options: *Not Installed*, *360 KB 5¼*, *1.2 MB 5¼*, *720 KB 3½*, *1.44 MB 3½*, *2.88 MB 3½*.

Boot Sector Virus Protection
The item is to set the Virus Warning feature for IDE Hard Disk boot sector protection. When *Enabled*, BIOS will issue a virus warning message and beep if a write to the boot sector or the partition table of the HDD is attempted. Setting options: *Disabled*, *Enabled*.

Note: This feature only protects the boot sector, not the whole hard disk.

Advanced BIOS Features

```
         AMIBIOS NEW SETUP UTILITY - VERSION 3.31a
┌──────────────────────────────────────┬──────────────────────┐
│     Advanced BIOS Features            │ [   Setup Help   ]   │
├──────────────────────────────────────┼──────────────────────┤
│ Quick Boot                Enabled     │                      │
│ Full Screen LOGO Show     Enabled     │                      │
│ ▶ Boot Device Select ...              │                      │
│ S.M.A.R.T. for Hard Disks Disabled    │                      │
│ BootUp Num-Lock           On          │                      │
│ Floppy Drive Swap         Disabled    │                      │
│ Floppy Drive Seek         Disabled    │                      │
│ Halt On Keyboard Error    Disabled    │                      │
│ Password Check            Setup       │                      │
│ Boot To OS/2              No          │                      │
│ CPU L1 & L2 Cache         Enabled     │                      │
│ System BIOS Cacheable     Enabled     │                      │
│ C000,32k Shadow           Cached      │                      │
│ Flash Protection          Enabled     │                      │
│ MPS Revision              1.4         │                      │
├──────────────────────────────────────┴──────────────────────┤
│ F1:Help      ↑↓:Select Item   +/-:Change Values   F7:Opiomal Defaults │
│ Esc:Previous Menu        Enter:Select ▶Sub-Menu   F6:Fail-Safe 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*.

Full Screen LOGO Show

This item enables you to show the company logo on the bootup screen. Setting options: *Enabled, Disabled*.

Boot Device Select

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

```
         AMIBIOS NEW SETUP UTILITY - VERSION 3.31a
┌──────────────────────────────────────┬──────────────────────┐
│     Boot Device Select ...            │ [   Setup Help   ]   │
├──────────────────────────────────────┼──────────────────────┤
│ 1st              Floppy;              │                      │
│ 2nd              IDE-0;               │                      │
│ 3rd              CD/DVD;              │                      │
│ Try Other Boot Devices      Yes       │                      │
│                                       │                      │
├──────────────────────────────────────┴──────────────────────┤
│ F1:Help      ↑↓:Select Item   +/-:Change Values   F7:Opiomal Defaults │
│ Esc:Previous Menu        Enter:Select ▶Sub-Menu   F6:Fail-Safe Defaults│
└──────────────────────────────────────────────────────────────┘
```
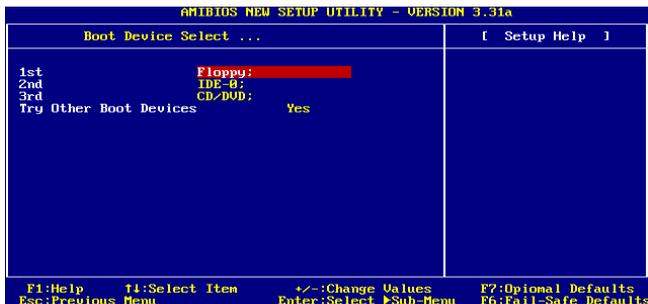
1st/2nd/3rd

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

IDE-0	The system will boot from the first HDD.
IDE-1	The system will boot from the second HDD.
IDE-2	The system will boot from the third HDD.
IDE-3	The system will boot from the fourth HDD.
Floppy	The system will boot from floppy drive.
ARMD-FDD	The system will boot from any ARMD device, such as LS-120 or ZIP drive, that functions as a floppy drive.
ARMD-HDD	The system will boot from ARMD device, such as MO or ZIP drive, that functions as hard disk drive.
CD-ROM	The system will boot from the CD-ROM.
Legacy SCSI	The system will boot from the SCSI.
Legacy NETWORK	The system will boot from the Network drive.
BBS-0	The system will boot from the first BBS (BIOS Boot Specification) compliant device.
BBS-1	The system will boot from the second BBS (BIOS Boot Specification) compliant device.
BBS-2	The system will boot from the third BBS (BIOS Boot Specification) compliant device.
BBS-3	The system will boot from the fourth BBS (BIOS Boot Specification) compliant device.
Disabled	Disable this sequence.

> **MSI** *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.*

Try Other Boot Devices

Setting the option to *Yes* allows the system to try to boot from other devices if the system fails to boot from the 1st/2nd/3rd boot device.

S. .M.A.R.T. for Hard Disks
This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Re-porting 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*, *Disabled*.

BootUpNum-Lock
This item 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 end users to use the arrow keys on the numeric keypad. Setting options: *On*, *Off*.

Floppy Drive Swap
Setting to *Enabled* will swap floppy drives A: and B:.

Floppy Drive Seek
This setting causes the BIOS to search for floppy disk drives at boot time. When enabled, the BIOS will activate the floppy disk drives during the boot process: the drive activity light will come on and the head will move back and forth once. First A: will be done and then B: if it exists. Setting options: *Disabled*, *Enabled*.

Halt on Keyboard Error
When enabled, the system will stop POST process if the keyboard is not connected. When disabled, the system will show Error message in POST process while the keyboard is not connected.

Password Check
This specifies the type of AMIBIOS password protection that is implemented. Setting options are described below.

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

Boot To OS/2

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

CPU L1 & L2 Cache

Cache memory is additional memory that is much faster than conventional DRAM (system memory). When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. This setting enables/disables the internal cache (also known as L1 or level 1 cache) and external cache (also known as L2 or level 2 cache). Settings are: *Enabled* and *Disabled*.

System BIOS Cacheable

Selecting *Enabled* allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. Setting options: *Enabled, Disabled*.

C000, 32k Shadow

This item specifies how the contents of the adapter ROM named in the item are handled. Settings are described below:

Option	Description
Disabled	The specified ROM is not copied to RAM.
Enabled	The contents of specified ROM are copied to RAM for faster system performance.
Cached	The contents of specified ROM are not only copied to RAM, the contents of the ROM area can be written to and read from cache memory.

Flash Protection

This function protects the BIOS from accidental corruption by unauthorized users or computer viruses. When enabled, the BIOS's data cannot be changed when attempting to update the BIOS with a Flash utility. To successfully update the BIOS, you'll need to disable this BIOS Flash Write Control function. You should enable this function at all times. The only time when you need to disable the function is when you want to update the BIOS. After updating the BIOS, you should immediately re-enable it to protect the BIOS against viruses.

Settings: *Enabled*, *Disabled*.

MPS Revision
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. Options: *1.4*, *1.1*.

Advanced Chipset Features

```
AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

Advanced Chipset Features              [  Setup Help  ]

▶ DRAM Timing Setting...
  AGP Aperture Size               64MB
  Internal Graphics Mode Select   1MB
  ******** Display Setting ********
  Boot Display Device             Auto




  F1:Help      ↑↓:Select Item      +/-:Change Values    F7:Opiomal Defaults
  Esc:Previous Menu                Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```
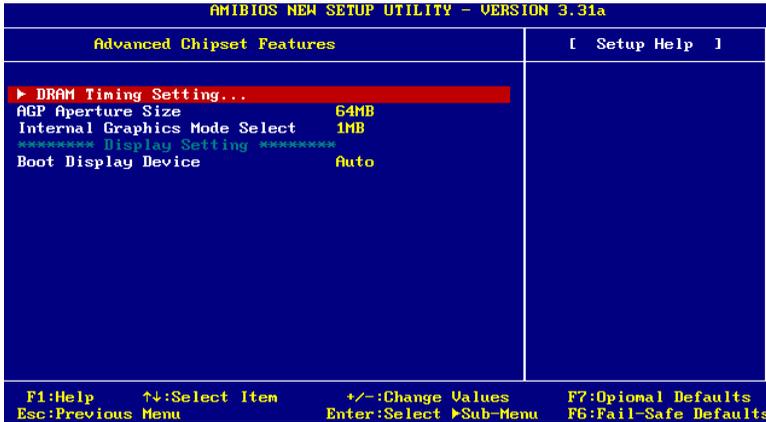
Note: Change these settings only if you are familiar with the chipset.

DRAM Timing Setting

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

```
AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

DRAM Timing Setting...               [  Setup Help  ]

Configure DRAM Timing by SPD    Enabled
  CAS# Latency                  3 Clocks
  RAS# Precharge                3 Clocks
  RAS# to CAS# Delay            3 Clocks
  Precharge Delay               7 Clocks
  Burst Length                  4




  F1:Help      ↑↓:Select Item      +/-:Change Values    F7:Opiomal Defaults
  Esc:Previous Menu                Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```
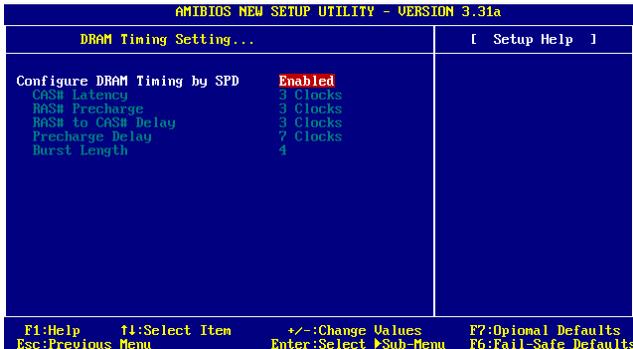
Configure DRAM Timing by SPD

Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to *Enabled* enables CAS# Latency, RAS# Precharge, RAS# to CAS# Delay, Precharge Delay and Burst Length automatically to be determined by BIOS based on the configurations on the SPD. Selecting *Disabled* allows users to configure these fields manually.

CAS# Latency
The field controls the CAS latency, which determines the timing delay before SDRAM starts a read command after receiving it. Setting options: *2 Clocks* and *3 Clocks*. *2 Clocks* increases system performance while *3Clocks* provides more stable system performance.

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

RAS# to CAS# Delay
This field allows you to set the number of cycles for a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from or refreshed. Fast speed offers faster performance while slow speed offers more stable performance. Settings: *3 Clocks*, *2 Clocks*.

Precharge Delay
The field specifies the idle cycles before precharging an idle bank. Settings: *7 Clocks*, *6 Clocks*, *5 Clocks*.

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 (QW)*.

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, and 256 MB.*

Internal Graphics Mode Select
The field specifies the size of system memory allocated for video memory. Settings: *512KB*, *1MB*, *8MB*, *Disabled*.

Power Management Features

```
            AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

    Power Management Features                    [  Setup Help  ]

ACPI Standby State                   S3/STR
Re-Call VGA BIOS at S3 Resuming      Enabled
Power Management/APM                 Enabled
Power Button Function                On/Off
Restore on AC/Power Loss             Power Off
▶ Set Wake Up Events ...




    F1:Help      ↑↓:Select Item     +/-:Change Values      F7:Opiomal Defaults
    Esc:Previous Menu               Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```
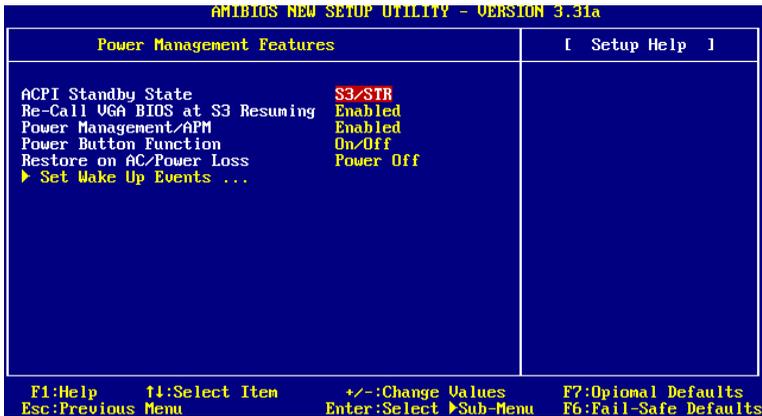
ACPI Standby State

This item specifies the power saving modes for ACPI function. Options are:

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

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

Auto   OS driver determines the best mode for ACPI standby state.

Re-Call VGA BIOS at S3 Resuming

Selecting *Enabled* allows BIOS to call VGA BIOS to initialize the VGA card when system wakes up (resume) 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 from S3.

Power Management/APM
Setting to *Enabled* will activate an Advanced Power Management (APM) device to enhance Max Saving mode and stop CPU internal clock. Settings: *Disabled*, *Enabled*.

Power Button Function
This feature sets the function of the power button. Settings are:

On/Off	The power button functions as normal on/off button.
Suspend	When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

Restore On AC/Power Loss
This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

Power Off	Leaves the computer in the power off state.
Power On	Reboots the computer.
Last State	Restores the system to the status before power failure or interrupt occurred.

Set Wake Up Events
Press <Enter> to enter the sub-menu and the following screen appears:

```
            AMIBIOS NEW SETUP UTILITY - VERSION 3.31a
      Set Wake Up Events ...              [  Setup Help  ]

   USB Device Wake up From S3       Disabled
   Keyboard Wake up From S3         Disabled
   Mouse Wake up From S3            Disabled
   Resume On Ring                   Disabled
   Resume On PME#                   Disabled
   Resume On RTC Alarm              Disabled
   RTC Alarm Date                   15
   RTC Alarm Hour                   12
   RTC Alarm Minute                 30
   RTC Alarm Second                 30




   F1:Help      ↑↓:Select Item    +/-:Change Values    F7:Optional Defaults
   Esc:Previous Menu              Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```

Keyboard/Mouse/USB Device Wake up From S3, Resume On Ring/PME#
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.

> **MSI**
> *1. You need to install a modem card supporting power on function for "Resume On Ring" function.*
> *2. In "Keyboard Wake up From S3", you have two options: "any key" & "disabled". Selecting "any key" allows you to power on the system by pressing any key.*
> *3. In "Mouse Wake up From S3", you have two options: "disabled" & "enabled". Selecting "anabled" allows you to power on the system by clicking on the mouse.*

Resume On RTC Alarm
This is used to enable or disable the feature of booting up the system on a
scheduled time/date from the soft off (S5) state. Settings: *Enabled*, *Disabled*.

RTC Alarm Date/Hour/Minute/Second
If *Resume On RTC Alarm* is set to *Enabled*, the system will automatically
resume (boot up) on a specific date/hour/minute/second specified in these
fields. Available settings for each item are:

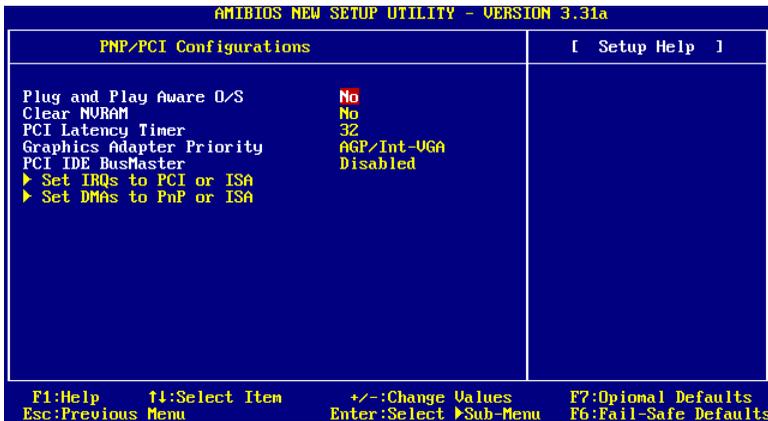|	
Alarm Date	*01 ~ 31*, *Every Day*
Alarm Hour	*00 ~ 23*
Alarm Minute	*00 ~ 59*
Alarm Second	*00 ~ 59*

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.

```
             AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

    PNP/PCI Configurations                    [  Setup Help  ]

  Plug and Play Aware O/S          No
  Clear NVRAM                      No
  PCI Latency Timer                32
  Graphics Adapter Priority        AGP/Int-VGA
  PCI IDE BusMaster                Disabled
  ▶ Set IRQs to PCI or ISA
  ▶ Set DMAs to PnP or ISA






   F1:Help        ↑↓:Select Item    +/-:Change Values     F7:Opiomal Defaults
   Esc:Previous Menu                Enter:Select ▶Sub-Menu F6:Fail-Safe Defaults
```

Plug and Play Aware O/S
When set to *Yes*, BIOS will only initialize the PnP cards used for booting (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system like Windows® 98, 2000 or ME. When set to *No*, BIOS will initialize all the PnP cards. Select *Yes* if the operating system is Plug & Play.

Clear NVRAM
The ESCD (Extended System Configuration Data) NVRAM (Non-volatile Random Access Memory) is where the BIOS stores resource information for both PNP and non-PNP devices in a bit string format. When the item is set to *Yes*, the system will reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to *No* automatically.

PCI Latency Timer

This item controls how long each PCI device can hold the bus before another takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. For better PCI performance, you should set the item to higher values. Settings range from *32* to *248* at a 32 increment.

Graphics Adapter Priority

This item specifies which VGA device is your primary graphics adapter. Settings are:

> *Internal VGA*   The system initializes the onboard VGA device.

> *PCI/Int-VGA*   The system initializes the installed PCI VGA card first. If a PCI VGA card is not available, it will initialize the onboard VGA device.

PCI IDE BusMaster

Set this option to *Enabled* to specify that the IDE controller on the PCI local bus has bus mastering capability. Settings options: *Disabled*, *Enabled*.

Set IRQs to PCI or ISA

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

```
               AMIBIOS NEW SETUP UTILITY - VERSION 3.31a
       Set IRQs to PCI or ISA                    [  Setup Help  ]

   IRQ3                    PCI/PnP
   IRQ4                    PCI/PnP
   IRQ5                    PCI/PnP
   IRQ7                    PCI/PnP
   IRQ9                    PCI/PnP
   IRQ10                   PCI/PnP
   IRQ11                   PCI/PnP
   IRQ14                   PCI/PnP
   IRQ15                   PCI/PnP




   F1:Help      ↑↓:Select Item    +/-:Change Values    F7:Opiomal Defaults
   Esc:Previous Menu            Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```
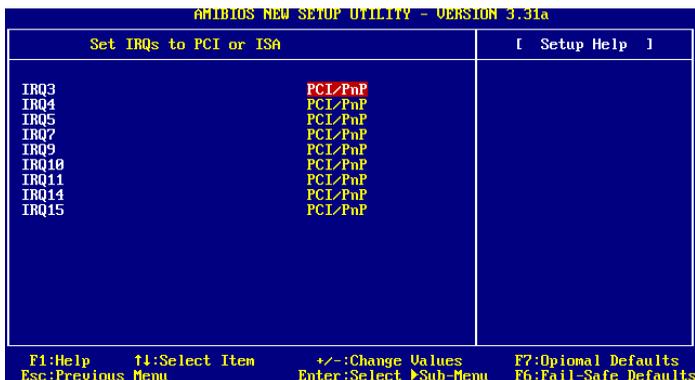
IRQ 3/4/5/7/9/10/11/14/15

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

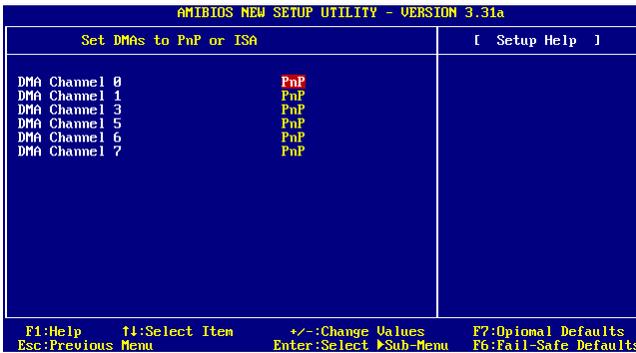The settings determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the IRQ pool, the end user can use these settings to reserve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

Set DMAs to PnP or ISA

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

```
           AMIBIOS NEW SETUP UTILITY - VERSION 3.31a
       Set DMAs to PnP or ISA            [  Setup Help  ]

   DMA Channel 0                PnP
   DMA Channel 1                PnP
   DMA Channel 3                PnP
   DMA Channel 5                PnP
   DMA Channel 6                PnP
   DMA Channel 7                PnP

  F1:Help      ↑↓:Select Item    +/-:Change Values    F7:Opimal Defaults
  Esc:Previous Menu              Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```

DMA Channel 0/1/3/5/6/7

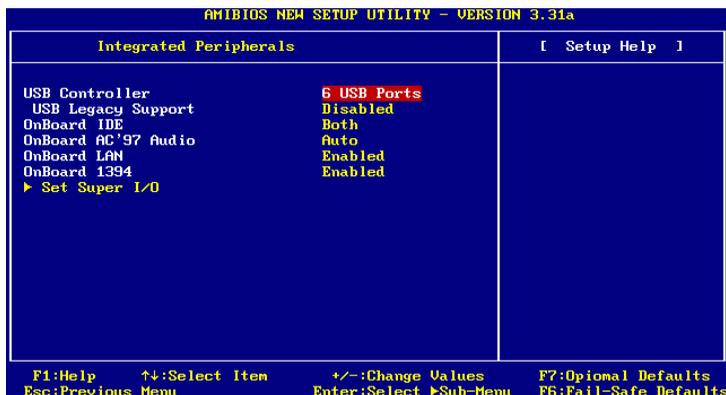These items specify the bus that the system DMA (Direct Memory Access) channel is used.

The settings determine if AMIBIOS should remove a DMA from the available DMAs passed to devices that are configurable by the system BIOS. The available DMA pool is determined by reading the ESCD NVRAM. If more DMAs must be removed from the pool, the end user can reserve the DMA by assigning an *ISA/EISA* setting to it.

Integrated Peripherals

```
           AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

      Integrated Peripherals               [  Setup Help  ]

 USB Controller              6 USB Ports
  USB Legacy Support         Disabled
 OnBoard IDE                 Both
 OnBoard AC'97 Audio         Auto
 OnBoard LAN                 Enabled
 OnBoard 1394                Enabled
 ▶ Set Super I/O



 F1:Help      ↑↓:Select Item    +/-:Change Values   F7:Opiomal Defaults
 Esc:Previous Menu              Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```

USB Controller
This setting is used to enable/disable the onboard USB controllers. Setting
options: *2 USB Ports*, *4 USB Ports, 6 USB Ports, Disabled.*

USB Legacy Support
Set to *All Device* if you need to use a USB1.1 device in the operating system
that does not support or have any USB driver installed, such as DOS and SCO
Unix. Set to *No Mice* if you want to use any USB1.1 device except the mouse.
Setting options: *Disabled*, *No Mice*, *All Device*.

OnBoard IDE
This setting controls the on-chip IDE controller. Setting options: *Disabled*,
Primary, *Secondary, Both*.

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

OnBoard LAN
The field determines whether the onboard LAN controller is activated. The
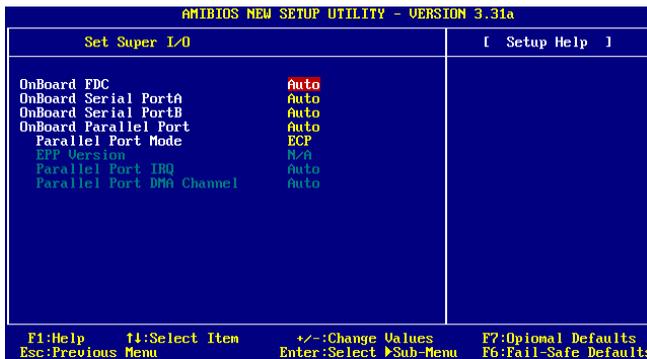field appears only when the mainboard supports the LAN function. Setting

options: *Enabled*, *Disabled*.

OnBoard 1394
This item allows you to enable the onboard 1394 function.

Set Super I/O
Press <Enter> to enter the sub-menu and the following screen appears:

```
              AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

        Set Super I/O                              [  Setup Help  ]

OnBoard FDC                         Auto
OnBoard Serial PortA                Auto
OnBoard Serial PortB                Auto
OnBoard Parallel Port               Auto
   Parallel Port Mode               ECP
   EPP Version                      N/A
   Parallel Port IRQ                Auto
   Parallel Port DMA Channel        Auto




  F1:Help       ↑↓:Select Item      +/-:Change Values      F7:Opiomal Defaults
  Esc:Previous Menu                 Enter:Select ▶Sub-Menu  F6:Fail-Safe Defaults
```

OnBoard FDC
This is used to enable or disable the onboard Floppy controller.

Option	Description
Auto	BIOS will automatically determine whether to enable the onboard Floppy controller or not.
Enabled	Enables the onboard Floppy controller.
Disabled	Disables the onboard Floppy controller.

OnBoard Serial Port A/B
These items specify the base I/O port addresses of the onboard Serial Port A (COM A)/Serial Port B (COM B). Selecting *Auto* allows AMIBIOS to automatically determine the correct base I/O port address. Settings: *Auto, 3F8/COM1*, *2F8/COM2*, *3E8/COM3*, *2E8/COM4*, *Disabled*.

OnBoard Parallel Port
This field specifies the base I/O port address of the onboard parallel port. Selecting *Auto* allows AMIBIOS to automatically determine the correct base I/O port address. Settings: *Auto, 378*, *278*, *3BC*, *Disabled*.

Parallel Port Mode
This item selects the operation mode for the onboard parallel port: *ECP*, *Normal*, *Bi-Dir* or *EPP*.

EPP Version
The item selects the EPP version used by the parallel port if the port is set to *EPP* mode. Settings: *1.7*, *1.9*.
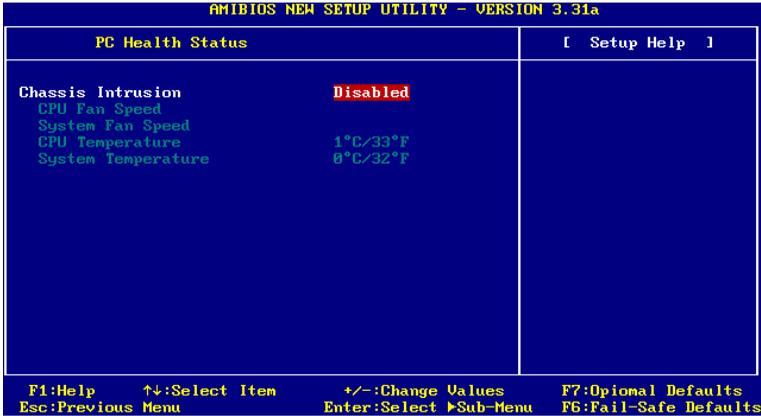
Parallel Port IRQ
When *Parallel Port* is set to *Auto*, the item shows *Auto* indicating that BIOS determines the IRQ for the parallel port automatically.

Parallel Port DMA Channel
This feature needs to be configured only when *Parallel Port Mode* is set to the *ECP* mode. When Parallel Port is set to *Auto*, the field will show *Auto* indicating that BIOS automatically determines the DMA channel for the parallel port.

PC Health Status

This section shows the status of your CPU, fan, and overall system status.
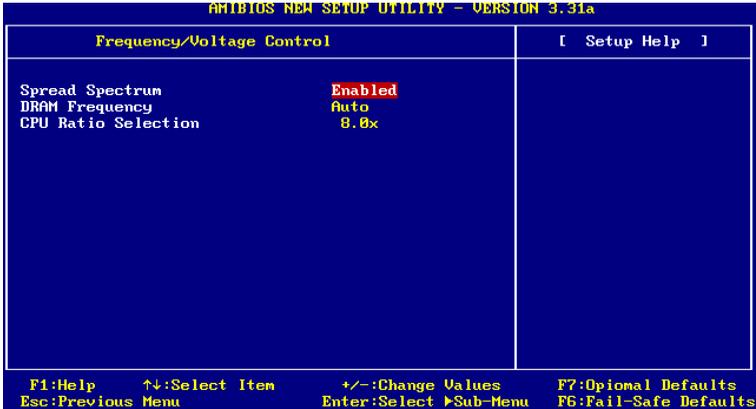
```
          AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

      PC Health Status                       [  Setup Help  ]

   Chassis Intrusion            Disabled
      CPU Fan Speed
      System Fan Speed
      CPU Temperature           1°C/33°F
      System Temperature        0°C/32°F




   F1:Help      ↑↓:Select Item     +/-:Change Values    F7:Opional Defaults
   Esc:Previous Menu              Enter:Select ▶Sub-Menu F6:Fail-Safe Defaults
```

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

CPU /System Fan Speed, CPU /System Temperature
These items display the current status of all of the monitored hardware devices/components such as CPU voltages, temperatures and all fans' speeds.

Frequency/Voltage Control

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

```
             AMIBIOS NEW SETUP UTILITY - VERSION 3.31a
      Frequency/Voltage Control              [  Setup Help  ]

  Spread Spectrum            Enabled
  DRAM Frequency             Auto
  CPU Ratio Selection         8.0x

  F1:Help      ↑↓:Select Item    +/-:Change Values    F7:Opiomal Defaults
  Esc:Previous Menu             Enter:Select ▶Sub-Menu   F6:Fail-Safe Defaults
```

Spread Spectrum
When the motherboard 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, setting to *Enabled* for EMI reduction. Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clockspeed which may just cause your overclocked processor to lock up.
speed of the processor relative to the external or motherboard clock speed.

DRAM Frequency
This setting shows the current frequency of DDR DRAM (read only).

CPU Ratio Selection
This setting controls the multiplier that is used to determine the internal clock speed of the processor relative to the external or motherboard clock speed.

Set Supervisor/User Password

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

```
[ Enter new supervisor password ]
```

```
[ Enter new user password ]
```

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

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

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

Additionally, when a password is enabled, you can also have AMIBIOS 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 PASSWORD CHECK option of the ADVANCED BIOS FEATURES menu. If the PASSWORD CHECK option is set to *Always*, 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.

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*

Load Optimal/Fail-Safe Defaults

The two options on the main menu allow users to restore all of the BIOS settings to Optimal defaults or Fail-Safe defaults. The Optimal Defaults are the default values set by the mainboard manufacturer for the best system performance but probably will cause a stability issue. The Fail-Safe Defaults are the default values also set by the mainboard manufacturer for stable performance of the mainboard.

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

```
[ Load Optimal Defaults ]

Press [Enter] to Continue
    Or [ESC] to Abort
```

Pressing 'Y' loads the default BIOS values that enable the best system performance but may lead to a stability issue.

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

```
[ Load Fail Safe Defaults ]

Press [Enter] to Continue
    Or [ESC] to Abort
```

Pressing 'Y' loads the default values that are factory settings for stable system performance.

Appendix: Using 4- or 6-Channel Audio Function

The motherboard is equipped with Realtek ALC650 chip, which provides support for 6-channel audio output, including 2 Front, 2 Rear, 1 Center and 1 Subwoofer channel. ALC650 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 ALC650 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.
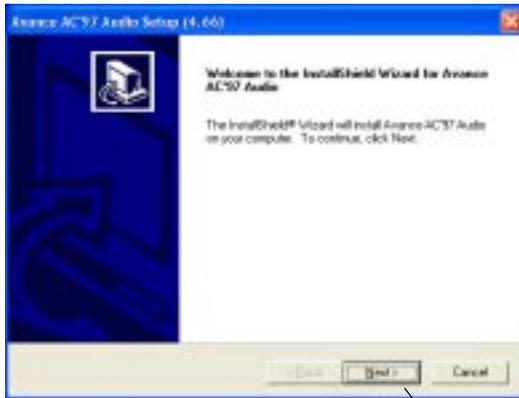
1. Insert the companion CD into the CD-ROM drive. The setup screen will automatically appear.

2. Click **Avance ALC650 Sound Drivers**.

Click here

3. Click **Next** to start installing files into the system.

Click here

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

**Select this option**

Click here

A-3

Using 4- or 6- Channel Audio Function

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. 2-Channel Mode for Stereo-Speaker Output

   b. 4-Channel Mode for 4-Speaker Output

   c. 6-Channels Mode for 5.1-Speaker Output

6. Click **OK** to close this window.
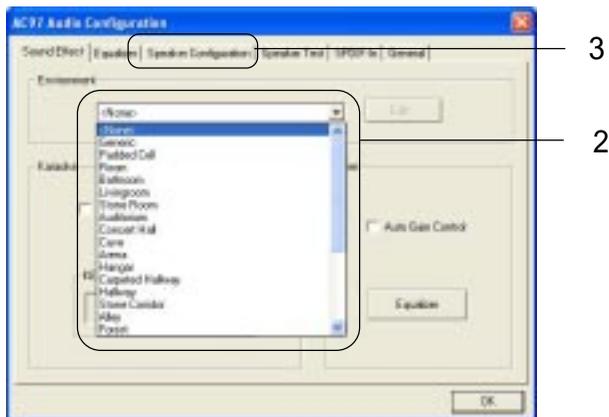
Connecting the Speakers

When you have set the Multi-Channel Audio Function mode properly in the software utility, connect your speakers to the correct phonejacks 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 phonejack on the back panel when 2-Channel mode is selected.

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

A-5
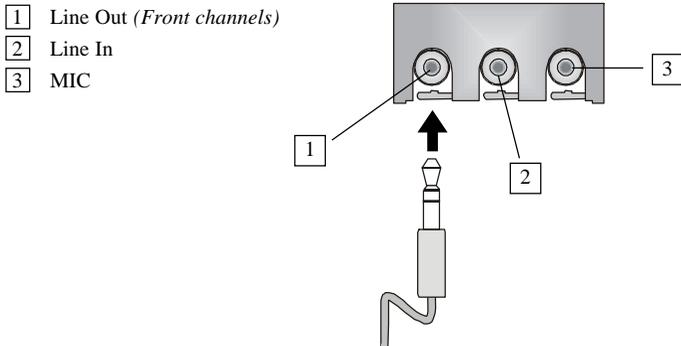
■ **4-Channel Mode for 4-Speaker Output**
The audio jacks on the back panel always provide 2-Channel analog audio output function, however these audio jacks can be transformed to 4- or 6- channels analog audio jacks by selecting the corresponding multi-channel operation from **No. of Speakers**.

Refer to the following diagram and caption for the founction of each jack on the back panel when 4-Channels mode is selected.
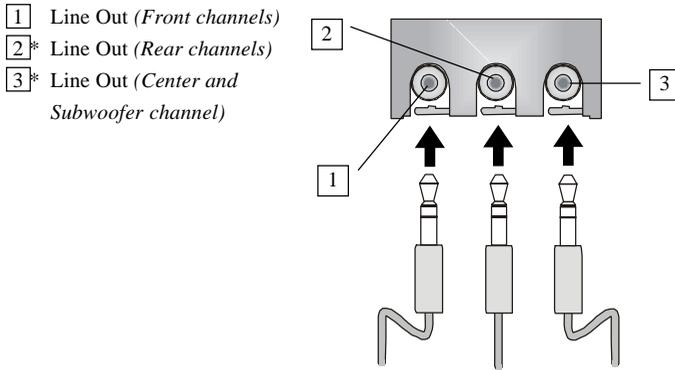
1   Line Out *(Front channels)*
2 * Line Out *(Rear channels)*
3   MIC

1
2
3
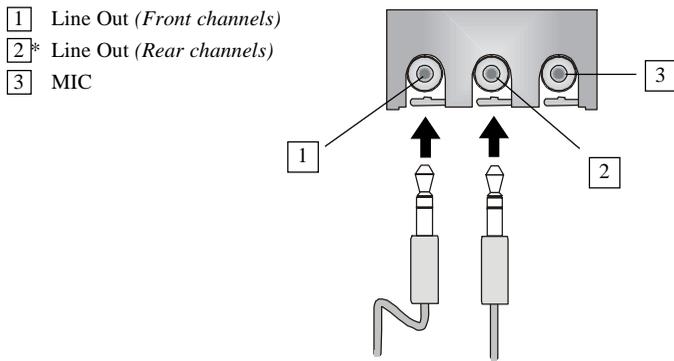
* Line In function is converted to Line Out function when 4-Channel Mode for 4-Speaker Output is selected.

■ **6-Channel Mode for 6-Speaker Output**
  Refer to the following diagram and caption for the founction of
  each jack on the back panel when 6-Channels mode is selected.

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

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

*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 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.

Subwoofer

Front Left

Front Right

Rear Left

Rear Right

Center
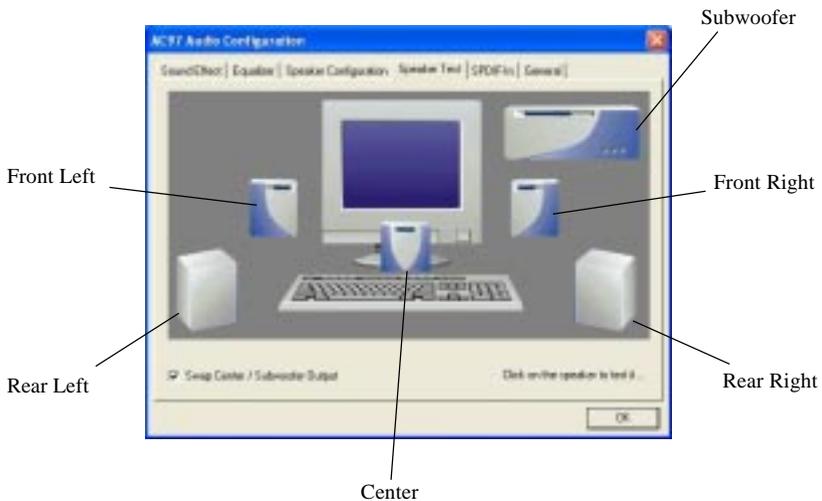
6 speakers appear on the "Speaker Test" window only when you select "6-Channel Mode" in the "No. of Speakers" column. If you select "4-Channel Mode", only 4 speakers appear on the window.

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 cornerof the screen.
2. In the Sound Effect tab, select **Voice Cancellation** under "KaraOK."
3. Click **OK** to close this window.

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.

BIOS *(Basic Input/Output System)*
On PCs, an essential software that contains all the control code of input/output inter-face (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 trans-ferred 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 receiv-ing data; a PC chipset provides the electronic interfaces between all subsystems.

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

DVI
1) Short for **D**igital **V**isual **I**nterface, a digital interface standard created by the Digital Display Working Group (DDWG) to convert analog signals into digital signals to accommodate both analog and digital monitors.
2) Short for **D**igital **V**ideo **I**nteractive, a now-defunct technology developed by General Electric that enables a computer to store and display moving video images like those on television.

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.

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.

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 operating 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.

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.

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.

PCMCIA
Short for ***Personal Computer Memory Card International Association***, PCMCIA is an

organization consisting of some 500 companies that has developed a standard for small , credit card-sized devices, called PC Cards. Originally designed for adding memory to portable computers, the PCMCIA standard has been expanded several times and is now suitable for many types of devices.

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 supports 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.

SPDIF
Short for Sony/Philips Digital Interface, a standard audio file transfer format. Deverloped jointly by the Sony and Philips corporations, SPDIF allows the transfer of digital audio signals from one device to another without having to be converted first to an analog format.

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.