

MEX8440S

User's Manual Version A

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1**Introduction 1**

1-1 KeyFeatures 2

1-2 Static Electricity Precautions 4

1-3 What's included in the package 4

2**Hardware Configuration 5**

2-1 Mainboard Component Locations 6

2-2 Power Precautions 7

2-3 Connectors 7

2-4 Jumper Settings 8

JP7 ATX Power Supply Connector 9

Keyboard Connector 10

PS/2 Mouse Connector 10

USB (Universal Serial Bus Connector) 10

COM1, COM2 Serial Port Connectors 10

LPT1 Parallel (Printer) Connectors 10

MIDI/GAME/Aideo Port 10

J8 KBLOCK, SPK, RST, HDLED, SUSLED,
Suspend Switch 11

JP1/JP2/JP3 CPU Speed Selectors 13

JP4 CPU Internal Clock Speed Selectors .. 13

FAN1 CPU FAN POWER 13

FAN2 System FAN POWER 13

IR IR Connector 13

J1,J2 Audio CD-in Connector 13

FDD1 Floppy Drive Connector 13

IDE1 Primary IDE Connector 13

IDE2 Secondary IDE Connector 13

2-5 Installing Pentium II Processor in Slot 1 14

2-6 Memory Installation 16

3

| | |
|------------------------------------|-----------|
| AWARD BIOS Setup | 17 |
| 3-1 Award BIOS Setup | 18 |
| 3-2 Main Menu Options | 19 |
| STANDARD CMOS SETUP | 19 |
| BIOS FEATURES SETUP | 21 |
| CHIPSET FEATURES SETUP | 24 |
| POWER MANAGEMENT SETUP | 26 |
| PNP/PCI SLOT CONFIGURATION | 29 |
| LOAD SETUP DEFAULTS | 30 |
| INTEGRATED PERIPHERALS SETUP | 31 |
| USER PASSWORD SETTING | 33 |
| IDE HDD AUTO DETECTION | 33 |
| SAVE & EXIT SETUP | 34 |
| EXIT WITHOUT SAVING | 34 |

4

| | |
|---|-----------|
| Audio Installation | 35 |
| 4-1 Product Features | 36 |
| 4-2 DOS and Windows 3.1 Applications Installation | 37 |
| 4-3 Installation of Windows 95 | 39 |
| 4-4 Installation of Windows 4.0 | 41 |
| 4-5 Windows Application (Audio Rack) | 42 |

A

| | |
|---|-----------|
| Hardware Monitor Setup/AGP Utility | 45 |
| A-1 System Health Monitor Utility | 46 |
| A-2 Installing the Utility | 47 |
| A-3 Application | 47 |
| A-4 AGP and 8440EX chip Utility | 48 |

Chapter 1 Introduction

1

The mainboard is a high-performance mainboard based on the advanced PENTIUM™ II microprocessor, the AGP, PCI Local Bus and the Intel 440EX chipset.

The mainboard offers a high degree of flexibility in configuration and is fully IBM PC compatible.

1-1 KeyFeatures

- Intel 440EX AGPset™ chipset
- Support either 233~333 MHz PENTIUM™ II and Celeron™ CPUs with Slot 1.
- Uses 168-pin DIMM modules x 2 auto banking in multiple configuration up to 256MB.
- Supports SDRAM and 3.3V EDO DRAM.
- Provides single bit ECC capability.
- 3 PCI Local Bus slots, and 3 x 16 bits ISA Bus slots.
- All 3 PCI slots support Master mode.
- Supports 32-bits A.G.P. (Accelerated Graphics Port) slot x 1.
- System BIOS support 4 IDE harddisk drivers that don't need device driver for S/W application, the capacity each harddisk can large than 528MB up to 8.4GB.
- PCI Bus master IDE interface on board with two connectors support 4 IDE devices in 2 channel, the PCI IDE Controller supports PIO Mode 0 to Mode 4, Bus master IDE DMA Mode 2 and Ultra DMA 33MB/sec.
- On board super Multi-I/O chip that support 2 serial port with 16550 Fast UART compatible, 1 parallel port with EPP and ECP capabilities, and a floppy disk drive interface.
- On board support PS/2™ mouse Connector.
- On board support PS/2™ Keyboard Connector.
- 2 x Universal Serial Bus (U.S.B) on board

Chapter 1

- Support Ir connector. (optional)
- System BIOS supports Green feature function, Plug and Play Flash ROM.
- Use switching regulator to support CPU core voltage.
- Supports LS-120 floppy disk drive (120MB).
- Supports CMI 8330DX 3D 16-bits stereo audio controller. Sound Blaster 16/PRO compatible with stereo voice up to 48KHz sampling rates.
- Daul channel game port. (supports Microsoft game-pad up to 8 ports).
- Supports 3V, 5V and 12V 20-pins ATX power connector.
- ATX form factor : 170mm x 305 mm
- Hardware Monitor :
Support CPU/System FAN status monitoring and alarm, CPU voltage, system temperature monitoring.
- Poly switch resettable fuse over current protection for keyboard and mouse

1-2 Static Electricity Precautions

Static electricity can easily damage your mainboard.

Observing a few basic precautions can help you safeguard against damage that could result in expensive repairs. Follow the measures below to protect your equipment from static discharge:

- Keep the mainboard and other system components in their anti-static packaging until you are ready to install them.
- Touch a grounded surface before you remove any system component from its protective anti-static packaging. A grounded surface within easy reach is the expansion slot covers at the rear of the system case, or any other unpainted portion of the system chassis.
- During configuration and installation, touch a grounded surface frequently to discharge any static electric charge that may build up in your body. Another option is to wear a grounding wrist strap.
- When handling a mainboard or an adapter card, avoid touching its components. Handle the mainboard and adapter cards either by the edges or by the mounting bracket that attaches to the slot opening in the case.

1-3 What 's included in the package?

The mainboard comes packed in a sturdy cardboard shipping carton. The carton contains :

- The Mainboard
- The User's Guide
- The 440EX Utility

Chapter 2

Hardware Configuration

Before you install the mainboard into the system chassis, you may find it convenient to first configure the mainboard hardware. This chapter describes how to set jumpers and install memory modules, and where to attach components.

2

2-1 Mainboard Component Locations

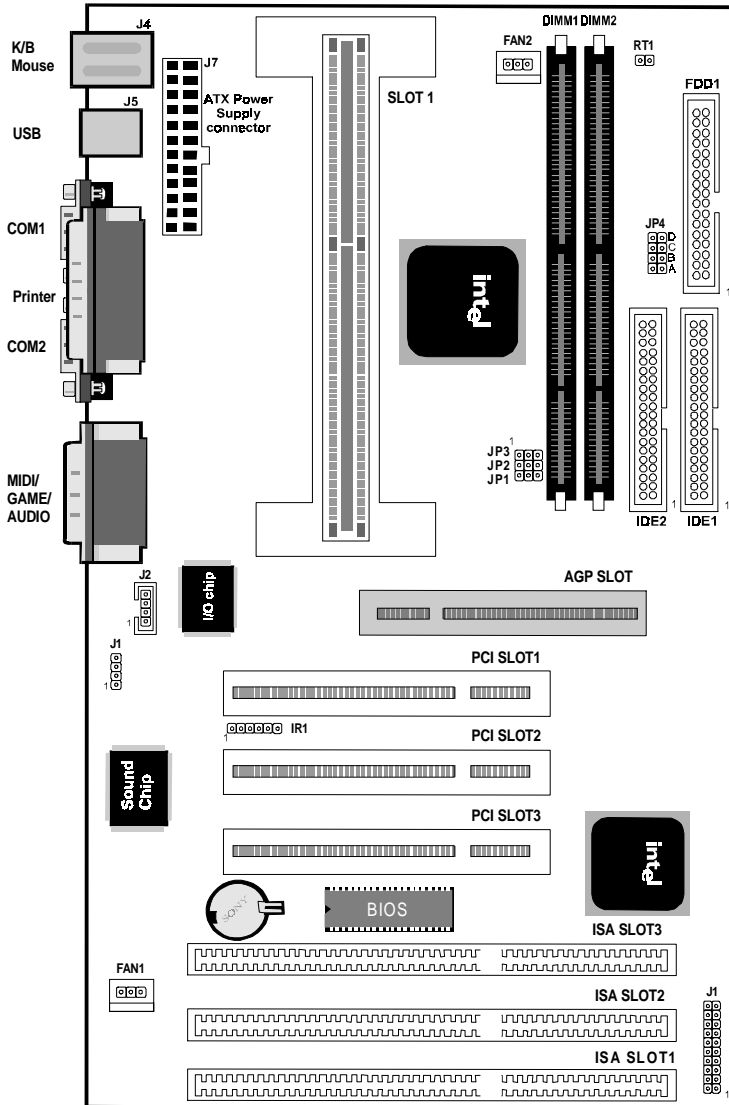


Figure 2-1 Mainboard Component Locations

2-2 Power Precautions

Before you begin configuration, make sure you are working with an unplugged mainboard. Many components are powered by low-voltage current, but there still may be a dangerous electric current coming from the leads and power supply. You should take the following precautions:

- Turn off the power supply, and unplug the power cord before you begin
- Unplug all cables that connect the mainboard to any external devices.

2-3 Connectors

Attach system components and case devices to the mainboard via the mainboard connectors. A description of each .i.connector; and its connector pins follows. See Figure 2-1 for the location of the connectors on the mainboard.

Note:

Before making connections to the board, make sure that power to the system is turned off.

2-4 Jumper Settings

You can configure hardware options by setting jumper on the mainboard. See Figure 2-1 for jumper locations.

Set a jumper as follows:

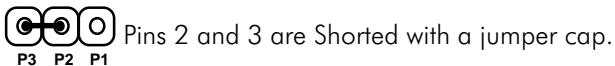
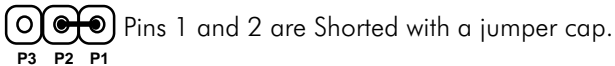
- Short a jumper by placing the plastic jumper cap over two pins of the jumper.
- Open the pins of a jumper by removing the jumper cap.

Note:

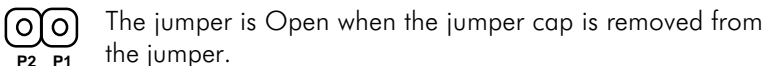
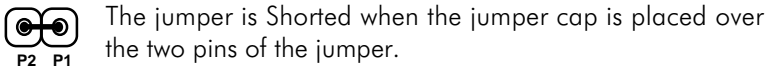
When you open the jumper, attach the plastic jumper cap to one of the pins so you won't lose it.

Symbols:

For setting 3-pin jumpers, the symbols below are used:



For setting 2-pin jumpers, the following symbols are used:



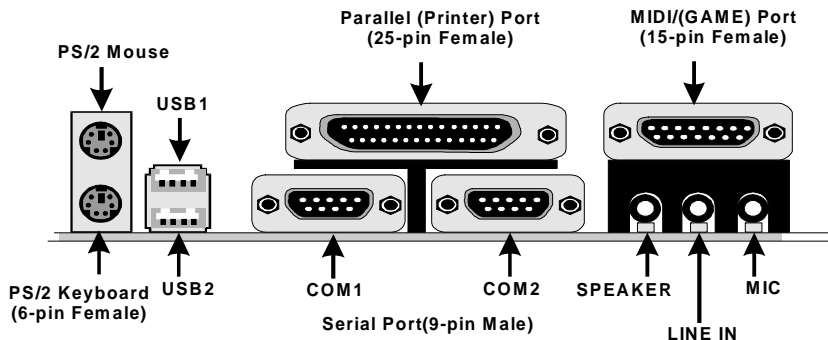
J7 ATX Power Supply Connector

This connector connects to a ATX power supply, The plug from the power supply will only insert in one orientation because of the different hole sizes. Find the proper orientation and push down firmly making sure that the pins are aligned.

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | 3.3V | 2 | 3.3V |
| 3 | GND | 4 | 5V |
| 5 | GND | 6 | 5V |
| 7 | GND | 8 | PW-OK |
| 9 | 5VSB | 10 | 12V |
| 11 | 3.3V | 12 | -12V |
| 13 | GND | 14 | PS-ON |
| 15 | GND | 16 | GND |
| 17 | GND | 18 | -5V |
| 19 | 5V | 20 | 5V |

Note:

Make sure that the ATX power supply can take at least 10mA load on the 5 volt standby lead (5VSB).



Keyboard Connector

| Pin | Description | Pin | Description |
|-----|----------------|-----|-------------|
| 1 | Keyboard Data | 2 | N.C. |
| 3 | Ground | 4 | +5VDC |
| 5 | Keyboard Clock | 6 | N.C. |

PS/2 Mouse Connector

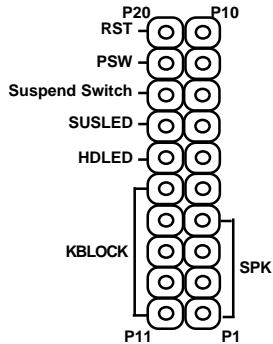
| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Mouse Data | 2 | N.C. |
| 3 | Ground | 4 | +5VDC |
| 5 | Mouse CLK | 6 | N.C. |

USB (Universal Serial Bus Connector)

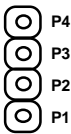
This connector supports two port USB Bus.

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | +5 VDC | 5 | +5VDC |
| 2 | DATA - | 6 | DATA- |
| 3 | DATA + | 7 | DATA+ |
| 4 | Ground | 8 | Ground |

COM1, COM2 Serial Port Connectors**LPT1 Parallel (Printer) Connector****MIDE/GAME /Audio Port****RT1 Thermistor Connector (temperature)**

J8 KBLOCK, SPK, RST, HDLED, PSW, SUSLED, Suspend Switch**SPK Speaker Connector**

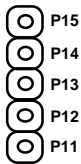
Attach the system speaker to connector SPK.



| Pin | Description |
|-----|-------------|
| 1 | DATA Out |
| 2 | NC |
| 3 | Ground |
| 4 | +5V |

KBLOCK Keylock + Power LED Connectors

KB Lock is a keylock connector that enables and disables the keyboard and the Power-LED on the case.



| Pin | Description |
|-----|-------------|
| 11 | LED Output |
| 12 | NC |
| 13 | Ground |
| 14 | Keylock |
| 15 | GND |

HDLED Hard Disk LED Connector

| Pin | Description |
|-----|-------------|
| 6 | 5V |
| 16 | Active Low |

SUSLED Suspend Mode LED Connector

| Pin | Description |
|-----|-------------|
| 7 | 5V |
| 17 | Active Low |

Suspend Switch Connector

Attach the power suspend switch cable to this connector.



| Setting | Description |
|---------|--------------------------|
| Open | Normal mode (Default) |
| Short | Suspend mode |

PSW Power Switch Connector

Attach the power switch cable to this connector. Holding the power switch for more than 4 seconds will power off the system.

**RST Reset Switch Connector**

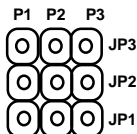
Attach the Reset switch cable to this connector.



| Setting | Description |
|---------|--------------|
| Open | Normal Mode |
| Short | Reset System |

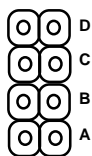
JP1/JP2/JP3 CPU Speed Selectors

The mainboard has a clock generator that lets you choose the CPU frequency by settings jumper JP1/JP2/JP3. You can set CPU speed to 50/55/60/66/68/75 MHz as shown below :



| CPU | JP1 | JP2 | JP3 |
|-------|-----|-----|-----|
| 50MHz | 1-2 | 1-2 | 1-2 |
| 55MHz | 2-3 | 1-2 | 1-2 |
| 60MHz | 2-3 | 2-3 | 1-2 |
| 66MHz | 2-3 | 2-3 | 2-3 |
| 68MHz | 1-2 | 2-3 | 2-3 |
| 75MHz | 2-3 | 1-2 | 2-3 |

Chapter 2

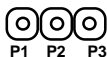
JP4 CPU Internal Clock Speed Selectors

| CPU | A | B | C | D |
|-------|-------|-------|-------|-------|
| x 3.0 | Short | Open | Short | Short |
| x 3.5 | Open | Open | Short | Open |
| x 4.0 | Short | Short | Open | Short |
| x 4.5 | Open | Short | Open | Short |
| x 5.0 | Short | Open | Open | Short |
| x 6.0 | Short | Short | Short | Open |

FAN1 CPU FAN POWER

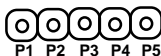
| Pin | Description |
|-----|------------------|
| 1 | Ground |
| 2 | +12VDC * |
| 3 | FAN Speed Sensor |

Note : * :Suspend mode will turn off

SYSFAN System FAN POWER

| Pin | Description |
|-----|------------------|
| 1 | Ground |
| 2 | +12VDC |
| 3 | FAN Speed Sensor |

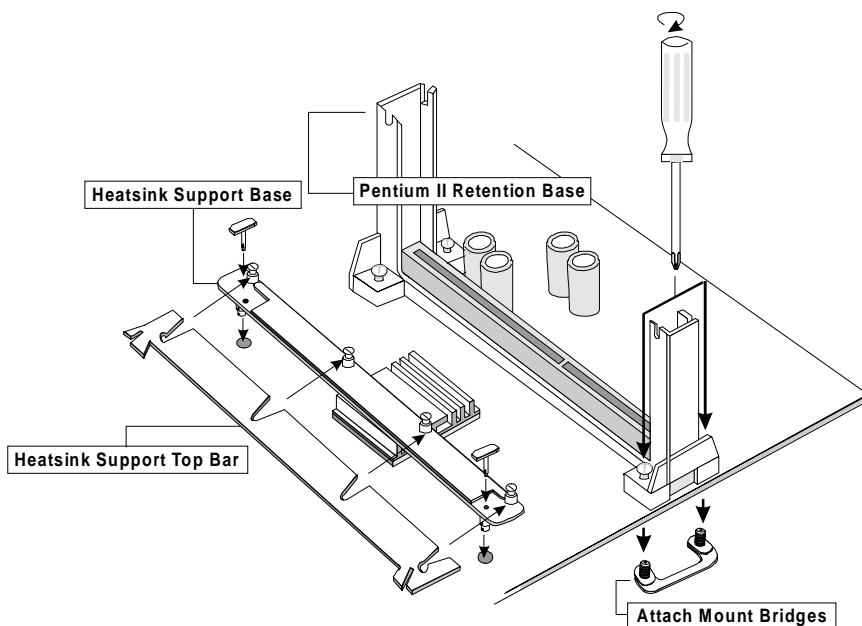
Note : * :Suspend mode will turn off

IR Connector

| Pin | Description |
|-----|-------------|
| 1 | VCC |
| 2 | Fast IR |
| 3 | IRRX |
| 4 | Ground |
| 5 | IRTX |

J1, J2 Audio CD-in Connector**FDD1 Floppy Drive Connector****IDE1 Primary IDE Connector****IDE2 Secondary IDE Connector**

2-5 Installing Pentium II Processor in Slot 1



1. Find the complementary indentation at the bottom of the Pentium II retention base and insert the Pentium II retention base onto Slot 1 accordingly.
2. Insert the attach mount bridges (For the remaining instructions) into the bottom of the mainboard with the curved edges facing outwards, toward the edge of the mainboard.
3. Use a screw driver to lightly tighten the retention base screws.
4. Insert the heatsink support base into the holes on either side of the 440EX PCIset located next to Slot 1. Note that one hole is bigger than the other to prevent backwards insertion.

Chapter 2

5. Insert the heatsink support pins into the heat sink support base with the long axis of the pins parallel to the wide axis of the mainboard. The ends of the pins will protrude through the bottom of the heatsink support base when fully inserted.
6. Insert the Pentium II processor into the Pentium II retention base with the processor's heatsink fitting over the heatsink support base. Press evenly and gently until the snaps on the upper side of the processor have been inserted into the holes at the top of the retention base. Note that when removing the processor, these snaps can be clicked into a completely vertical position, leaving your hands free to stabilize the board and pull the processor evenly and gently out of the board. Also note that like PCI and ISA slots, Slot 1 has a divider that prevents backwards insertion.
7. Insert the heatsink support top bar into the heatsink support base in a horizontal fashion, allowing it to click in place. The heatsink support bar has no directionality (can be inserted with the top facing up or down).

Note:

Installing a heatsink and cooling fan is necessary for proper heat dissipation from your CPU. Failing to install these items may result in overheating and possible burn-out of your CPU.

2-6 Memory Installation

The mainboard lets you add up to 256MB of system memory via DIMM sockets on the mainboard. The mainboard supports the following memory configurations and DIMM socket consists of two 168-pin DIMM Module.

| BANK | MEMORY MODULE |
|--------|---|
| DIMM 1 | 8MB, 16MB, 32MB, 64MB, 128MB 168PIN DIMM (Single Side, Double Side) |
| DIMM 2 | 8MB, 16MB, 32MB, 64MB, 128MB 168PIN DIMM (Single Side, Double Side) |

Notes:

DRAM type : 3.3V , 64/72-bit DEO DRAM(50/60ns) and SDRAM(8/10/12ns)

3

Chapter 3 AWARD BIOS Setup

**This chapter explains how to
configure the mainboard's
BIOS setup program.**

After you have configured the mainboard, and have assembled the components, you can turn on the completed system. At this point, run the software setup to ensure that the system information is correct.

The software setup of the system board is achieved through Basic Input-Output System (BIOS) programming. You use the BIOS setup program to tell the operating system what types of devices are connected to your system board.

The system setup is also called CMOS setup. Normally, you need to run system setup if either the hardware is not identical with information contained in the CMOS RAM, or if the CMOS RAM has lost power.

3-1 Award BIOS Setup

Enter the Award Setup program's Main Menu as follows:

1. Turn on or reboot the system. The following message appears at the bottom of the screen:
"Press to enter setup, ESC to skip memory test"
2. Press the key to enter the Award BIOS setup program and the following screen appears:

| ROM PCI/ISA BIOS CMOS SETUP UTILITY AWARD SOFTWARE, INC. | |
|--|--------------------------|
| STANDARD CMOS SETUP | INTEGRATED PERIPHERALS |
| BIOS FEATURES SETUP | USER PASSWORD |
| CHIPSET FEATURES SETUP | IDE HDD AUTO DETECTION |
| POWER MANAGEMENT SETUP | SAVE & EXIT SETUP |
| PNP/PCI CONFIGURATION | EXIT WITHOUT SAVING |
| LOAD SETUP DEFAULTS | |
| Esc : Quit | ← → ↓ ↑ : Select Item |
| F10 : Save & Exit Setup | (Shift)F2 : Change Color |
| Time , Date , Hard Disk Type ... | |

3. Choose an option and press <Enter>. Modify the system parameters to reflect the options installed in the system. (See the following sections for more information.)
4. Press <ESC> at anytime to return to the Main Menu.
5. In the Main Menu, choose "SAVE AND EXIT SETUP" or <F10> to save your changes and reboot the system.
Choosing "EXIT WITHOUT SAVING" or <ESC> ignores your changes and exits the program.

Chapter 3

3-2 Main Menu Options

The Main Menu options of the Award BIOS are as below.

STANDARD CMOS SETUP

Run the Standard CMOS Setup as follows.

1. Choose "STANDARD CMOS SETUP" from the Main Menu and a screen with a list of items appears.

| ROM PCI/ISA BIOS STANDARD CMOS SETUP AWARD SOFTWARE, INC. | | | | | | | | | |
|---|------|------|------|------|---------------------------|-------|--------|------|--|
| Date (mm:dd:yy) : Tue, APR 9 1998 | | | | | | | | | |
| Time (hh:mm:ss) : 15 : 50 : 44 | | | | | | | | | |
| HARDDISKS | TYPE | SIZE | CYLS | HEAD | PRECOMP | LANDZ | SECTOR | MODE | |
| Primary Master: | Auto | 0 | 0 | 0 | 0 | 0 | 0 | Auto | |
| Primary Slave: | Auto | 0 | 0 | 0 | 0 | 0 | 0 | Auto | |
| Secondary Master: | Auto | 0 | 0 | 0 | 0 | 0 | 0 | Auto | |
| Secondary Slave: | Auto | 0 | 0 | 0 | 0 | 0 | 0 | Auto | |
| Drive A : 1.44M, 3.5 in | | | | | | | | | |
| Drive B : None | | | | | | | | | |
| Video : EGA/VGA | | | | | Base Memory : 640K | | | | |
| Halt On : All Errors | | | | | Extended Memory : 130480K | | | | |
| | | | | | Other Memory : 384K | | | | |
| | | | | | Total Memory : 131072K | | | | |
| Esc : Quit ← → ↑ ↓ : Select Item PU/PD/+/- : Modify | | | | | | | | | |
| F10 : Save & Exit Setup (Shift)F2 : Change Color | | | | | | | | | |

2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn/+/- keys. Some fields let you enter numeric values directly.

Date (mm/dd/yy) Type the current date

Time (hh:mm:ss) Type the current time

Hard Disk Configurations

TYPE : Select from 1 to 45 to fill remaining fields with predefined values of disk drives. Select user to fill the remaining fields. Select auto to detect the HDD type automatically.

SIZE : The hard disk size. The unit is Mega Bytes.

CYLS : The Cylinder number of the hard disk.

HEAD : The read/write head number of hard disk.

PRECOMP : The cylinder number at which the disk drive changes the write timing.

LANDZ : Landing zone.

SECTOR : Number of sectors

MODE : Select auto to detect the mode type automatically. If your hard disk supports the LBA mode, select LBA or Large. However, if your hard disk cylinder is more than 1024 and does not support the LBA function, set at Large. Select Normal if your hard disk supporting cylinders is below 1024.

Drive A & B

| | | |
|--------|---------------|---------------|
| Choose | 360KB 5 1/4" | 1.2MB 5 1/4" |
| | 720KB 3 1/2" | 1.44MB 3 1/2" |
| | Not installed | 2.88MB 3 1/2" |

Video

| | | |
|--------|---------------|-------------|
| Choose | Monochrome | Color 40x25 |
| | VGA/EGA | Color 80x25 |
| | Not installed | |

Halt On

| | | |
|--------|----------------------|-------------------|
| Choose | All Errors (Default) | No Errors |
| | All, But Keyboard | All, But Diskette |
| | All, But Disk/Key | |

Note :

You can select Auto under the TYPE and MODE fields. This will enable auto detection of your IDE drives during bootup.

3. After you have finished with the Standard CMOS Setup program, press the <ESC> key to return to the Main Menu.

BIOS FEATURES SETUP

Run the BIOS Features Setup as follows.

1. Choose "BIOS FEATURES SETUP" from the Main Menu and a screen with a list of items appears.
2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn/+/- keys.

| ROM PCI/ISA BIOS BIOS FEATURES SETUP AWARD SOFTWARE, INC. | | |
|---|------------|-----------------------------------|
| Virus Warning | : Disabled | Video BIOS Shadow : Enabled |
| CPU Internal Cache | : Enabled | C8000-CBFFF Shadow : Disabled |
| External Cache | : Enabled | CC000-CFFFF Shadow : Disabled |
| Quick Power On Self Test | : Enabled | D0000-D3FFF Shadow : Disabled |
| Boot Sequence | : C,A,SCSI | D4000-D7FFF Shadow : Disabled |
| Swap Floppy Drive | : Disabled | D8000-DBFFF Shadow : Disabled |
| Boot Up Floppy Seek | : Enabled | DC000-DFFFF Shadow : Disabled |
| Boot Up NumLock Status | : On | |
| Typematic Rate Setting | : Disabled | |
| Typematic Rate (Chars/Sec) | : 6 | |
| Typematic Delay (Msec) | : 250 | |
| Security Option | : Setup | |
| PS/2 mouse function control | : Enabled | |
| PCI/VGA Palette Snoop | : Disabled | ESC : Quit ←→↑↓: Select Item |
| Assign IRQ for VGA | : Enabled | F1 : Help PU/PD/+/- : Modify |
| OS Select for DRAM >64MB | : Non-OS2 | F5 : Old Values (Shift)F2 : Color |
| Report no FDD for Win95 | : No | F7 : Load Setup Defaults |

Virus Warning

Choose Enabled or Disabled. Enable this option and a SYSTEM WARNING MESSAGE appears when the system detects a virus.

CPU Internal Cache

Choose Enabled or Disabled. This option lets you enable the CPU's internal cache memory.

External Cache

Choose Enabled or Disabled. This option lets you enable the external cache memory. For better performance, make sure you always choose "Enabled."

Quick Power On Self Test

Choose Enabled or Disabled. Enabled provides a fast POST and boot-up speed.

Boot Sequence

The default setting first to boot from drive C: You can reverse this sequence with "A:C:", will then drive A: boot directly.

Swap Floppy Driver

Choose Enabled or Disabled. When Enabled Floppy drives A & B are swapped under DOS.

Boot Up Floppy Seek

Choose "Enabled" or "Disabled". "Disabled" provides a fast boot and reduces the possibility of damage to the heads.

Boot Up Num Lock Status

Choose On or Off. On puts numeric keypad in Num Lock mode at boot-up. Off puts this keypad in arrow key mode at boot-up.

Typematic Rate Setting

This determines the typematic rate.

Enabled : Enable typematic rate and typematic delay programming.

Disabled : Disable typematic rate and typematic delay programming.

The system BIOS will use default value of these 2 items and the default is controlled by keyboard.

Typematic Rate(Chars/Sec)

Choose the rate a character keeps repeating.

Typematic Delay (Msec)

Choose how long after you press a key that a character begins repeating.

Security Option

Choose Setup, or System. Use this feature to prevent unauthorized system boot-up or unauthorized use of BIOS Setup.

"System" - Each time the system boots the password prompt appears.

"Setup" - Password prompt only appears if you attempt to enter the Setup program.

PS/2 mouse function control

The default of Auto allows the system to detect a PS/2 mouse on bootup. If detected, IRQ 12 will be used for the PS/2 mouse. IRQ12 will be reserved for expansion cards if a PS/2 is not detected. Enabled will always reserve IRQ12, whether on bootup a PS/2 mouse is detected or not.

PCI/VGA Palette Snoop

Some display cards that are nonstandard VGA such as graphics accelerators or MPEG Video Cards may not show colors properly. The setting Enabled should correct this problem. Otherwise leave this on the setup default setting of Disabled.

Assign IRQ for VGA

Choose Enabled (default) or Disabled.

Enabled : Add one IRQ to VGA controller.

Disabled : Remove IRQ from VGA controller.

The system will have extra IRQ for other devices but the VGA controller will still not disabled (only IRQ was removed.)

OS/2 Onboard Memory >64M

When using OS/2 operating systems with installed DRAM of greater than 64MB, you need to set this option to Enabled otherwise leave this on Disabled.

C8000-CBFFFF to DC000-DFFFF

These fields are used for shadowing others expansion card ROMs. If you install other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow them specifically. Shadowing a ROM reduces the memory available between 640KB and 1024KB by the amount used for this purpose.

3. After you have finished with the BIOS Features Setup program, press the <ESC> key and then follow screen instructions to save or disregard your settings.

CHIPSET FEATURES SETUP

The "CHIPSET FEATURES SETUP" is used to control the values of the chipset registers. These registers control most of the system options in the computer.

Run the Chipset Features Setup as follows:

1. Choose "CHIPSET FEATURES SETUP" from the Main Menu and a screen with a list of items appears.

| ROM PCI/ISA BIOS CHIPSET FEATURES SETUP AWARD SOFTWARE, INC. | |
|--|--------------------------------------|
| DRAM Speed Selection : 60ns | CPU Warning Temperature : 70°C/158°F |
| DRAM Data Integrity Mode : Non-ECC | Current CPU Temperature : 26°C/78°F |
| SDRAM RAS-to-CAS Delay : Slow | Current CPUFAN1 Speed : 4615 RPM |
| SDRAM RAS Precharge Time: Slow | Current CPUFAN2 Speed : 4000RPM |
| SDRAM CAS latency Time : 3 | Current CPU Voltage (V) : 2.80 V |
| System BIOS Cacheable : Disabled | |
| Video BIOS Cacheable : Disabled | |
| Video ROM Cacheable : Disabled | |
| 8 Bit I/O Recovery Time : 1 | |
| 16 Bit I/O Recovery Time : 1 | |
| Memory Hole At 15Mb Addr. : Disabled | |
| AGP Aperture Size : 64M | |
| ESC : Quit ←→↑↓:Select Item | |
| F1 : Help PU/PD/+/- : Modify | |
| F5 : Old Values (Shift)F2 : Color | |
| F7 : Load Setup Defaults | |

DRAM Speed Selection

The DRAM speed selection is controlled by the DRAM Timing Register 60ns : DRAM Timing (default)

DRAM Data Integrity Mode

These bits provide software configurability of selecting between ECC mode or non-ECC mode of operating of the DRAM interface following manner :
NON-ECC(default) : Byte-Wise Writes supported
ECC : Generation and Checking / Correction.

SDRAM RAS-to-CAS Delay

The SDRAM Timing type : SLOW (Default) , FAST

SDRAM RAS Precharge Time

The SDRAM Timing type : SLOW (Default), FAST

SDRAM CAS Latency Time

The SDRAM Timing type : 2, 3 (Default)

System BIOS Cacheable

When enabled, access to the system BIOS ROM addressed at F0000H-FFFFFH are cached, provided that the cache controller is enabled.

Video BIOS Cacheable

When enabled, access to video BIOS addressed at C0000H to C7FFFH are cached, provided that the cache controller is enabled.

Video RAM Cacheable

Choose enabled or disabled (default).

When enabled, the access to the VGA RAM addressed is cached.

8 Bit I/O Recovery Time

The timing for 8-bit ISA card.

16 Bit I/O Recovery Time

The timing for 16-bit ISA cards

Memory Hole at 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This field allows you to reserve 15MB to 16MB memory address space to ISA expansion cards. This makes memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB. By default, this field is set to Disabled.

AGP Aperture Size (MB)

Memory-mapped, graphics data structures can reside in a graphics aperture. The AGP Aperture Size register allows the selection of an aperture size of 4MB, 8MB, 16MB, 32MB, 64MB, 128MB and 256MB.

CPU Warning Temperature

When CPU temperature is over the setting value, the speaker will sound an alarm and the clock will drop until the temperature is within optimum the temperature range.

2. The items are optimal setting for this mainboard, you should not change them unless you are familiar with the chipset.

POWER MANAGEMENT SETUP

The Power Management controls the mainboard's "green" features that for the power saving Mode, Display turn off and HDD power down that together form the hardware power conservation scheme.

Run the Power Management Setup as follows:

1. Choose "POWER MANAGEMENT SETUP" from the Main Menu and a screen with a list of items appears.

| ROM PCI/ISA BIOS POWER MANAGEMENT SETUP AWARD SOFTWARE, INC. | | | |
|--|----------------|---------------------------------|------------|
| Power Management | : User Define | ** Reload Global Timer Events** | |
| PM Control by APM | : Yes | IRQ3 (3-7, 9-15), NMI | : Enabled |
| Video Off Method | : Suspend->Off | Primary IDE 0 | : Disabled |
| Video Off After | : Standby | Primary IDE 1 | : Disabled |
| MODEM Use IRQ | : 3 | Secondary IDE 0 | : Disabled |
| Doze Mode | : Disable | Secondary IDE 0 | : Disabled |
| Standby Mode | : Disable | Floppy Disk | : Disabled |
| Suspend Mode | : Disable | Serial Port | : Enabled |
| HDD Power Down | : Disable | Parallel Port | : Disabled |
| Throttle Duty Cycle | : 62.5% | | |
| VGA Active Monitor | : Disabled | | |
| Soft-Off by PWR-BTTN | : Delay 4 Sec. | | |
| CPUFAN Off In Suspend | : Enabled | | |
| Resume by Ring | : Enabled | | |
| IRQ 8 Break Suspend | : Disabled | | |
| ESC : Quit ←→↑↓: Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F7 : Load Setup Defaults | | | |

2. A short description of the screen items follows:
 "POWER MANAGEMENT" is the master control for the four power saving modes, doze, standby, suspend mode and HDD power down mode..

Power Management :User Define

Disabled : The system operates in NORMAL conditions (Non-GREEN), and the Power Management function is disabled.

Max.saving : This mode will maximize the power saving capability.

Min.saving : This mode will minimize the power saving capability.

User define : Allow user to define time out parameters to control power saving timing. Refer to item B shown below.

PM Control by APM

The option "No" allows the BIOS to ignore the APM (Advanced Power Management) specification. Selecting "Yes" will allow the BIOS wait for APM's prompt before it enters Doze mode, Standby mode, or Suspend mode. If the APM is installed, it will prompt the BIOS to set the system into the power saving mode after all tasks are done.

Video off Option

This feature provides the selections of the video display power saving mode. The option "Suspend-> Off" allows the video display blanks if the system enters Suspend mode. The option "All modes-> Off" allows the video display banks if the system enters Doze mode or Suspend mode. The option "Always On " allows the video display to stay in standby mode even the system enters Doze or Suspend mode.

Video Off Method

The option "V/H SYNC+Blank" allows the BIOS to blank off screen display by turning off the V-Sync signals sent from add-on VGA card. "DPMS Supported" allows the BIOS to blank off screen display by your add-on VGA card which supports DPMS (Display Power Management Signaling Function.) "Blank Screen" allows the BIOS to blank screen display by turning off the red-green-blue signals.

MODEM use IRQ

When the system is in green function, modem wakes up the system through IRQ.

Doze Mode

When disabled, the system will not enter Doze mode. The specified time option defines the idle time the system takes before it enters Doze mode.

Suspend Mode

When disabled, the system will not enter Suspend mode. The specified time option defines the idle time the system takes before it enters Suspend mode.

HDD Power Down

Selecting Disabled "will turn off the hard disk drive (HDD) motor. Selecting "1 Min..15Min" allows you to define the HDD idle time before the HDD enters Power Saving Mode. The option "When Suspend" lets the BIOS turns the HDD motor off when the system is in Suspend mode.

The options "1Min..15Min" and "When Suspend" will not work concurrently. When HDD is in Power Saving Mode, any access to the HDD will wake the HDD up.

Throttle duty Cycle

Choose the duty cycle time : 12.5%, 25%, 37.5%, 50%, 62.5%(default), 75%, or 87.5%. The bigger of the percentage, the more saving power it gets.

VGA Active Monitor

Enabled : the system can not enter the power saving mode when monitor is on.

Disabled : the system can enter the power saving mode when monitor is on.

Soft-Off by PWRBTN

When enabled, turning the system off with the on/off button places the system in a very low-power-usage state, with only enough circuitry receiving power to detect power button activity or Resume by Ring activity.

Resume by Ring

Enabled : Wake up the system from ring signal.

Disabled : (default) Ring signal can not wake up the system.

PNP/PCI SLOT CONFIGURATION

The “PNP/PCI SLOT CONFIGURATION” sets the system for use with PCI bus cards.

Run the PNP/PCI Slot Configuration program as follows.

1. Choose “PNP/PCI CONFIGURATION” from the Main Menu and a screen with a list of items appears.

| ROM PCI/ISA BIOS PNP/PCI CONFIGURATION AWARD SOFTWARE, INC. | |
|---|--|
| PNP OS Installed : Yes | PCI IDE IRQ Map To : ISA |
| Resources controlled by : Auto | |
| Reset configuration Data : Disabled | |
| | Assign IRQ For USB : Enabled |
| | ESC : Quit ←→↑↓:Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F7 : Load Setup Defaults |

2. Explained below:

PNP OS Installed

If your operating system is a Plug-and-Play one, such as Windows NT, Windows 95, select Yes. The options are : No (Default), Yes.

Resource Controlled By

Manual : The field defines that the PNP Card's resource is controlled by manual. You can set which IRQ-X and DMA-X assigned to PCI/ISA PNP or Legacy ISA cards.

Auto : If your ISA card and PCI card are all PNP cards. To set this field Auto.

The BIOS will be assigned the interrupt resource automatically.

Reset Configuration Data

Disabled : Normal Setting

Enabled : If you had plugged some Legacy cards in the system and there were records into ESCD (Extended System Configuration Data). You can set this field to Enabled and to clear ESCD one time . When some Legacy cards were removed.

PCI IDE IRQ Map To

Select PCI-AUTO (default), ISA, or assign a PCI SLOT number (depending on which slot the PCI IDE is inserted). If PCI-AUTO does not work, then assign an individual PCI SLOT number.

Assign IRQ for USB

Choose enabled(default) or disabled.

Enabled : Add one IRQ to USB controller.

Deisabled : Remove IRQ from USB controller. The system will have extra IRQ for other devices but the USB controller will still not disabled (only IRQ was removed.)

4. After you have finished with the PCI Slot Configuration program, press the <ESC> key and then follow screen instructions to save or disregard your settings.

LOAD SETUP DEFAULTS

This Main Menu item loads the default system values. These settings are recommended for optimum performance. If the CMOS is corrupted when enter BIOS setup utility you must load setup default again. Choose this item and the following message appears:

"Load SETUP Defaults (Y/N)? Y"

To use the Setup defaults, change the prompt to and press "Y" and press <Enter>.

INTEGRATED PERIPHERALS SETUP

The "INTEGRATED PERIPHERALS" is used to control the values of the I/O chipset registers. These registers control the mode of HDD type and I/O address port.

Run the Integrated Peripherals as follows:

1. Choose "INTEGRATED PERIPHERALS" from the Main Menu and a screen with a list of items appears.

| ROM PCI/ISA BIOS INTEGRATED PERIPHERALS AWARD SOFTWARE, INC. | | | |
|--|------------|-------------------------|--------------------|
| IDE HDD Block Mode | : Enabled | UART Mode Select | : Normal |
| IDE Primary Master PIO | : Auto | Parallel Port Mode | : SPP |
| IDE Primary Slave PIO | : Auto | Onboard Parallel Port | : 378/IRQ7 |
| IDE Secondary Master PIO | : Auto | | |
| IDE Secondary Slave PIO | : Auto | | |
| IDE Primary Master UDMA | : Auto | | |
| IDE Primary Slave UDMA | : Auto | | |
| IDE Secondary Master UDMA | : Auto | | |
| IDE Secondary Slave UDMA | : Auto | | |
| On-Chip Primary PCI IDE | : Enabled | | |
| On-Chip Secondary PCI IDE | : Enabled | | |
| USB Keyboard Support | : Disabled | | |
| Init AGP Display First | : Disabled | | |
| KBC input clock | : 8 MHz | | |
| Onboard FDC Controller | : Enabled | ESC : Quit | ←→↑↓:Select Item |
| Onboard Serial Port 1 | : 3F8/IRQ4 | F1 : Help | PU/PD/+/- : Modify |
| Onboard Serial Port 2 | : 2F8/IRQ3 | F5 : Old Values (Shift) | F2 : Color |
| UART 2 Mode | : Standard | ESC : Quit | ←→↑↓:Select Item |

Note:

If you don't use the Onboard IDE connector, than use On-card (PCI or ISA card) IDE connector, you will set Onboard Primary PCI IDE : Disabled and Onbard Secondary PCI IDE : Disabled from CHIPSETFEATURES SETUP UTILITY.

The Onboard PCI IDE cable should be equal to or less than 18 inches (45cm).

IDE HDD Block Mode:

The default value is Enabled.

Enabled : Enabled IDE HDD Block Mode. The HDD transfer rate is better than Disable.

Disabled : Disable IDE HDD Block Mode.

IDE Primary Master PIO /IDE Primary Slave PIO

The default value is Auto.

Auto : BIOS will automatically detect the Onboard PCI IDE HDD Accessing mode.

Mode0-4 : Manually set the IDE Accessing mode.

IDE Secondary Master PIO /IDE Secondary Slave PIO

The default value is Auto.

Auto : BIOS will automatically detect the Onboard PCI IDE HDD Accessing mode.

Mode0-4 : Manually set the IDE Accessing mode.

IDE Primary Master UDMA/IDE Primary Slave UDMA

Allows you to select the first PCI IDE channel of the first master hard disk mode or to detect it by the BIOS if the hard disk supports UDMA (Ultra DMA, faster than DMA).

IDE Secondary Master UDMA/IDE Secondary Slave UDMA

Allows you to select the second PCI IDE channel of the secondary master hard disk mode or to detect it by the BIOS if the hard disk supports UDMA (Ultra DMA, faster than DMA).

On-Chip Primary/Secondary PCI IDE

Turn on(enable)/Turn off(disable) the onboard IDE function.

USB Keyboard Support

Enable : USB keyboard. Disable : AT keyboard.

Onboard FDC Controller

Choose disabled when you use an ISA card with FDD function, or choose enabled to use the onboard FDD connector.

Onboard Parallel Port

Select from a given set of parameters if the parallel port uses the onboard I/O controller.

The options are : 278/IRQ5 , 3BC/IRQ7, 378/IRQ7(Default).

Parallel Port Mode

Allows you to connect with an advanced printer. Select SPP for standard parallel port (SPP) used on IBM PC/XT, PC/AT and bi-directional parallel port found on PS/2 system.

Select ECP Mode for Microsoft and HP Extended Capabilities Parallel Port. Select ECP+EPP Mode for both ECP and EPP Modes ports.

The options are SPP (Default), EPP+SPP Mode, ECP Mode, ECP+EPP Mode.

USER PASSWORD SETTING

This Main Menu item lets you configure the system so that a password is required every time the system boots or an attempt is made to enter the Setup program. The password cannot be longer than 8 characters. If CMOS is corrupted or the option was not used, a default password stored in the ROM will be used. The screen will display the following message:

Enter Password :

IDE HDD AUTO DETECTION

1. If your system has an IDE hard drive, you can use this utility to detect its parameters and automatically enter them into the Standard CMOS Setup.
2. For IDE hard disk driver, the BIOS provides three modes to support both normal IDE hard disk and also drives larger than 528MB, a short description of three modes as follows:
 - a. Normal mode: For drives smaller than 528MB
 - b. Large Mode: For drives larger than 528MB that do not use LBA. There can only be used with MS-DOS operating system.
 - c. LBA mode: For drives larger than 528MB and up to 8.4GB that use logic block addressing mode. Normally we recommend to select LBA Mode if your HDD drives larger than 528MB.
3. This utility will auto detect as many as four IDE drives.

SAVE & EXIT SETUP

After you have made changes under Setup, press "Esc" to return to the main menu. Move cursor to "Save and Exit Setup" or press "F10" and then press "Y" to change the CMOS Setup. If you did not change anything, press "Esc" again or move cursor to Exit Without Saving and press "Y" to retain the Setup settings. The following message will appear at the center of the screen to allow you to save data to CMOS and exit the setup utility.

Save to CMOS and EXIT (Y/N)?

EXIT WITHOUT SAVING

If you select this feature, the following message will appear at the center of the screen to allow you to exit the setup utility without saving CMOS modifications

Quit Without Saving (Y/N)?

4

Chapter 4 Audio Installation

The Audio is a stereo 16 bit PnP sound device. It is compatible with Sound Blaster 16 and Microsoft WindowsSoundSystem.

The Audio supports 3D surround sound function.



4-1 Product Features

- ✓ Special Features
 - ISA bus Plug and Play (PnP) device support: WSS, MPU401, GAME/MIDI PORT, SB16
 - 3D surround sound
 - Full duplex playback and recording
 - Support Windows 95 and Window NT 4.0
 - Auto hardware switching mode between WSS and SB without program setting
 - Support C3D HRTF Demo
- ✓ Compatibility
 - Windows Sound System
 - AdLib/ Sound Blaster 16/PRO/2.0
 - MPU-401 UART MIDI
- ✓ Digitized Audio
 - 16 bit stereo 44KHz sampling rate voice playback/recording
 - Full duplex playback and recording
- ✓ Stereo Mixer
 - Stereo analog mixing from CD-Audio, Line-in
 - Stereo digital mixing from Voice, FM/Wave-table, Digital CD-Audio
 - Mono mixing from MIC
 - Software adjustable volume
- ✓ FM Music Synthesizer
 - OPL3 FM synthesizer (4 operators)
- ✓ MIDI Interface
 - MPU-401 MIDI UART mode
- ✓ Game Port
 - Standard IBM PC joystick/game port (dual channel)
 - External MIDI port for external MIDI keyboard



- ✓ Wave Table Synthesis
 - MPU-401 interface for Wave Table Synthesis (optional)
- ✓ 3D Surround Sound
 - Built-in 3D Surround sound (software control ON/OFF)
- ✓ Software configurable I/O Address, IRQ, DMA channel for all interface (Jumperless)
- ✓ **3D Surround Sound**

Our 3D surround function takes any ordinary stereo signal as input and produces an output signal with dramatically widened stereo imaging and enhanced realism. And requires no extra speakers or special encoding of input signals.

4-2 DOS and Windows 3.1 Applications Installation

Please make sure that your hard disk has 4MB free spaces at least. Insert the "udio Driver Disk" Diskette into drive A: (or B:).

1. Change to drive A(or B) at DOS prompt, type in INSTALL [Enter].
2. Type DOS utilities path that you want to install.
3. Type the path of Windows 3.1 when asking Windows path.
4. Program will expand file to path that you specify.
5. After expanding DOS utilities. program CMINIT.EXE will be executed and showing current value of all I/O. Please adjust I/O to avoiding conflict.
6. Mixer program CMMIX.COM will be executed too. You can adjust default volume to your favorite value. Press ESC key to exit.
7. Install program will continue execute testing program CMTEST.EXE to check output of sound card.



8. Program will launch Windows 3.1 to install device drivers and applications.
9. Please restart PC after installation completed.

Note :

- 1. After installation, if you want to change I/O of Windows device drivers, please execute file CMINIT.EXE to adjust item "WSS I/O", "WSS IRQ" and "WSS DMA".**
- 2. If you didn't install Windows applications (only install DOS utilities), run "WSE1 UP.EXE" in disk root directory to install Windows applications.**

Set DOS environment variables for Sound Blaster compatible

The Audio is compatible with Sound Blaster, so you can execute programs which can run with it, but you need to set the DOS environment variables like below:

C:\SET BLASTER = A2x0 ly Dz T4

x = 2 or 4 (This is address number)

y = 5 or 7 or 9 or 10 (This is IRQ number)

z = 0 or 1 or 3 (This is DMA number)

4-3 Installation of Windows 95

Note :

- 1. We recommend that you have already installed Microsoft Windows 95 before installing Audio. And you didn't install any other sound card device drivers in your current system.**
- 2. If you got any problem with installing Windows 95, please contact your local Microsoft's agent.**

Installing the Windows 95 driver

Steps of installing Windows 95 driver of Audio

1. Turn on the computer, and enter into Microsoft Windows 95.
2. Insert the Audio Windows 95 installation diskette into drive A(Audio Driver Disk).
3. You will see a windows prompt like this:
"New Hardware Found
CMI8330 Audio Adapter
Windows has found new hardware and is installing the software for it", then the dialog box shown.
4. Select "Driver form disk provided by hardware manufacturer", click "OK".
5. When system requests for Audio Windows 95 installation disk. Please make sure the path is point to the drive that installation disk is in, and click "OK".
6. Now, system is installing PnP device drivers automatically. After a while, system finished installation. Then enter Windows 95 main screen. You will hear a wave playing from the system if you have installed speakers.
7. Now, you have already installed Audio on Microsoft Windows 95 successfully.



If you want to install Windows applications of Audio. Please follow the following steps:

1. Click "start" key. Select "Run".
2. Please make sure your Audio Windows 95 driver disk is in floppy A (Audio application Software)
3. Please Key in the path name of Windows applications install program as "A:\WSETUP.EXE"
4. Click "OK" to start the procedure of installation. and follow questions to finish installation.
5. Shut down Windows 95 system and reboot your system, when all of application software have been installed.

Install DOS drivers under Windows 95 DOS

If you enter DOS and excuting applications or games by press "Alt-F5" or "F8" key before Windows 95 system booting. You need to install DOS drivers. Please run "INSTALL .EXE" program in root directory of "Audio Driver Disk" disk.

Please do not specify Windows path when program request. You need only DOS drivers.

If you just running applications and games in Windows 95 system or shut down to DOS, you don't have to install DOS drivers.

4-4 Installation of Windows NT 4.0

Note :

- 1. We recommend that you have already installed Windows NT 4.0 before installing Audio. And you didn't install any other sound card device drivers in your current system.**
- 2. Please make sure your PC BIOS PnP AUTO CONFIG is set to ENABLE, if your PC BIOS supports PnP function.**
- 3. If you got any problem with installing Windows NT 4.0, please contact your local Windows agent.**

Please follow the following steps to install Audio device drivers into Windows NT 4.0.

1. Click "Start" button, move highlight bar to Setting", select "Control Panel".
2. Double click "Multimedia" icon.
3. Select "Devices" page and press "Add" button.
4. Select "Unlisted or Updated Driver" item in "List of Drivers".
5. Specify path that NT drivers is in (ex. A:\NT).
6. Select "C-Media CM8330" item and press "OK " button.
7. Select proper value of I/O.
8. Press "OK" button.
9. Restart system when asking.
10. Now, you have already installed Audio on Microsoft Windows NT 4.0 successfully.

If you want to use MPU-401 MIDI device, please follow the steps describe above. But in steps 4, select "MPU-401 MIDI compatible driver" item. Specify the path of Windows NT 4.0 CD-ROM directory \I386, system will add MPU- 401 MIDI device for you.



4-5 Windows Applications (Audio Rack)

Introduction

Audio Rack lets you control over your PC's audio functions through a user interface as simple to use as a home stereo system.

Audio Rack consists of several major components:

Control Center : Controls the display of Audio Rack's components

MIDI Player: Plays MIDI music tiles. Lets you create song playlists and play the song tiles.

Wave Player: Records and plays digital audio (wave) files. Let's you create wave file playlists and playback the wave files.

CD Player: Plays standard audio CDs. Allows you to create playlist collections of CD tracks (songs).

System Mixer: Sets the volume level of your audio inputs and outputs.

Showing or Hiding Audio Rack Components

To remove or add a component from display, click on the component's button on the Control Center's Button Bar or toggle it off.

System Mixer

System Mixer lets you control all audio output and input levels.

Volume Control: Clicking on this button allows you to use the output level controls.

Recording Control: Clicking on this button allows you to use the input level controls.

Input and Output Level Sliders and Buttons:

For each input or output signal, a control slider controls the loudness, a horizontal slider controls balance between the two speakers, and the mute button temporarily stops input or output without changing slider positions.



Control types and names vary. Some common types are listed below:

- Vol : The master control for all outputs. The strength of an output signal is determined by both the Vol slider and the slider for the individual output. To affect all outputs, move the Vol slider. To change the output of an individual output type, move its slider.
- Line-in : Controls the audio hardware's Line In or Line Out levels. Line In might be for an externally attached cassette player, e.g.
- Mic : Controls the microphone input level.
- Wave : Controls wave (voice) playback or record levels.
- FM : Controls the FM music play or record level.
- Synth : Controls the external MIDI synthesis(wave table) play or record level.
- CD : Controls the CD drive audio output level.
- Dig-CD : Turn on or off the CD drive digital audio output.
- 3D Snd : Toggle the 3D surround sound effect.
- Loud : Toggle the output loudness.
- Mute Buttons :
Toggle between muting and resuming the output volume. A button with a lit LED is resuming the output, while a LED not lit is muted. Several output signals can usually be enabled at once.



MIDI Player, Wave Player, and CD Player

- Sel (or Trk) field:
If you have multiple selections in your playlist, this shows the number of the current selection or CD track.
- Current File or Track:
The name of the current MIDI file, wave audio file, or CD track.
- Total Length field:
displays the total length of tiles or tracks in minutes and seconds.
- Current Time field:
displays the current time of tiles or tracks in minutes and seconds when playback or recording.

Please refer to help screen for more detail button functions description.
(click on help "?" button on player)



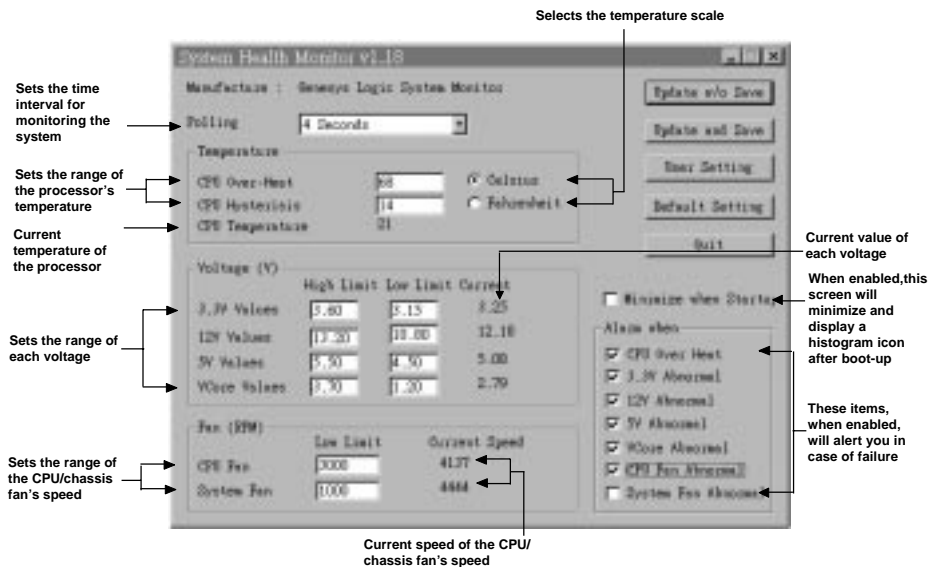
A

Appendix Hardware Mointor Setup/ AGP Utility

**This chapter explains how to
configure the mainboard's
hardware mointor setup
program and AGP utility.**



A-1 System Health Monitor Utility



The system board comes with a System Health Monitor utility contained in the provided CD/diskette. This utility shows the current temperature of the processor, power voltages, and processor/chassis fan speed.

The utility also allows you to manually set the range of the processors temperature, power voltages, and processor/chassis fan speed. If the settings/values are over or under the set range, an error message will pop-up and an alarm will sound. There are three types of sound for the three different failure alarms (temperature, voltage and fan). Refer to the Chipset Features Setup (Chapter 3) section for details.

When you hear a failure alarm, you must power off your computer and check the following: processor fan/heatsink, chassis fan and power supply. We recommend that you use the "Default Setting" which is the ideal setting that would keep the system in good working condition.

**Important:**

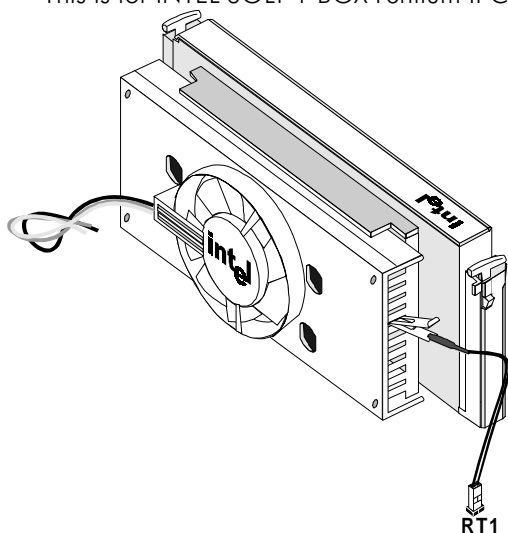
Once this utility is installed, the system will ignore the settings in the “System Health Monitor” field of the Chipset Features Setup. If you are using Windows[®] 95 or Windows NT[®] 4.0, you may select between using the utility and the Chipset Features Setup. For other operating systems, you may only use the Chipset Features Setup.

A-2 Installing the Utility

Insert the CD/diskette that came with the system board. Run SETUP.EXE of the System Health Monitor utility. After completing installation, you will find this utility in “StartUp” under “Programs” of Windows[®] 95 / NT 4.0. Please refer to the “Readme” file for details on using the utility.

A-3 Application

This is for INTEL SOLT 1 BOX Pentium II CPU temperature sensing.





A-4 AGP and EX Chip Utility

Microsoft 95 system not support the AGP controller by Intel 440EX.
Please install winp2x4.exe to upgrade inf file under Win95 DOS prompt.

1. Start Win95.
2. Run MS-DOS prompt.
3. Insert CD/diskette , run winp2x4.exe.

