## Chapter 1

# INTRODUCTION

The MSI NLX LX3 mainboard is a high-performance personal computer mainboard based on the Pentium® II processor. The mainboard supports Intel® 82558 Network chip and Creative Lab® Vibra 16x sound chip. An AGP slot is also available for an AGP VGA card. The Pentium® II processor supports MMX™ (Multimedia Extension) technology.

The mainboard uses the highly integrated Intel® 82440LX AGPset which optimize the system bandwidth and concurrency with the implementation of Quad Port Acceleration (QPA). QPA provides 4-port concurrent arbitration of the processor bus, graphics, PCI bus and SDRAM.

The Intel® 82371AB chipset integrates all system control functions such as ACPI (Advanced Configuration and Power Interface). The ACPI provides more Energy Saving Features for the OSPM(OS Direct Power Management) function. The Intel® 82371AB chipset also improves the IDE transfer rate by supporting Ultra DMA/33 IDE that transfers data at the rate of 33MB/s.

The mainboard also supports the LM78/W83781D System Hardware Monitor Controller as optional function. The System Hardware Monitor function includes: CPU /power supply/chassis fan revolution detect, CPU/ system voltage monitor, system temperature monitor, and chassis intrusion detect(optional).

## 1.1 Mainboard Features

**CPU**
- Slot 1 for Pentium® II processor.
- Supports 200MHz, 233MHz, 266MHz, 300MHz, and 333MHz.
- Core/Bus ratios are x2, x2.5, x3, x3.5, x4, x4.5, x5, x5.5, x6 and higher.

**Switching Voltage Regulator**
- On-board switching mode DC-DC Step Down Regulator.
- Conforms to Intel® VRM ver 8.1 specifications.
- Over-Voltage and Over-Current protection.

**Chipset**
- Intel® 82440LX AGP Chipset.

**Clock Generator**
- 66.6MHz clocks are supported.

**Main Memory**
- Supports six memory banks using three 168-pin unbuffered DIMM sockets.
- Supports a maximum memory size of 768MB.
- Supports ECC(Error Check Correct) function.
- Supports 3.3v unbuffered DIMM.
- Supports Symmetric and Asymmetric DIMM.
- Supports FP, EDO, and SDRAM memory.

**Slots**
- One AGP(Accelerated Graphics Port) slot.
  - AGP specification compliant
  - AGP 66/133MHz 3.3v device support
- NLX interface.

### System Hardware Monitor
- This can be used with Intel® LDCM to monitor system voltage, system temperature & fan rotation speed.
- This can also be used to monitor overall system status over the network.
- System temperature sensor:
  - detect Pentium® II processor's temperature.
- System voltage monitor:
  - monitor CPU core voltage, CPU interface voltage(+2.5v), 3.3v,±12v,±5v
- Fan speed monitor:
  - monitor chassis fan, power fan & CPU cooling fan speed.
- Chassis intrusion sensor: (reserved)
  - monitor any intrusion on the Chassis.

### Power Management Features
- Doze/Standby/Suspend mode.
- System management mode compliant.
- Support APM 1.2.
- Meet ACPI spec.
- PC97 compliant.

### Sound
- Creative® Vibra 16x audio chip.
- Sound Blaster™ 16 compatible.
- Support Plug and Play.
- Full duplex DMA allowing 8-bit or 16-bit data for record and playback.
- 3D audio effects.
- Stereo enhancement support.
- Advanced power management.

### Network
- Intel® 82558 10/100M Ethernet.
- WFW baseline & NET PC specs compliant.
- ACPI
- Magic packet filtering to wake-up LAN.
- ARP & FLEXIBLE frame filtering.
- Software drivers are backwards compatible.

**Note:** Requires an ATX power supply with 720mA 5VSB (5v Stand by).

**Rear Mainboard Connectors**
- PS/2® keyboard interface and PS/2® mouse interface.
- Two COM port connectors.
- One printer port with SPP/EPP/ECP function.
- One USB connector.
- One MIDI/Joystick connector.
- One RJ-45 LAN connector.
- Audio conectors:  Speaker/Line-In/Mic.

**Dimension**
- NLX Form Factor:  21.7cm(L) x 34.6cm(W) x 4 layers PCB.

**Other Features**
- Bulk Erase Flash ROM.
- Supports DMI.
- System Wake-up by modem.
- System Wake-up by alarm.
- Soft-power off. (Windows® 95)
- Polyfuse function.
  - this function works when the electric current is larger than 2A. It will become an open circuit to protect your mainboard.  Turn the power off for 1-3 secs for polyfuse to recover.
- LAN wake-up. (reserved)
- Keyboard password wake-up system.  (reserved)
- Restore AC power loss status.

## 1.2 Mainboard Layout
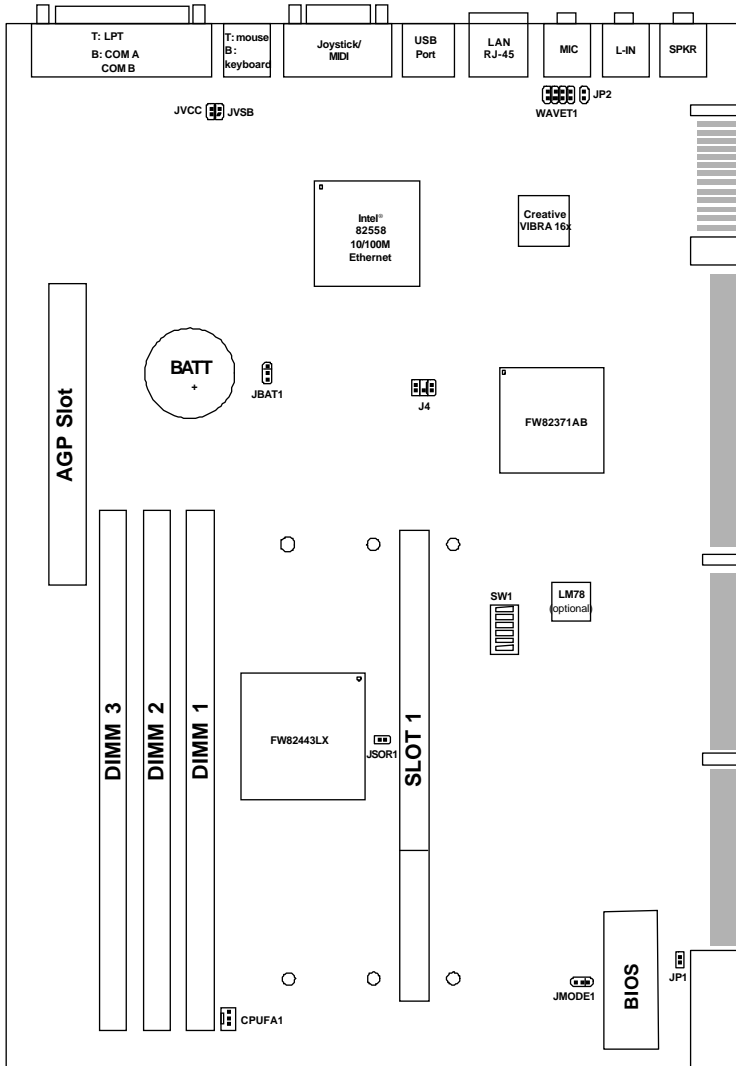


MS-6113

## Chapter 2

## HARDWARE INSTALLATION

## 2.1 Central Processing Unit: CPU

The mainboard operates with **Intel® Pentium® II processor with MMX™ technology.** The mainboard uses a CPU Slot called Slot 1 for easy CPU installation and a DIP switch (SW1) to set the proper speed for the CPU. The CPU should always have a Heat Sink and a cooling fan attached to prevent overheating.

## 2.1-1 CPU Installation Procedures

There are two kinds of Pentium® II processor that is currently used: the OEM Pentium® II processor and the Boxed Pentium® II processor. OEM Pentium® II processor has no Heat Sink, Fan and Heat Sink Support, while the Boxed Pentium® II processor is provided with Heat Sink w/ fan and Heat Sink Support.

## A.  OEM Pentium® II processor Installation Procedures



Processor Lock — Heat Sink W/Fan — Pentium® II Processor — Notch Hole — Heat Sink Support Top Bar — Retention Mechanism — Heat Sink Support Base — Heat Sink Support Pin

## Required Things:

**Pentium® II processor** - Processor.

**\*Retention Mechanism(RM)** - Plastic Guide that holds the S.E.C. Catridge in the Slot 1 connector.

**\*Retention Mechanism Attach Mount(RMAM)** - Bolt/Bridge assemblies inserted up through the bottom of the motherboard. RM secures to RMAM ( 2 RMAM required per RM ).

**\*Heat Sink Support Base (HSSBASE)** - Plastic support bar mounted to the mainboard under the ATX heatsink. (One leg is always bigger than the other one)

**\*Heat Sink Support Pin (HSSPIN)** - Plastic pins inserted through the HSSBASE to secure it to the mainboard (2 required per Assembly).

**\*Heat Sink Support Top Bar (HSSTOP)** - Plastic bar that clips onto the HSSBASE through the fins on the ATX heatsink.

**\*\*Heat Sink w/ fan** - Heat Sink that can be attached to the **Pentium**® **II processor** with metal clip.

**Note:** \* Provided by MSI mainboard.

       \*\* Provided by Special request.
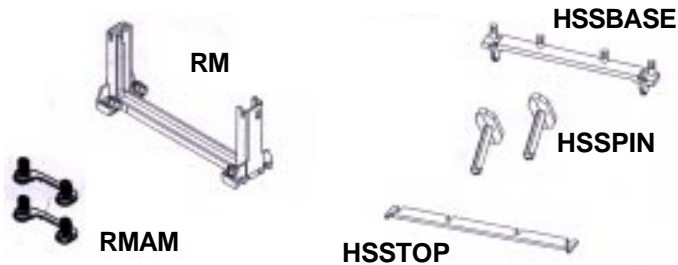


RM       HSSBASE       HSSPIN       RMAM       HSSTOP

**Step 1:** Insert the Retention Mechanism Attach Mount at the bottom of the mainboard.

**Step 2:** Install the Retention Mechanism.

Look for the key on Slot 1, and match it with the Notch Key on the Retention Mechanism for  proper direction.  Then, attach the Retention Mechanism to the Retention Mechanism Attach Mount. Use a Screwdriver to secure the Retention Mechanism.
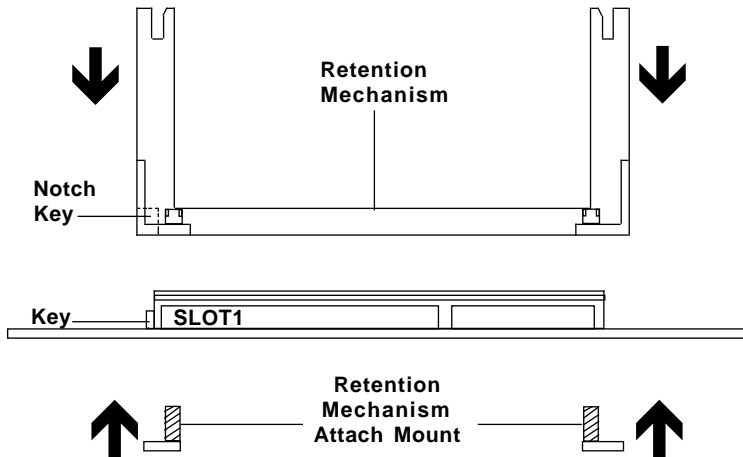
**Step 3:** Install the Heat Sink Support Base.

Look for the Two holes across Slot 1, and match it with the Two legs of the Heat Sink Support Base for the proper direction. Take note that one hole/leg is bigger than the other. The Four top pins of the Heat Sink Support Base should also be oriented towards Slot 1.
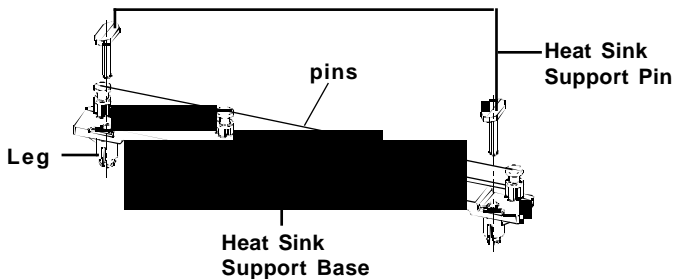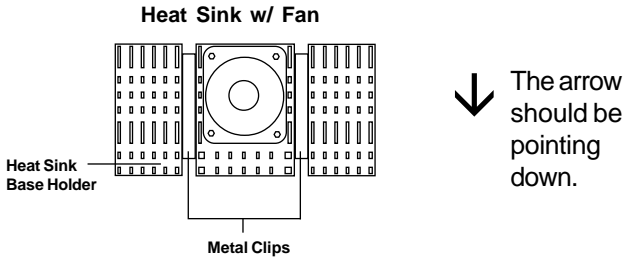


Push the Heat Sink Support Base onto the mainboard, until you hear a click sound. Check for a perfect fit.

**Step 4:** Install the Heat Sink Support Pin.

Push the Heat Sink Support Pins onto the two holes of the Heat Sink Support Base. Check for a perfect fit. These pins are used to secure the Heat Sink Support Base.

**Step 5:** Install the Heat Sink with Fan to the Processor.

Push down the metal clips, so that they are in line with the back of the Heat Sink. Be careful, so as not detach the metal clips from the Heat Sink.

**Heat Sink w/ Fan**

The arrow should be pointing down.

Heat Sink Base Holder

Metal Clips

In case the metal clips are detached from the Heat Sink, re-attach them. Look for the arrow on the metal clip. This arrow should be pointing down and aligned with the Heat Sink Support Base Holder.

Attach the Heat Sink to the processor.

Metal Clips Ear

Clip Holder

Secure holes

Secure Posts

Clip Holder
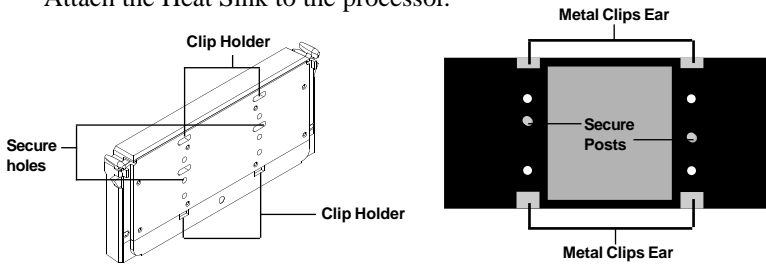
Metal Clips Ear

**Pentium® II processor (Back)**         **Heat Sink w/ Fan(Back)**

- Look at the back of the Heat Sink and take note of the 2 secure posts. Insert these 2 Secure posts to the 2 secure holes on the back of the processor.

- Align the ears of the metal clips with the clip holders on the back of the processor. Use a screw driver to push the metal clips onto the clip holders. Check for a perfect fit.

**Step 6:**  Install the Processor.

Unlock the Processor by pushing in the Processor Locks.



Insert the Processor like inserting a PCI or an ISA card.

**Step 7:**  Lock the Processor Locks.

Secure the CPU by pulling the Processor Locks out.
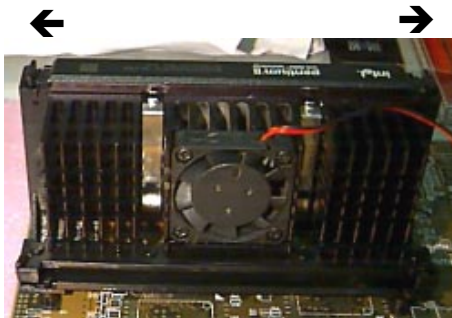
**Step 8:** Install the Heat Sink Support Top Bar.

Push the Heat Sink Support Top Bar to the Heat Sink Support Base,
Until you hear a "click" sound. Check for a perfect fit.



**Heatsink
Support Top
Bar**

The installation is now complete.

## B.  Boxed Pentium® II processor Installation Procedures

The Boxed Pentium® II processor has a built- in Fan and Heat Sink. It also has a Heat Sink Support.  So if you're going to use the Boxed processor, all you need is the Retention Mechanism.

**Step 1:**  Insert the Retention Mechanism Attach Mount at the bottom of the mainboard.

**Step 2:**  Install the Retention Mechanism.

Look for the key on Slot 1, and match it with the Notch Key on the Retention Mechanism for  proper direction.  Then, attach the Retention Mechanism to the Retention Mechanism Attach Mount. Use a Screwdriver to secure the Retention Mechanism.
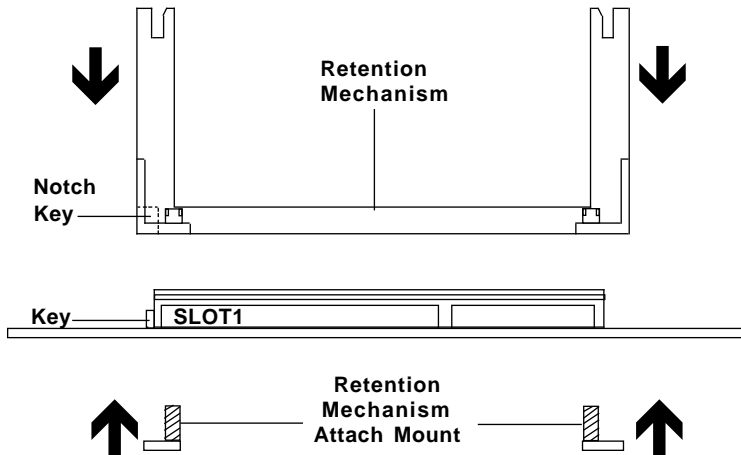
**Step 3:** Install the Heat Sink Support Base.

Look for the 2 holes across Slot 1, and match it with the 2 Heat Sink Support Base.  Take note that one hole/base is bigger than the other.
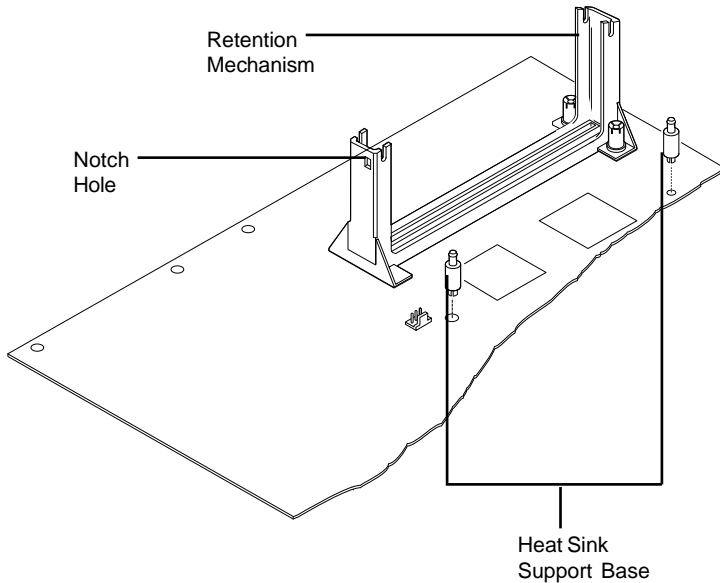


Retention Mechanism

Notch Hole

Heat Sink Support Base

Push the Heat Sink Support Base onto the mainboard, until you hear a click sound.  Check for a perfect fit.

**Step 4:** Install the Heat Sink Support.

Attach the 2 Heat Sink Supports to the sides of the Processor. These Heat Sink Supports will fit in any direction, so be sure that the Heat Sink Support Locks are oriented outwards for the proper direction.



Intel® Boxed
PentiumTM II
Processor

Heat Sink
Support

Heat Sink
Support Lock

PC-3743
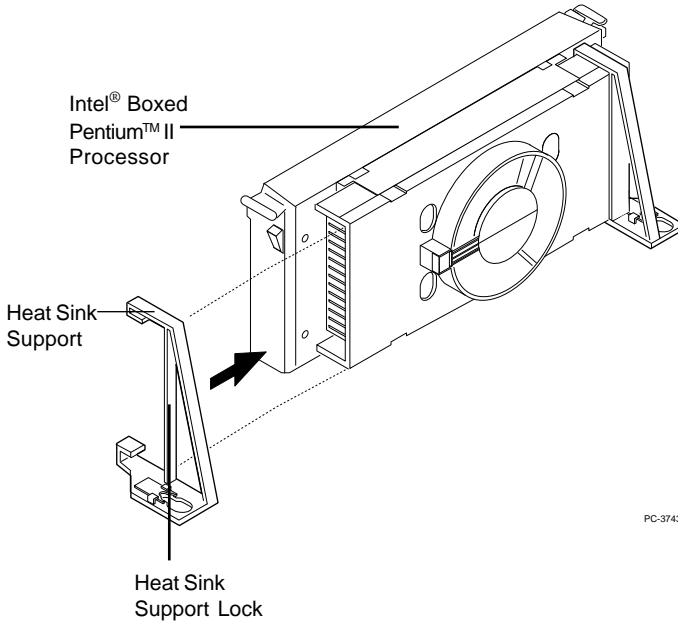
**Step 5:**  Unlock the Processor Locks and Heat Sink Support Locks.

Push in the Processor Locks.  Open the Heat Sink Support Locks.

Processor
Lock

Heatsink
Support
Lock

PC-3744
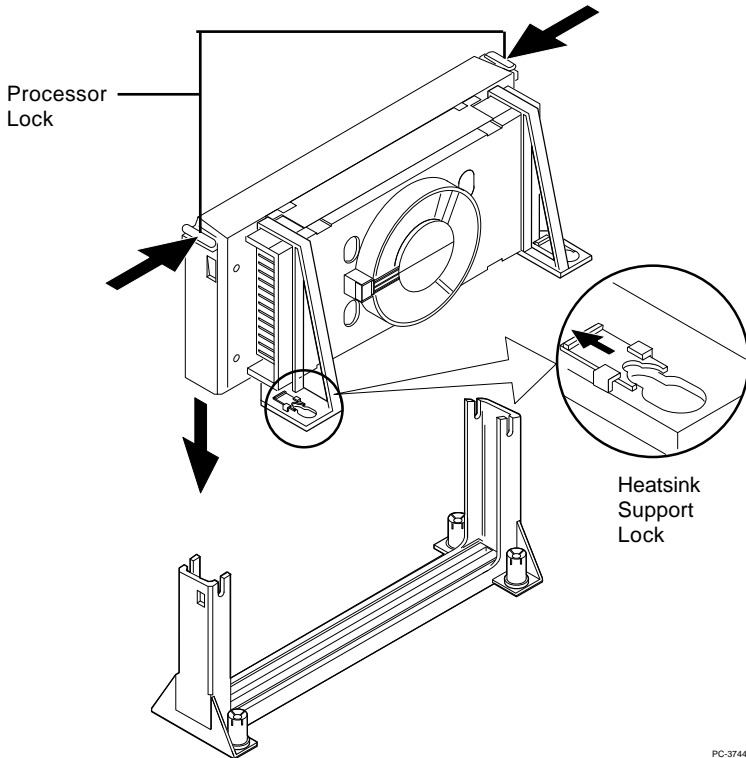
**Step 6:**  Insert the Processor like inserting a PCI or an ISA card.
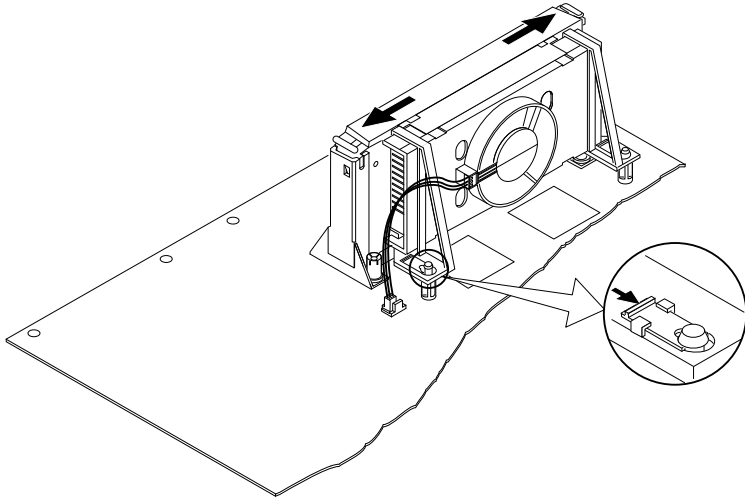
**Step 7:**  Lock the Processor Locks and Heat Sink Support Locks

Secure the CPU by pushing out the Processor Locks.  Close the Heat Sink Support Locks.

The installation is now complete.

## 2.1-2   CPU Core Speed Derivation Procedure

1. The DIP Switch SW1 (5 & 6) is used to adjust the CPU clock frequency.

| SW1 | | CPU |
|:---:|:---:|:---:|
| **5** | **6** | **Clock** |
| OFF | OFF | 66.8MHz |
| OFF | ON | 68.5MHz* |
| ON | OFF | 75MHz* |

**Note:**   We don't guarantee 68.5MHz and
75MHz bus frequency.  It might
not be stable.

2. The DIP Switch SW1 (1, 2, 3, and 4) is used to set the Core/Bus (Fraction) ratio of the CPU. The actual core speed of the CPU is the Host Clock Frequency multiplied by the Core/Bus ratio. For example:

| | | | |
|---|---|---|---|
| **If** | CPU Clock | = | 66MHz |
| | Core/Bus ratio | = | 1.5 |
| **then** | CPU core speed | = | Host Clock x Core/Bus ratio |
| | | = | 66MHz x 1.5 |
| | | = | 100MHz |

| SW1 | | | | CPU |
|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **Core/Bus Ratio** |
| ON | OFF | ON | ON | 2.5 |
| ON | ON | OFF | ON | 3 |
| ON | OFF | OFF | ON | 3.5 |
| ON | ON | ON | OFF | 4 |
| ON | OFF | ON | OFF | 4.5 |
| ON | ON | OFF | OFF | 5 |
| ON | OFF | OFF | OFF | 5.5 |
| OFF | ON | ON | ON | 6 |
| OFF | OFF | ON | ON | 6.5 |
| OFF | ON | OFF | ON | 7 |
| OFF | OFF | OFF | ON | 7.5 |
| OFF | ON | ON | OFF | 8 |

3. The PCI Bus Clock is fixed at 33MHz.

## 2.1-3 CPU Speed Setting: SW1

To adjust the speed of the CPU, you must know the specifications of your CPU (*always ask the vendor for CPU spec.*). Then look at **Table 2.1 (200 ~ 333MHz Intel® Pentium® II processor)** for setting.
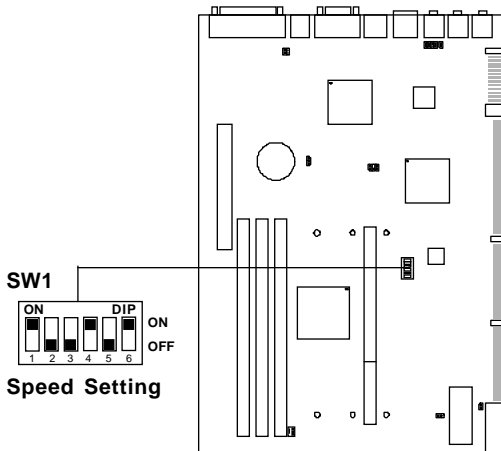
SW1

Speed Setting

Table 2.1 200 ~ 333MHz Intel® Pentium® II processor

| CPU Type | SW1 |
|----------|-----|
| 200MHz | |
| 233MHz | |
| 266MHz | |
| 300MHz | |
| 333MHz | |

## 2.1-4  Fan Power Connector:  CPUFA1

This connector support system cooling fan with +12V.  It supports three pin
head connector.   When connecting  the wire to the connector, always take
note that the red wire is the positive and should be connected to the +12V,
the black wire is Ground and should be connected to GND.  If your
mainboard had 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.
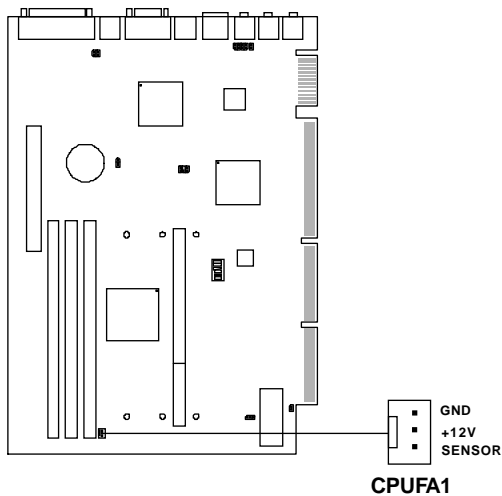


**CPUFA1**

**Note:**  For fans with speed sensor, every rotation of the fan will send out 2
        pulses.  System Hardware monitor will count and report the fan
        rotation speed.

## 2.2 External Battery Connector: JBAT1

A battery must be used to retain the mainboard configuration in CMOS
RAM.   If you use the on-board battery, you must short 1-2  pins of JBAT1
to keep the CMOS data.
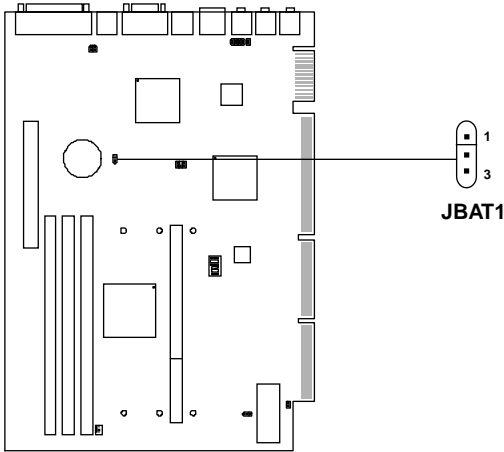


JBAT1

| JBAT1 | Function |
|-------|----------|
| 1<br>3 | **Keep Data** |
| 1<br>3 | **Clear Data** |

**Note:**     You can clear CMOS by shorting 2-3 pin, while the system is off.
            Then, return to 1-2 pin position.  To be able to clear the CMOS, you
            need to unplug the power plug of the system, because there's a 3V
            standby power for PIIX4 chipset which is provided by the power
            supply.  Otherwise, the CMOS will not be cleared.

## 2.3  Flash ROM Programming Voltage:  JMODE1

This jumper is for setting the voltage of the Flash ROM BIOS.
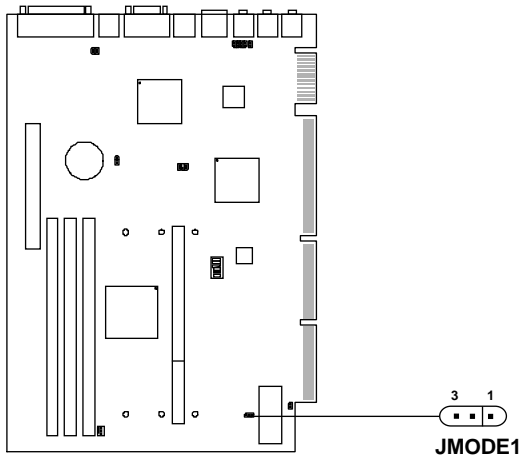


**JMODE1**

| JMODE1 | Function |
|--------|----------|
|  | **+12V** |
|  | **+5V (default)** |

**Note:**   a. Short 1-2 pin, if you're using Intel® or MXIC® flash memory and you want to flash the ROM data.
   b. Short 2-3 pin, if you're using Intel® or MXIC® flash memory for normal operation.
   c. Leave JMODE1 open, if you're using Winbond® flash memory.

## 2.4  Power On Mode Jumper: JP1

The mainboard supports two kinds of system boot up: the Boot-Up by switch and the Immediate Boot-Up.  With the Boot-Up by Switch, the system will boot up only when the power on switch is pressed.  For Immediate Boot-Up, the system will boot up instantly when the power connector is connected into the system.
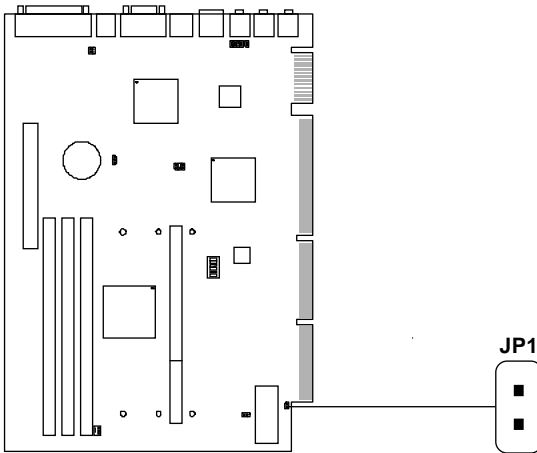


**Table 2.4:  Power On Mode Feature**

| JP1 | Feature |
|:---:|:---:|
|  | Select Boot-Up by Switch |
|  | Select Immediate Boot-Up |

**Note:**  Short **JP1**, when using Boot-Up by Switch feature.  Open **JP1**, to enable Immediate Boot-Up.

## 2.5 Keyboard Power-On Feature: JVCC/JVSB

This is used to enable/disable the keyboard power on feature. This mainboard supports keyboard power-on feature. The keyboard needs to have a power supply which can provide sufficient 5V standby power for both the keyboard and the mainboard.
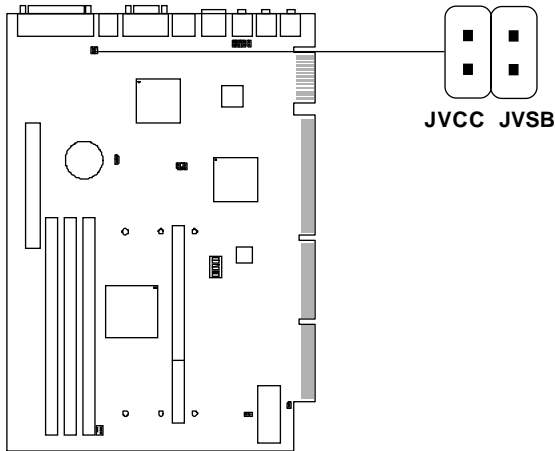


**JVCC  JVSB**

| JVCC/JVSB | Function |
|:---:|:---:|
|  | Enabled |
|  | Disabled |

**Note:**    a. To be able to use this function, you need a power supply that provide enough power for the keyboard power on feature. (750 ma power supply with 5V Stand-by)
b. Consult power supply vendor about the 5V stand-by for your keyboard power consumption.
c. If JVCC is short, then you cannot set the BIOS setting of Keyboard/Mouse Wake-up function to Enabled. It will not turn the system on. If this happen, you must clear the CMOS.

## 2.6 Memory Installation

### 2.6-1  Memory Bank Configuration

The mainboard supports a maximum of  768MB of memory :  It provides
three 168-pin **unbuffered** DIMMs (Double In-Line Memory Module) sockets.
It supports 8 MB to 256 Mbytes DIMM memory module.  The memory
module can be either FP(Fast Page), EDO (Extended Data Output), and
SDRAM(Synchronous DRAM) MODE DRAM.
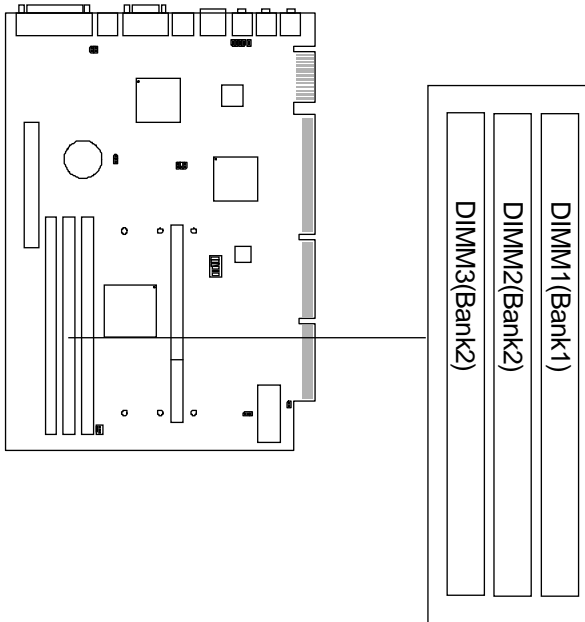
## 2.6-2   Memory Installation Procedures:

### A. How to install a DIMM Module
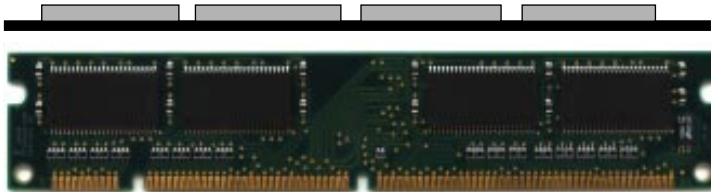


**Single Sided DIMM**
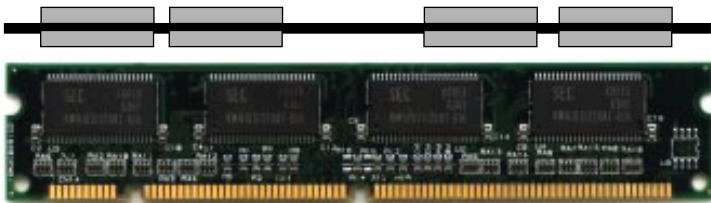


**Double Sided DIMM**

1. The DIMM slot has a two Notch Key "VOLT and DRAM", so the DIMM memory module can only fit in one direction.

2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in.



**DRAM          VOLT**
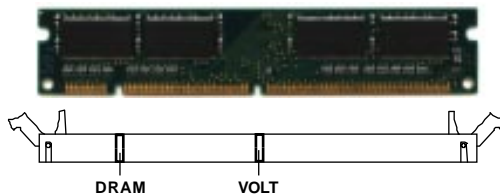
3. The plastic clip at the side of the DIMM slot will automatically close.

## 2.6-3   Memory Population Rules

1. To operate properly, at least one 168-pin DIMM module must be installed. This mainboard supports Table Free memory, so memory can be installed on (DIMM1),  (DIMM2), or  (DIMM 3), in any order.

2. Use only a 3.3v unbuffered DIMM.

3. Supports FP, EDO,  and SDRAM DIMM.

4.  The DRAM addressing and the size supported by the mainboard is shown next page.

## Table 2.5-1 EDO DRAM Memory Addressing

| DRAM Tech. | DRAM Density & Width | DRAM Addressing | Address Size | | MB/SIMM | |
|---|---|---|---|---|---|---|
| | | | Row | Column | Single no. Side(S) pcs. | Double no. Side(D) pcs. |
| 4M | 1Mx4 | SYMM | 10 | 10 | 4MBx8 | 8MBx16 |
| 16M | 1Mx16 | SYMM | 10 | 10 | 4MBx2 | 8MBx4 |
| | 1Mx16 | ASYM | 12 | 8 | 4MBx2 | 8MBx4 |
| | 2Mx8 | ASYM | 11 | 10 | 8MBx4 | 16MBx8 |
| | 2Mx8 | ASYM | 12 | 9 | 8MBx4 | 16MBx8 |
| | 4Mx4 | SYMM | 11 | 11 | 16MBx8 | 32MBx16 |
| | 4Mx4 | ASYM | 12 | 10 | 16MBx8 | 32MBx16 |
| 64M | 2Mx32 | ASYM | 11 | 10 | 8MBx1 | 16MBx2 |
| | 2Mx32 | ASYM | 12 | 9 | 8MBx1 | 16MBx2 |
| | 2Mx32 | ASYM | 13 | 8 | 8MBx1 | 16MBx2 |
| | 4Mx16 | SYMM | 11 | 11 | 16MBx2 | 32MBx4 |
| | 4Mx16 | ASYM | 12 | 10 | 16MBx2 | 32MBx4 |
| | 8Mx8 | ASYM | 12 | 11 | 32MBx4 | 64MBx8 |
| | 16Mx4 | SYMM | 12 | 12 | 64MBx8 | 128MBx16 |

## Table 2.5-2  SDRAM Memory Addressing

| DRAM Tech. | DRAM Density & Width | DRAM Addressing | Address Size | | MB/DIMM | |
|---|---|---|---|---|---|---|
| | | | Row | Column | Single no. Side(S) pcs. | Double no. Side(D) pcs. |
| 16M | 1Mx16 | ASYM | 11 | 8 | 8MBx4 | 16MBx8 |
| | 2Mx8 | ASYM | 11 | 9 | 16MBx8 | 32MBx16 |
| | 4Mx4 | ASYM | 11 | 10 | 32MB | 64MB |
| 64M | 2Mx32 | ASYM | 11 | 9 | 32MBx2 | 64MBx4 |
| | 2Mx32 | ASYM | 12 | 8 | 16MBx2 | 32MBx4 |
| | 4Mx16 | ASYM | 11 | 10 | 32MB | 64MB |
| | 4Mx16 | ASYM | 13 | 8 | 32MB | 64MB |
| | 8Mx8 | ASYM | 13 | 9 | 64MB | 128MB |
| | 16Mx4 | ASYM | 13 | 10 | 128MB | 256MB |
| 64M | 2Mx32 | ASYM | 11 | 8 | | |
| | 4Mx16 | ASYM | 12 | 8 | | |
| | 8Mx8 | ASYM | 12 | 9 | | |
| | 16Mx4 | ASYM | 12 | 10 | | |

## 2.7  Serial Port Connectors:  COM A & COM B

The mainboard has two 9-pin male DIN connectors for serial ports COM A and COM B.  These two ports are 16550A  high speed communication ports that send/receive 16 bytes FIFOs.  You can attach a mouse or a modem cable directly into these connectors.

1 2 3 4 5

6 7 8 9
**COM  A**            **COM  B**
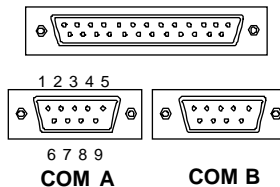
### PIN  DEFINITION

| PIN | SIGNAL |
|-----|--------|
| 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** |
| 6 | **DSR**(Data Set Ready) |
| 7 | **RTS**(Request To Send) |
| 8 | **CTS**(Clear To Send) |
| 9 | **RI**(Ring Indicate) |

## 2.8  Parallel Port Connector: LPT

The mainboard provides a 25 pin female centronic connector for LPT.  A parallel port is a standard printer port that also supports Enhanced Parallel Port(EPP) and Extended capabilities Parallel Port(ECP).  See connector and pin definition below:
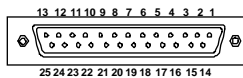
**LPT**

### PIN  DEFINITION

| PIN | SIGNAL | PIN | SIGNAL |
|-----|--------|-----|--------|
| 1   | STROBE | 14  | AUTO FEED# |
| 2   | DATA0  | 15  | ERR#   |
| 3   | DATA1  | 16  | INIT#  |
| 4   | DATA2  | 17  | SLIN#  |
| 5   | DATA3  | 18  | GND    |
| 6   | DATA4  | 19  | GND    |
| 7   | DATA5  | 20  | GND    |
| 8   | DATA6  | 21  | GND    |
| 9   | DATA7  | 22  | GND    |
| 10  | ACK#   | 23  | GND    |
| 11  | BUSY   | 24  | GND    |
| 12  | PE     | 25  | GND    |
| 13  | SELECT |     |        |

## 2.9  Mouse Connector

The mainboard provides a standard PS/2® mouse mini DIN connector for attaching a PS/2® mouse.  You can plug a PS/2® mouse directly into this connector.  The connector location and pin definition are shown below:
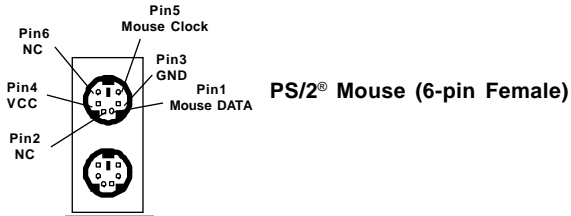


## 2.10  Keyboard Connector

The mainboard provides a standard PS/2® keyboard mini DIN connector for attaching a keyboard.  You can plug a keyboard cable directly to this connector.
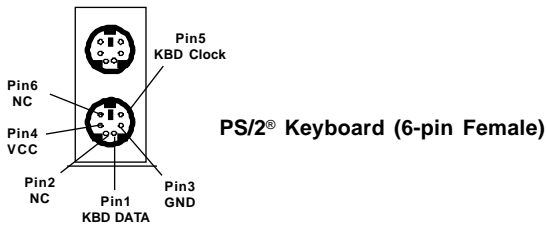
## 2.11 Joystick/Midi Connectors

You can connect MIDI keyboard, joystick or game pads to this connector.
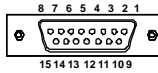


### Joystick/Midi(15-Pin Female)

| PIN | SIGNAL |
|-----|--------|
| 1 | +5v |
| 2 | Joystick But0 |
| 3 | Joystick X1 |
| 4 | GND |
| 5 | GND |
| 6 | Joystick Y1 |
| 7 | Joystick But1 |
| 8 | +5v |
| 9 | +5v |
| 10 | Joystick But2 |
| 11 | Joystick X2 |
| 12 | Midi Out |
| 13 | Joystick Y2 |
| 14 | Joystick But3 |
| 15 | Midi In |

## 2.12 USB Connector

The mainboard provides a **UHCI(Universal Host Controller Interface) Universal Serial Bus root** for attaching USB devices like: keyboard, mouse and other USB devices. You can plug the USB device directly to this connector.
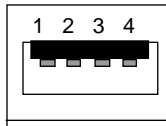


**USB Port**

| PIN | SIGNAL | DESCRIPTION |
|-----|--------|-------------|
| 1 | VCC | +5V |
| 2 | -Data 0 | Negative Data Channel 0 |
| 3 | GND | Ground |
| 4 | +Data 0 | Positive Data Channel 0 |

**USB Port Description**

## 2.13  LAN Connector

The mainboard provides a RJ-45 connector for your network need.
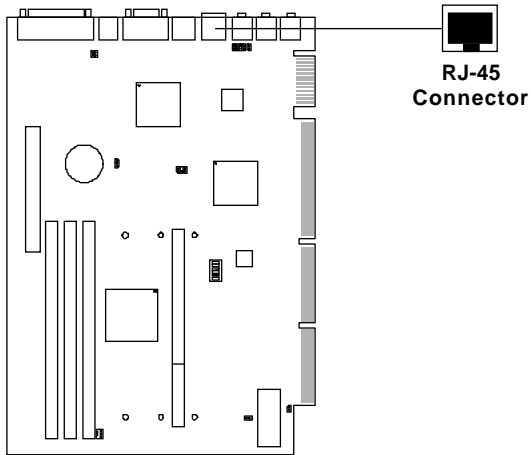


**RJ-45 Connector**

## 2.14 Audio Port Connectors

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



Speaker    Line In   Mic
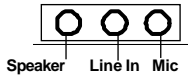
**1/8" Stereo Audio Connectors**

## 2.15 PC Speaker Amplify: JP2

This jumper is used to amplify the PC speaker.



JP2
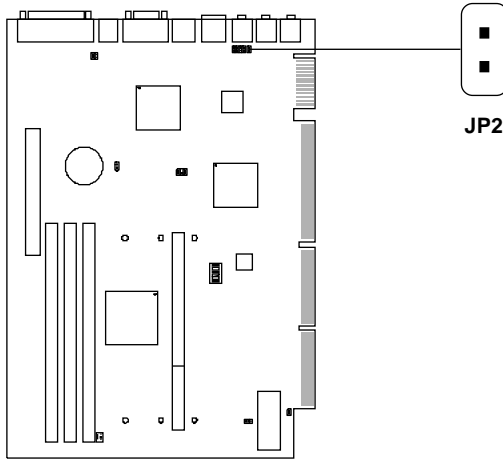
| JP2 | Feature |
|-----|---------|
|  | Enable |
|  | Disable |

**Note:** Short **JP2**, to enable the PC speaker amplify.  Open **JP2**, to disable the PC speaker amplify.

## 2.16  On-board Sound Chip Wave Table Connector: WAVET1
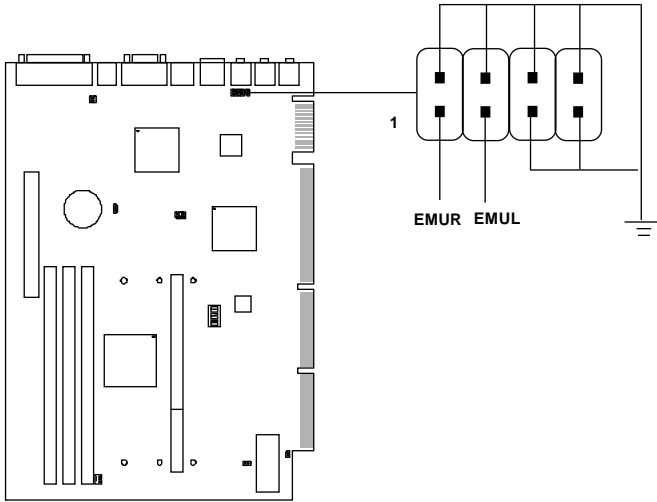
## 2.17  SB-Link™ Sound Connector: J4

The mainboard provides a connector to support the PC-PCI technology of
Sound Blaster AWE64D.  This will enable users to play real-mode DOS
game.



J4
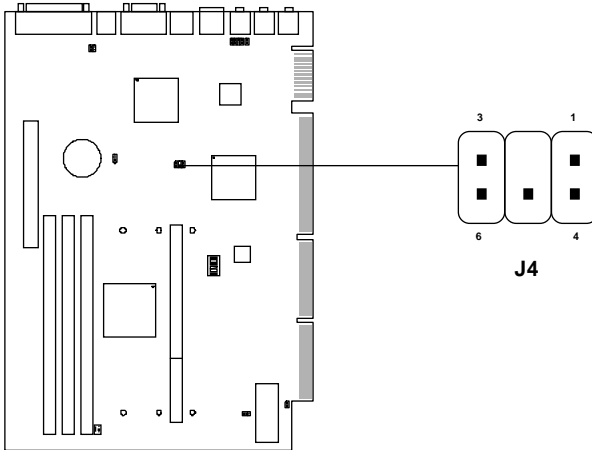
| PIN | SIGNAL |
|-----|--------|
| 1 | DMA Grand Signal |
| 2 | NC |
| 3 | GND |
| 4 | GND |
| 5 | DMA Request Signal |
| 6 | Serial Interrupt SIgnal |

## 2.18  CPU Temperature Sensor:  JSOR1

This is used to check the CPU temperature.  The JSOR1 is a sensor that is placed near the processor heatsink.  This will monitor the CPU temperature.



JSOR1
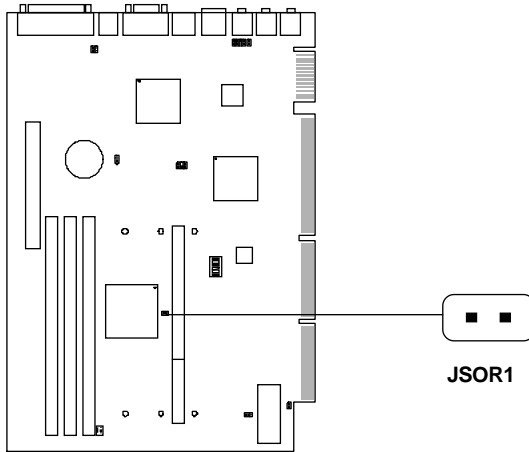
## 2.19 MS-5931 Riser Card (Optional)

The MS-5931 Riser card can be used with the MS-6113 mainboard.
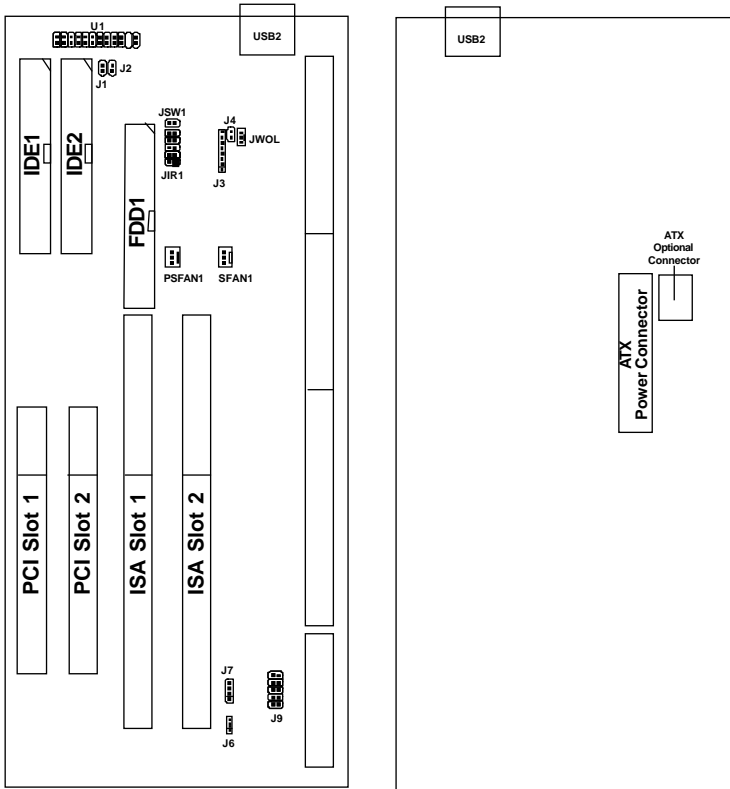


**MS-5931(Front View)**          **MS-5931(Back View)**

### 2.19-1 Power Saving LED: J1

This connector is used by Power Saving LED.
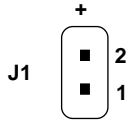
**Note:** During **Suspend Mode**, this LED will light up.

### 2.19-2 Power LED: J2

This connector is used by Power LED.
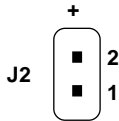
**Note:** During **System-On Mode**, this LED will light up.

### 2.19-3 Front Panel Connector: U1
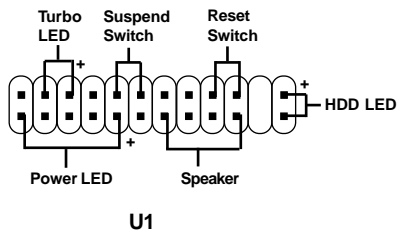
### a. Turbo LED
The Turbo LED is always ON. You can connect the Turbo LED from
the system case to this pin.

### b. Reset Switch
Reset switch is used to reboot the system rather than turning the
power ON/OFF. Avoid rebooting while the HDD LED is lit. You can
connect the Reset switch from the system case to this pin.

### c. Power LED
The Power LED is always lit while the system power is on. You can
connect the Power LED from the system case to this pin.

### d. Speaker
Speaker from the system case is connected to this pin.

### e. HDD LED
HDD LED shows the activity of a hard disk drive. Avoid turning the
power off while the HDD led is lit. You can connect the HDD LED
from the system case to this pin.

### f. Suspend Switch
This 2-pin connector is used to suspend the system.

## 2.19-4 USB Secondary Port: USB2
Connector for USB devices like: keyboard, mouse and other USB devices.
You can plug the USB device directly to this connector.

## 2.19-5 Power ON/Off Switch Connector: JSW1
Connect to a 2-pin push button switch. If Instant-on is Enabled, every time
the switch is shorted by pushing it once, the power supply will change its
status from OFF to ON. **If Instant-on is Disabled: During ON stage, push
once and the system goes to sleep mode: pushing it more than 4 seconds
will change its status from ON to OFF**. If you want to change the setup,
you could go to the BIOS Power Management Setup.

JSW1

## 2.19-6  Infrared Module Connector:   JIR1

The mainboard provides two 5-pin infrared (IR) connectors for IR modules. These connectors are for optional wireless transmitting and receiving infrared module.  You must configure the setting through the BIOS setup to use the IR function.  FIR and Consumer IR are reserved functions for future Super I/O chipset. **\*FIR:  CIRRX is reserved.**

```
NC  ┤■  ■├IRTX
NC  ┤■  ■├GND
NC  ┤■  ■├IRRX
CIRRX ┤■  ■├NC
NC  ┤■  ■├VCC
         1
```

**JIR1**
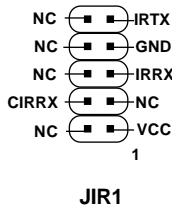
## 2.19-7  Internal Modem Ring Wake-Up Connector/Chassis Intrusion Selector:   J3

The J3 pin 1-6 is used for special internal modem that supports the ring power on function.

```
8  ■ ─┐
    ■ ─┘ Chassis Intrusion

    ■ ─ NC
    ■ ─ 5VSB
    ■ ─ NC
    ■ ─ MDM
    ■ ─ ⏚
1   ■ ─ NC
```
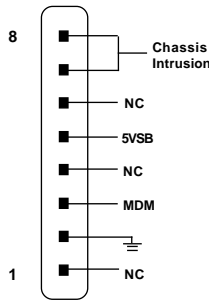
| J3 | Chassis Intrusion |
|---|---|
| Short pin 7-8 | To Enable Chassis Intrusion |
| Open pin 7-8 | To Disable Chassis Intrusion |

## 2.19-8 Chassis Intrusion Switch Connector:   J4

This connector can be used to connect the Chassis Intrusion switch.

**J4**

## 2.19-9  Wake On LAN Connector:   JWOL

The JWOL connector is for use with LAN add-on cards that supports Wake Up on LAN function.

**JWOL**

| PIN | SIGNAL |
|-----|-----------|
| 1 | 5VSB |
| 2 | GND |
| 3 | MP_WAKEUP |

**Note:**  LAN wake-up signal is active "high".

**Note:**    To be able to use this function, you need a power supply that provide enough power for this feature.
(750 ma power supply with 5V Stand-by)

### 2.19-10 Power/System Fan Connector: PSFAN1/SFAN1

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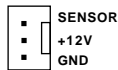
```
          . SENSOR
          . +12V
          . GND
```

PSFAN1: Power Fan          **PSFAN1/SFAN1**
SFAN1: System Fan

**Note:** For fans with speed sensor, every rotation of the fan will send out 2 pulses. System Hardware monitor will count and report the fan rotation speed.

### 2.19-11  2mm CD-ROM Input Connector:  J6

J6 is used as a CD Line-in connector. Connect the audio cable provided by the CD-ROM.

### 2.19-12  2.54mm CD-ROM Input Connector:  J7

J7 is used as a CD Line-in connector. Connect the audio cable provided by the CD-ROM.

## Chapter 3

## AMI® BIOS USER GUIDE

The system configuration information and chipset register information is stored in the CMOS RAM.  This information is retained by a battery when the power is off.  Enter the BIOS setup (if needed) to modify this information.

The following pages will describe how to enter BIOS setup, and all about options.

## 3.1 Enter BIOS Setup

**Enter the AMI® setup Program's Main Menu as follows:**

1. Turn on  or reboot the system.  The following screen appears with
   a series of diagnostic check.

```
AMIBIOS (C) 1996 American Megatrends Inc.
AGIOMS  VXXX  XXXXXX

Hit <DEL> if you want to run setup






(C) American Megatrends Inc.
61-XXXX-001169-00111111-071592-i82440FX-H
```

2. When the "Hit <DEL>" message appears, press <DEL> key to
   enter the BIOS setup screen.

3. After pressing <DEL> key, the BIOS setup screen will appear.

**Note:** *If you don't want to modify CMOS original setting, then don't press any*
        *key during the system boot.*

```
┌─────────────────────────────────────────────────┐
│   AMIBIOS  HIFLEX  SETUP  UTILITIES  -  VERSION 1.07 │
│   (C) 1996 American Megatrends, Inc. All Rights     │
│                   Reserved                          │
├─────────────────────────────────────────────────┤
│               Standard  CMOS  Setup                 │
│               Advanced  CMOS  Setup                 │
│             Advanced  Chipset  Setup                │
│             Power  Management  Setup                │
│           PCI/Plug  and  Play  Setup                │
│                 Peripheral  Setup                   │
│             Hardware  Monitor  Setup                │
│             Auto-Detect  Hard  Disks                │
│               Change  User  Password                │
│           Change  Supervisor  Password              │
│       Change  Keyboard  Wake-Up  Password           │
│             Change  Language  Setting               │
│     Auto  Configuration  with  Optimal  Settings    │
│   Auto  Configuration  with  Fail  Safe  Settings   │
│             Save  Settings  and  Exit               │
│               Exit  without  Saving                 │
├─────────────────────────────────────────────────┤
│   Standard CMOS setup for changing time, hard disk type, etc. │
└─────────────────────────────────────────────────┘
```

4.  Use the <Up> and <Down> key to move the highlight scroll up or down.

5.  Use the <ENTER> key to select the option.

6.  To exit, press <ESC>.  To save and exit, press <F10>.

7.  Section 3.2 to 3.7 will explain the option in more details.

## 3.2 Standard CMOS Setup

1. Press <ENTER> on "Standard CMOS Setup" of the main menu screen .

```
          AMIBIOS  SETUP  -  STANDARD  CMOS  SETUP
 (C)1996  American  Megatrends,Inc.All  Rights  Reserved

 Date (mm/dd/yyyy): Mon Jan 26, 1998
 Time (hh/mm/ss):   17:09:25

 Floppy Drive A:              1.44 MB 3 1/2
 Floppy Drive B:              Not  Installed
                                         LBA   Blk   PIO   32Bit
            Type  Size  Cyln  Head  WPcom Sec  Mode  Mode  Mode  Mode
 Pri Master :Auto                        ON    ON    AUTO  ON
 Pri Slave  :Auto                        ON    ON    AUTO  ON
 Sec Master :Auto                        ON    ON    AUTO  ON
 Sec Slave  :Auto                        ON    ON    AUTO  ON

 Boot  Sector  Virus  Protection Disabled


 Month    : Jan-Dec                  ESC:Exit :Sel
 Day      : 01-31                    PgUp/PgDn:Modify
 Year     : 1901-2099                F2/F3:Color
```

2. Use <Up> and <Down> to choose the item and <PgUp> and <PgDn> keys to modify the highlighted item.

3. After you have finished with the Standard CMOS Setup,    press <ESC> to go back to the main menu.

## 3.3 Advanced CMOS Setup

1.  Press <ENTER> on "Advanced CMOS Setup" of the main menu

```
          AMIBIOS  SETUP  -  ADVANCED  CMOS  SETUP
      (C)  1996  American  Megatrends,  Inc.  All  Rights
                        Reserved
Quick Boot                    Enabled      Available  Options:
Ist Boot Device               Floppy       Enabled
2nd Boot Device               IDE 0        Disabled
3rd Boot Device               CD-ROM
Try Other Boot Devices        Yes
Floppy Access Control         Read-Write
Hard Disk Access Control      Read-Write
S.M.A.R.T. for Hard Disks     Disabled
BootUp Num-Lock               On
Floppy Drive Swap             Disabled
Floppy Drive Seek             Disabled
PS/2 Mouse Support            Enabled
Primary Display               Abset
Password Check                Setup
Boot to OS/2 64M              No
Cache Bus ECC                 Enabled
System BIOS Cacheable         Enabled
C000, 16k Shadow              Cached
C400, 16k Shadow              Cached
C800, 16k Shadow              Disabled
CC00, 16k Shadow              Disabled
D000, 16k Shadow              Disabled
D400, 16k Shadow              Disabled
D800, 16k Shadow              Disabled
DC00, 16k Shadow              Disabled    ESC:Exit  :Sel
                                          PgUp/PgDn:Modify
                                          F2/F3:Color
```

2.  Use <Up> and <Down> to choose the item and <PgUp> and
    <PgDn> keys to modify the highlighted item.

3.  After you have finished with the Advanced CMOS Setup, press
    <ESC> to go back to the main menu.

## Description of the item on screen follows:

### Quick Boot

Set this option to Enabled to permit AMI® BIOS to boot within 5 seconds. This option replaces the old ABOVE 1 MB Memory Test option. The Optimal default setting is Enabled. The Fail-Safe default setting is Disabled.

### 1st Boot Device/2nd Boot Device/3rd Boot Device

This option sets the sequence of boot drives.
The settings are:

| | |
|---|---|
| IDE0 | The system will boot from the first HDD. |
| IDE1 | The system will boot from the Second HDD. |
| IDE2 | The system will boot from the Third HDD. |
| IDE3 | The system will boot from the Fourth HDD. |
| F(optical) | The system will boot from LS-120(120M Floppy). |
| SCSI | The system will boot from the SCSI. |
| Network | The system will boot from the Network drive. |
| CD-ROM | The system will boot from the CD-ROM. |
| Disable | Disable this sequence. |

### Try other Boot Devices

This option sets the boot device, if all the Four Boot Devices failed.

### Floppy Access Control

This option sets the Floppy to Read-only or Read-Write.

### Hard Disk Access Control

This option sets the HDD to Read-only or Read-Write. During Read-only, if you try to write on the HDD, the system will halt.

### S.M.A.R.T. for Hard Disks

This option sets the SMART function for the Hard Disk. The Hard Disk has to have SMART function for this feature to take effect.

### Boot up Num Lock

When this option is set to Off, AMI® BIOS turns off the Num Lock key when the system is powered on.  The end user can then use the arrow keys on both the numeric keypad and the keyboard.  The settings are On or Off.  The optimal default and Fail-Safe default settings are On.

### Floppy Drive Swap

Set this option to Enabled to specify that floppy drives A: and B: are swapped.  The setting are Enabled and Disabled.  The Optimal and Fail-Safe default settings are Disabled.

### Floppy Drive Seek

When this option is set to Enabled, AMI® BIOS performs a Seek command on floppy drive A: before booting the system.  The settings are Enabled and Disabled.  The Optimal and Fail-Safe default settings are Disabled.

### PS/2® Mouse Support

When this option is set to Enabled, AMI® BIOS supports a PS/2® mouse.  The settings are Enabled and Disabled.  The Optimal and Fail-Safe default settings are Enabled.

### Primary Display

This option configures the primary display subsytem in the computer.  The settings are Mono(monochrome), 40CGA, 80CGA or VGA/EGA.  The optimal and Fail-Safe default settings are VGA/EGA.

### Password Check

This option specifies the type of AMI® BIOS password protection that is implemented.  The Optimal and Fail-Safe default settings are Setup.

### Boot to OS/2®

Set this option to Enabled to permit the BIOS to run properly, if OS/2® is to be used with > 64MB of DRAM.  The settings are Enabled or Disabled.  The Optimal and Fail-safe default settings are Disabled.

## Cache Bus ECC

This option is for future Pentium® II processor.  During Enabled, this will affect the system performance.  Disabled this option if you don't want to affect the system performance.

## System BIOS Cacheable

AMI® BIOS always copies the system BIOS from ROM to RAM for faster execution.  Set this option to Enabled to permit the contents of the F0000h RAM memory segment to be written to and read from cache memory. The settings are Enabled or Disabled.  The Optimal default setting is Enabled.  The Fail-Safe default setting is Disabled.

## C000, 16K Shadow/C400, 16k Shadow

These options specify how the contents of the video ROM are handled.  The settings are:

**Disabled** - the Video ROM is not copied to RAM.
**Cached** - the contents of the video ROM from C0000h - C7FFFh are not only copied from ROM to RAM;  it can also be written to or read from cache memory.
**Shadow** - the Contents of the video ROM from C0000h - C7FFFh are copied(shadowed) from ROM to RAM for faster execution.
The Optimal and Fail-Safe default setting is Cached.

## C800, 16k Shadow/CC00, 16k Shadow/D000, 16K Shadow/ D400, 16k Shadow/D800, 16k Shadow/DC00, 16K Shadow

These options specify how the contents of the adaptor ROM named in the option title are handled.  The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.  The settings are;

**Disabled** - The specified ROM is not copied to RAM.
**Cache** - The contents of the ROM area are not only copied from ROM to RAM for faster execution, it can also be written to or read from cache memory.
**Shadow** - The contents of the ROM area are copied from ROM to RAM for faster execution.
The Optimal and Fail-Safe default settings are Disabled.

## 3.4 Advanced Chipset Setup

1.  Press <ENTER> on "Advanced Chipset Setup" of the main menu screen.

```
        AMIBIOS  SETUP  -  ADVANCED  CHIPSET  SETUP
     (C)  1996  American  Megatrends,  Inc.  All  Rights
                        Reserved
  Auto Configure EDO DRAM Timing   Enabled      Available  Options:
  EDO DRAM Speed (ns)              60           Enabled
    EDO Read Burst Timing          x222         Disabled
    EDO Write Burst Timing         x222
    EDO RAS Precharge Timing       3 clocks
    EDO RAS to CAS Delay           3 clocks
    MA wait State                  Slow
  ***** SDRAM Timing *****
    SDRAM RAS to CAS Delay         2 Clks
    SDRAM CAS Latency              3 Clks
    SDRAM RAS Precharge Time       2 Clks
  DRAM Integrity Mode              Non ECC
  VGA Frame Buffer USWC            Disabled
  PCI Frame Buffer USWC            Disabled
  Fixed Memory Hole               Disabled
  CPU To PCI IDE Posting           Enabled
  USWC Write I/O Post              Disabled
  AGP Aperture Size                64 MB
  USB Passive Release              Enabled
  PIIX4 Passive Release            Enabled
  PIIX4 Delayed Transaction        Disabled
  USB Function                     Enabled
  USB Keyboard Legacy Support      Disabled
                                                ESC:Exit  :Sel
                                                PgUp/PgDn:Modify
                                                F2/F3:Color
```

2.  Use <Up> and <Down> to choose the item and <PgUp> and <PgDn> keys to modify the highlighted item.

3.  After you have finished with the Advanced Chipset Setup, press <ESC> to go back to the main menu.

## Description of the item on screen follows:

### Auto Configure EDO DRAM Timing
Choose Enabled(default) will automatically configure the DRAM timing depending on the "DRAM Speed" selection. Choose disable to customize setup.

### EDO DRAM Speed (ns)
This option specifies the RAS access time (in nanoseconds) for the DRAM used in the computer. The settings are 50,60 or 70. The Optimal default setting is 60 and the Fail-Safe default setting is 70.

### EDO DRAM Read Burst Timing
Choose DRAM read burst timing for the customize setup.
E stand for EDO DRAM and F stand for FAST PAGE DRAM.

### EDO DRAM Write Burst Timing
Choose DRAM write burst timing for the customize setup.

### EDO RAS Precharge Timing
This option defines the RAS# precharge requirements for the EDO memory type in 66MHz clocks.

### EDO RAS to CAS Delay
This operation decide the delay in assertion of CAS#(SCAS#) from assertion of RAS#(SRAS#) in 66MHz.

### MA Wait State
This option selects Fast or Slow MA bus timing. The Slow timing is equal to Fast+1, in term of clock number for EDO DRAM.

### SDRAM RAS to CAS Delay
This operation decide the delay in assertion of CAS#(SCAS#) from assertion of RAS#(SRAS#) in 66MHz.

## SDRAM CAS Latency

This option determines the CAS latency time parameter of SDRAM. The settings are 2 clks or 3 clks.

## SDRAM RAS Precharge Time

This option defines the RAS# precharge requirements for the SDRAM memory type in 66MHz clocks.

## DRAM Integrity Mode

During ECC, this will enable the DRAM ECC mechanism that allows detection of single-bit and multiple-bit errors and recovery of single-bit errors. During EC, the ECC logic will calculate 8-bit pattern written along with 64-bit data into the main memory. During Read operation, 8-bit ECC code is read along with 64-bit data and error checking is performed. No correction of data will take place in this operation mode. During Disabled, this will disable the ECC mechanism.

**Note:** If you choose ECC or EC modes, you must use a DIMM with ECC byte.

## VGA Frame Buffer USWC

The Pentium® II processor supports the Uncacheable Speculatable Write-Combining (USWC) memory type. The processor provides a write-combining with buffering strategy for write operation. This is useful for frame buffering. Writing to USWC memory can be buffered and combined in the processors write-combining buffer (WCB). The WCBs are viewed as a special purpose outgoing write buffers, rather than a cache. The WCBs are written into memory to allocate a different address, or after executing a serializing, locked, or I/O instructions.

During Enabled, this will enable the processor memory location A000 and B000 segment as USWC memory type.

## PCI Frame Buffer USWC

The Pentium® II processor supports the Uncacheable Speculatable Write-Combining (USWC) memory type. The processor provides a write-combining with buffering strategy for write operation. This is useful for frame buffering. Writing to USWC memory can be buffered and combined in the processors write-combining buffer (WCB). The WCBs are viewed as a special purpose outgoing write buffers, rather than a cache. The WCBs are written into memory to allocate a different address, or after executing a serializing, locked, or I/O instructions.

During Enabled, this will enable the processor memory location C000 and DFFF segment as USWC memory type.

## Fixed Memory Hole

This option allows the end user to specify the location of a memory hole. The cycle matching the selected memory hole will be passed to the ISA bus. If Enabled, the selected hole is not remapped.

## CPU To PCI IDE Posting

Set this option to Enabled to enable posted messages from the CPU to the PCI bus or IDE controller. The settings are Enabled or Disabled. The Optimal and Fail-Safe default settings are Enabled.

## USWC Write I/O Post

Set this option to Enabled to use USWC(Uncacheable, Speculatable, Write-Combined) memory. The settings are Enabled or Disabled. The Optimal and Fail-Safe default settings are Disabled.

## AGP Aperture Size

This option determines the effective size of the graphics aperture used in the particular PAC configuration. The AGP aperture is memory-mapped, while graphics data structure can reside in a graphics aperture. The aperture range should be programmed as not cacheable in the processor cache. Accesses with the aperture range are forwarded to the main memory, then PAC will translate the original issued address via a translation table that is maintained on the main memory. The option allows the selection of an aperture size of 4MB, 8MB, 16MB, 32MB, 64MB, 128MB, and 256MB.

## USB Passive Release

During Enabled, this will allow the PIIX4® to use passive release (look at PIIX4® Passive Release) while transferring control information or data for USB transaction. During Disabled, PIIX4® will perform PCI accesses for USB without using passive release.

## PIIX4® Passive Release

The PIIX4® ISA bridge support GAT (Guaranteed Access Time) mode, which will now violate the spirit of the PCI specification. The system provides a programmable passive release mechanism to meet the required master latencies. During Enabled, ISA masters may see long delays in accessing PCI memory, including the main DRAM array. The ISA GAT mode is also not supported during enable. ISA masters must honor IOCHRDY.

## PIIX4® Delayed Transaction

During Enabled, the PIIX4® delay transaction mechanism is enabled when the PIIX4® is the target of a PCI transaction. A read cycle from Host to PCI is immediately retrived due to any pending PCI to DRAM cycle. During Disabled, a read cycle from Host to PCI is delayed until time-out due to any pending PCI to DRAM cycle.

## USB Function

Set this option to Enabled or Disabled the on-chip USB controller. The Optional and Fail-Safe default settings are Disabled.

## USB Keyboard Legacy Support

Set this option to Enabled or Disabled USB keyboard/mouse. The Optional and Fail-Safe default settings are Disabled.

## 3.5 Power Management Setup

1. Press <ENTER> on "Power Management Setup" of the main menu
   screen.

```
        AMIBIOS  SETUP  -  POWER  MANAGEMENT  SETUP
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                        Reserved

Power Management / APM             Enabled    Available  Options:
Green PC Monitor Power State       Stand By    Enabled
Video Power Down Mode              Suspend     Disabled
Hard Disk Power Down Mode          Stand By
Standby Time Out                   Disabled
Suspend Time Out                   Disabled
Throttle Slow Clock Ratio          50-62.5%
Modem Use IO Port                  N/A
Modem Use IRQ                      N/A
Display Activity                   Ignore
Device 6(Serial Port 1)            Monitor
Device 7(Serial Port 2)            Monitor
Device 8(Parallel Port)            Ignore
Device 5(Floppy Disk)              Monitor
Device 0(Primary master IDE)       Monitor
Device 1(Primary slave IDE)        Ignore
Device 2(Secondary master IDE)     Monitor
Device 3(Secondary slave IDE)      Ignore
System Thermal                     Ignore
Thermal Slow Clock Ratio           50-62.5%
CPU Critical Temperature           65°c/104°f
Power Button Function              On/Off     ESC:Exit :Sel
Restore on AC/Power Loss           Power On   PgUp/PgDn:Modify
Ring Resume From Soft-Off          Disabled   F2/F3:Color
LAN Resume From SOft-Off           Disabled


RTC Alarm Resume From Soft-Off     Disabled
RTC Alarm Date                     15
RTC Alarm Hour                     12
RTC Alarm Minute                   50
RTC Alarm Second                   30
```

2. Use <Up> and <Down> to choose the item and <PgUp> and
   <PgDn> keys to modify the highlighted item.

3. After you have finished with the Power Management Setup, press
   <ESC> to go back to the main menu.

## Description of the item on screen follows:

### Power Management/APM

Set this option to Enabled to enable the Intel® 82440LX ISA power management features and APM(Advanced Power Management). The settings are Enabled or Disabled. The default setting is Enabled. The Fail-safe default setting is Disabled.

### Green PC Monitor Power State

This option specifies the power state that the green PC-compliant video monitor enters when AMI® BIOS places it in a power savings state after the specified period of display inactivity has expired. The settings are Off, Standby, Suspend or Disabled. The Optimal and Fail-Safe default settings are Standby.

### Video Power Down Mode

This option specifies the power conserving state that the VESA VGA video subsystem enters after the specified period of display inactivity has expired. The settings are Disabled, Standby or Suspend. The Optimal and Fail-Safe default settings are Standby.

### Hard Disk Power Down Mode

This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The settings are Disabled, Standby or Suspend. The Optimal and Fail-Safe default settings are Disabled.

### Standby Time Out

This option specifies the length of a period of system inactivity while in Full power on state. When this length of time expires, the computer enters Standby power state. The settings are Disabled, 1 min, 2 min, 3 min, 4 min, 5 min, 6 min, 7 min, 8 min, 9 min, 10 min, 11 min, 12 min, 13 min, 14 min or 15 min. The Optimal and Fail-Safe default settings are Disabled.

**Suspend Time Out**

This option specifies the length of a period of system inactivity while in Standby state. When this length of time expires, the computer enters Suspend power state. The settings are Disabled, 1 min, 2 min, 3 min, 4 min, 5 min, 6 min, 7 min, 8 min, 9 min, 10 min, 11 min, 12 min, 13 min, 14 min or 15 min. The Optimal and Fail-Safe default settings are Disabled.

**Throttle Slow Clock Ratio**

This option specifies the speed at which the system clock runs in power saving states. The settings are expressed as a ratio between the normal CPU clock speed and the CPU clock speed when the computer is in the power-conserving state.

**Modem Use IO Port**

This indicates which IO port will be used by the Modem(if there is a Modem).

**Modem Use IRQ**

This indicates which IRQ no. will be used by the Modem(if there is a Modem).

**Display Activity/Device 6/Device 7/Device 8/Device 5/Device 0/Device 1/Device 1/Device 2/Device 3/System Thermal**

When set to Monitor, these options enable event monitoring on the specified hardware interrupt request line. If set to Monitor and the computer is in a power saving state, AMI® BIOS watches for activity on the specified IRQ line. The computer enters the full on power state if any activity occurs.

AMI® BIOS reloads the Standby and Suspend timeout timers if activity occurs on the specified IRQ line.

**Thermal Slow Clock Ratio**

When set to Monitor, then you can choose the throttle ratio. This option is connected with the **CPU Critical Temperature** Option.

### CPU Critical Temperature

This option is for setting the CPU temperature that would be critical enough, so that it would use the Thermal Slow Clock Ratio to cool down the CPU.

### Power Button Function

During Suspend, if you push the switch one time, the system goes into suspend mode and if you push it more than 4 seconds, the system will be turned off. During On/Off, the system will turn off once you push the switch.

### Restore on AC/Power Loss

The settings are power on or last status. During power on, after every AC power loss, the system will be turned on. During last status, after every AC power loss, whatever the system status, it will be the same when the AC power returns.

**Note:**  a. If you set this option to last status, the Power Button Function must be set to On/Off, or this function will not work.
b. Jumper JP1 must always be open, for this function to work properly.

### Ring Resume from Soft-Off

During Disabled, the system will ignore any incoming call from the modem. During Enabled, the system will boot up if there's an incoming call from the modem.

**Note:**  If you have change the setting, you must let the system boot up until it goes to the operating system. Then, power off the system. This function will work the next time you power on.

## LAN Resume from Soft-Off

During Disabled, the system will ignore any incoming signal from the LAN network card.  During Enabled, the system will boot up if there's an incoming signal from the LAN network card.

**Note:** If you have change the setting, you must let the system boot up until it goes to the operating system.  Then, power off the system.  This function will work the next time you power on.

## RTC Alarm Resume From Soft-Off

This function is for setting the Date, Hour, Minute, and Second for your computer to boot up.  During Disabled, you cannot use this function. During Enabled, Choose the Date, Hour, Minute, and Second:

| | |
|---|---|
| **RTC Alarm Date** | Choose which day the system will boot up. |
| **RTC Alarm Hour** | Choose which hour the system will boot up. |
| **RTC Alarm Minute** | Choose which minute the system will boot up. |
| **RTC Alarm Second** | Choose which second the system will boot up. |

**Note:** If you have change the setting, you must let the system boot up until it goes to the operating system.  Then, power off the system.  This function will work the next time you power on.

## 3.6 PCI/Plug and Play Setup

1. Press <ENTER> on "PCI/Plug and Play Setup" of the main menu screen.

```
        AMIBIOS  SETUP  -  PCI/PLUG  AND  PLAY  SETUP
      (C) 1996 American  Megatrends,  Inc. All  Rights
                        Reserved
  Plug and Play Aware O/S          No       Available  Options:
  Clear NVRAM on Every Boot        No       Enabled
  PCI Latency Timer (PCI Clocks)   64       Disabled
  Primary Graphics Adapter         PCI
  PCI VGA Palette Snoop            Disabled
  Allocate IRQ to PCI VGA          Yes
  PCI IDE Busmaster                Disabled
  OffBoard PCI IDE Card            Auto
  OffBoard PCI IDE Primary IRQ     Disabled
  OffBoard PCI IDE Secondary IRQ   Disabled
  PCI Slot4 IRQ Priority           Auto
  DMA Channel 0                    PnP
  DMA Channel 1                    PnP
  DMA Channel 3                    PnP
  DMA Channel 5                    PnP
  DMA Channel 6                    PnP
  DMA Channel 7                    PnP
  IRQ3                             PCI/PnP
  IRQ4                             PCI/PnP
  IRQ5                             PCI/PnP
  IRQ7                             PCI/PnP
  IRQ8                             PCI/PnP   ESC:Exit :Sel
  IRQ9                             PCI/PnP   PgUp/PgDn:Modify
  IRQ10                            PCI/PnP   F2/F3:Color
  IRQ11                            PCI/PnP
```

```
  IRQ12                            PCI/PnP
  IRQ14                            PCI/PnP
  IRQ15                            PCI/PnP
  Reserved  Memory  Size           Disabled
  Reserved  Memory  Address        C8000
```

2. Use <Up> and <Down> to choose the item and <PgUp> and <PgDn> keys to modify the highlighted item.

3. After you have finished with the PCI/Plug and Play Setup, press <ESC> to go back to the main menu.

## Description of the item on screen follows:

### Plug and Play Aware O/S
Set this option to Yes if the operating system in this computer is aware of and follows the Plug and Play specification. Currently, only Windows® 95 is PnP-aware. The settings are Yes or No. The Optimal and Fail-Safe default settings No.

### Clear NVRAM on Every Boot
During Yes, this will clear NVRAM data on every boot.

### PCI Latency Timer (PCI Clocks)
This option specifies the latency timings (in PCI clocks) for all PCI devices on the PCI bus. The settings are 32, 64, 96, 128, 160, 192, 224 or 248. The Optimal and Fail-Safe default settings are 64.

### Primary Graphics Adapter
This option is for selecting which VGA card is to be your primary display graphics adapter.

### PCI VGA Palette Snoop
When this option is set to Enabled, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example, if there are two VGA devices in the computer (one PCI and ISA) and the Bit settings are:
> **Disabled** - Data read and written by the CPU is only directed to the PCI VGA device's palette registers.
> **Enabled** - Data  read and written by the CPU is directed to both the PCI VGA device's palette registers and the ISA VGA device palette registers, permitting the palette registers of both devices to be identical.

This option must be set to Enabled if an ISA adapter card requires VGA palette snooping. The settings are Enabled or Disabled. The Optimal and Fail-Safe default settings are Disabled.

## Allocate IRQ to PCI VGA

Choose the IRQ to be assigned to the PCI VGA display adapter card. The Optimal and Fail-Safe default setting is No.

## PCI IDE BusMaster

Set this option to Enabled to specify that the IDE controller on the PCI local bus includes a bus mastering capability. The settings are Enabled or Disabled. The Optimal and Fail-Safe default settings are Disabled.

## Offboard PCI IDE Card

This option specifies if an offboard PCI IDE controller adapter card is installed in the computer. You must specify the PCI expansion slot on the mainboard where the offboard PCI IDE controller is installed. If an offboard PCI IDE controller is used, the onboard IDE controller is automatically disabled. The settings are Auto(AMI® BIOS automatically determines where the offboard PCI IDE controller adaper card is installed), Slot1, Slot2, Slot3 or Slot4. The Optimal and Fail-Safe settings are Auto.

If an offboard PCI IDE controller adapter card is installed in the computer, you must also set the Offboard PCI IDE Primary IRQ and Offboard PCI IDE Secondary IRQ options.

## Offboard PCI IDE Primary IRQ/
## Offboard PCI IDE Secondary IRQ

These options specify the PCI interrupt used by the Primary (or Secondary) IDE channel on the offboard PCI IDE controller. The settings are Disabled, Hardwired, INTA, INTB, INTC or INTD. The Optimal and Fail-Safe default settings are Disabled.

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

These options specify the bus that the specified DMA channel is used.  These options allow you to reserve DMAs for legacy ISA adapter cards.

These options determine if AMI® BIOS 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 use these options to reserve the DMA by assigning an ISA/EISA setting to it.

## IRQ3/IRQ4/IRQ5/RQ7/IRQ9/IRQ10/IRQ11/IRQ14/IRQ15

These options specify the bus that the specified IRQ line is used on.  These options allow you to reserve IRQs for legacy ISA adapter cards.

These options determine if AMI® BIOS 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 pool, the end user can use these options to reserve the IRQ by assigning an ISA/EISA setting to it. Onboard I/O is configured by AMI® BIOS.  All IRQs used by onboard I/O are configured as PCI/PnP.  If all IRQs are set to ISA/EISA and IRQ14 and 15 are allocated to the onboard PCI IDE, IRQ9 will still be available for PCI and PnP devices, because at least one IRQ must be available for PCI and PnP devices.  The settings are ISA/EISA or PCI/PnP.  The Optimal and Fail-Safe default settings are IRQ3 through 7 are ISA/EISA.  The Optimal and Fail-Safe default settings PCI/PnP.

## Reserved Memory Size/Reserved Memory Address

Some ISA cards have ROM at 0C000h~0D000h segments, but in a non-standard format.  So Plug & Play BIOS can't detect it.  The end user needs to set it up manually.  Setting these options under this condition, will inform the BIOS which location and how many location is occupied.

## 3.7 Peripheral Setup

1. Press <ENTER> on "Peripheral Setup" of the main menu screen.

```
            AMIBIOS  SETUP  -  PERIPHERAL  SETUP
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                        Reserved

Onboard FDC                   Auto        Available  Options:
Onboard Serial Port A         3F8h/COM1   Auto
Onboard Serial Port B         2F8h/COM2   Enabled
  Serial Port B Mode          Auto        Disabled
  IR Duplex Mode              Auto
  IrDA Protocol               Auto
Onboard Parallel Port         378
  Parallel Port Mode          ECP
  EPP Version                 N/A
  Parallel Port IRQ           7
  Parallel Port DMA Channel   3
K/B Wake-Up Function          Disabled
Mouse Wake-Up Function        Disabled
Onboard IDE                   Both
Onboard Sound chip            Enabled
Onboard LAN chip              Enabled



                                          ESC:Exit  :Sel
                                          PgUp/PgDn:Modify
                                          F2/F3:Color

```

2. Use <up> and <down> to choose the item and  <PgUp> and <PgDn> keys to modify the highlighted item.

3. After you have finished with the Peripheral Setup, press <ESC> to go back to the main menu.

## Description of the item on screen follows:

### Onboard FDC

Choose Auto, for the BIOS to automatically detect the device

| If the ISA add-on card has | Onboard FDC to be set at |
|---|---|
| FDC exist | Disabled |
| none FDC exist | Enabled |

Choose Enabled, Enabling onboard FDC.
Choose Disabled, Disabling onboard FDC.
The Optimal and Fail-Safe default settings are Auto.

### Onboard Serial Port A/Onboard Serial Port B

Choose 3F8, for the BIOS to automatically detect the device.

| If the ISA add-on card has | | | | Onboard Serial port to be set at | | | |
|---|---|---|---|---|---|---|---|
| COM1 (I/O:3F8H) | COM2 (I/O:3F8H) | COM3 (I/O:3E8H) | COM4 (I/O:2E8H) | PORT1 | IRQ ASSIGNED | PORT2 | IRQ ASSIGNED |
| ✓ | ✓ | ✓ | ✓ | DISABLED | X | DISABLED | X |
| ✓ | ✓ | X | X | COM3 | 4 | COM4 | 3 |
| X | X | ✓ | ✓ | COM1 | 4 | COM2 | 3 |
| ✓ | X | X | ✓ | COM2 | 3 | COM3 | 4 |
| X | ✓ | ✓ | X | COM1 | 4 | COM4 | 3 |
| ✓ | ✓ | ✓ | X | COM4 | 3 | DISABLED | X |
| ✓ | ✓ | X | ✓ | COM3 | 4 | DISABLED | X |
| ✓ | X | ✓ | ✓ | COM2 | 3 | DISABLED | X |
| X | ✓ | ✓ | ✓ | COM1 | 4 | DISABLED | X |
| X | X | X | X | COM1 | 4 | COM2 | 3 |
| ✓ | X | X | X | COM2 | 3 | COM3 | 4 |
| X | ✓ | X | X | COM1 | 4 | COM3 | 4 |
| X | X | ✓ | X | COM1 | 4 | COM2 | 3 |
| X | X | X | ✓ | COM1 | 4 | COM2 | 3 |

**Note:** *If the onboard serial port interrupt and ISA add-on card interrupt are in conflict, the serial port will not work properly. Please disable one of the devices.*

### Onboard Parallel Port

Choose Auto, the BIOS automatically assigned onboard parallel port to the available parallel port or disabled.

| If the ISA add-on card has | | | Onboard parallel port to be set as | |
|---|---|---|---|---|
| LPT1 I/O:378H | LPT2 I/O:278H | LPT3 I/O:3BCH | PORT ASSIGNED | IRQ ASSIGNED |
| ✓ | ✓ | ✓ | Disabled | X |
| ✓ | ✓ | X | LPT3 | 5 |
| ✓ | X | ✓ | LPT2 | 5 |
| X | ✓ | ✓ | LPT1 | 7 |
| ✓ | X | X | LPT2 | 5 |
| X | ✓ | X | LPT1 | 7 |
| X | X | ✓ | LPT1 | 7 |
| X | X | X | LPT1 | 7 |

### EPP Version

This option is for setting which EPP version will be used.  The settings are 1.7 and 1.9.

### Parallel Port Mode

This option allows user to choose the operating mode of the onboard parallel port.  The settings are Normal, SPP/EPP or ECP mode.

**Note:** *If the onboard parallel port interrupt and ISA add-on card interrupt are in conflict, the parallel port will not work properly. Please disable one of the devices.*

## Parallel Port IRQ

If the onboard parallel mode is not on auto mode, the user can select the interrupt line for onboard parallel port. We suggest that the user select the interrupt for the onboard parallel port as shown below:

| Onboard parallel port set at | Parallel Port IRQ |
|------------------------------|-------------------|
| LPT1(378H) | 7 |
| LPT2(278H) | 5 |
| LPT3(3BCH) | 5 |

## Parallel Port DMA Channel

This option allows user to choose DMA channel 1 to 3 for the onboard parallel port on ECP mode.

## K/B Wake-Up Function

During Any Key, if there is any activity on the keyboard, the system will change from OFF to ON. During Specific Key, you need to set the "Change Keyboard Wake-up Password" on the BIOS setup. Then, if you type the password, the system will change its status from OFF to ON. During Disabled, this function will not work.

## Mouse Wake-Up Function

During Enabled, if there is any activity on the mouse, the system will change from suspend to ON. During Disabled, this function will not work. ( This is reserved for future "New Super I/O -W83977TF)

## Onboard IDE

Set this option to enable or disable on board IDE controller.

## Onboard Sound Chip

Set this option to enable or disable on board sound chip.

## Onboard LAN Chip

Set this option to enable or disable on board LAN chip.

## 3.8 Hardware Monitor Setup

The Hardware Monitor Setup is used to monitor the Current CPU
temperature, CPU Fan speed, Chassis Fan Speed, Power fan speed,
Vcore, and etc.

```
         AMIBIOS  SETUP  -  HARDWARE  MONITOR  SETUP
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                        Reserved

-=System Hardware Monitor=-                 Available  Options:
   Chassis  Intrusion           Disabled    Enabled
   Current  CPU Temperature      30°c/100°f  Disabled
   Current  CPU Fan Speed        5273RPM
   Current  Chassis Fan Speed    0 RPM
   Current  Power Fan Speed      0 RPM
   Vcore                         2.2V
   Vcc                           2.5V
   Vio                           3.3V
   +5,000V                       +5V
   +12,000V                      +12V
   -12,000V                      -12V
   -5,000V                       -5V




                                            ESC:Exit  :Sel
                                            PgUp/PgDn:Modify
                                            F2/F3:Color
```

### Chassis  Intrusion
         Set this option to Enabled, Reset, or Disabled the chassis
intrusion detector.  During Enabled, any intrusion on the system chassis
will be recorded.  The next time you turn on the system, it will show a
warning message.  To be able to clear those warning, choose Reset.  After
clearing the message it will go back to Enabled.

## Chapter 4

# AUDIO INSTALLATION GUIDE

## INTRODUCTION

The Sound Blaster 16, lets you enjoy CD-quality digital audio.  This
mainboard audio comes with an extensive suite of Windows applications
and Creative® Wavesynth to help enhance your productivity and enjoyment.

**Chip List:**
❑ **Creative® VIBRA 16X**

**Installation CD**
This CD contains audio driver and audio software applications.  To install
the drivers, please follow the installation procedures provided by this
manual.

**Note:** This drivers are originally created for floppy diskettes.  Please
substitute any corresponding directory names (such as A: or B:) to
your CD-ROM drive letter (such as D: or  E:)

**System Requirements**
**Computer system requirements:** 90MHz Intel® Pentium® processor or above

**Monitor:** VGA Support, minimum 640x480 resolution

**Operating system:** DOS 5.0 or higher, Windows® 3.1, Windows® 95

**CD-ROM:** Double Speed or Higher

**Read Latest Important Information**
Read the README.TXT file on the installation disk for important
information you have to know before starting installation.

## 4.1  Install MS-6113 Audio Drivers

## 1. Driver

### 1.1  Install Enhance Audio Drivers for Windows® 95

After installing Windows® 95 on the mainboard, Windows® 95 will auto-detect the changes in your hardware configuration, and will show you a message.  To get a higher performance, you need to install the Driver.

**To install MS-6113 Enhance Audio Drivers, follow the steps below:**
**Step 1**:  Power up your computer and boot to Windows® 95.
**Step 2:**  Insert the provided **CD** into your CD-ROM.
**Step 3:**  Once Windows® 95 is up, a "New Hardware Found" message
            will appear. Select the item "**Creative Drivers Disk**" and
            Click "**OK**".
**Step 4:**  The "**Install from Disk**" dialog box will appear.  Select the
            drive of your CD-ROM (such as D: or E:).  Then, look for
            **VIBRA16>WIN95>DRV** folder and click "**OK**".
**Step 5:**  Once you have installed your sound card, you can check for
            it by going into **Control Panel** and select the **System** icon.
            Under **Device Manager**, select the **sound, video and game
            controllers** from the device list.  The C**reative Sound Blaster
            16 Plug and Play** and **Creative Gameport Joystick** icons will
            appear, showing that Windows® 95 had detected your on-
            board sound.

### 1.2 Install Enhance Audio Drivers for DOS or Windows® 3.1

The **Install.exe** is a Windows® 3.1 setup program that installs both DOS and Windows® 3.1 drivers and utilities at the same time.

**To install MS-6113 Enhance Audio Drivers, follow the steps below:**

**Step 1**: Select Run....from the File menu.

**Step 2:** Insert the provided **CD** into your CD-ROM.

**Step 3:** Look for the CD-ROM drive. Type (CD-ROM drive such as d:) d:\VIBRA16\DOSWIN|\INST\INSTALL.EXE and press <ENTER>.

**Step 4:** Follow the instructions on the screen to complete the installation.

## 4.2 Install MS-6113 Audio Utility Drivers

### 1. Utility

#### 1.1 Install Audio Utility Drivers for Windows® 95

The Sound Blaster 16 utility provides user-friendly and powerful Windows applications, that allows you to record, play, and edit 8-bit (tape quality) and 16-bit (CD-quality) wave data in your Windows environment. It also provides some special effects that will help you enhance your wave data.

**To install MS-6113 Audio Utility Drivers, follow the steps below:**
**Step 1**: Power up your computer and boot to Windows® 95.
**Step 2:** Insert the provided **CD** into your CD-ROM.
**Step 3:** Look for **Vibra16/Win95/Util/Setup** on your CD-ROM drive.
**Step 4:** Follow the instructions on the screen to complete installation

**Note:** In the middle of installation, it will look for the Audio drivers for updating, just change the folder from **utility** to **driver**.

### 2. User's Guide

The Sound Blaster 16 Utility Windows application provide an on-line help "User's Guide" to help you understand all the functions of your Sound Blaster 16 Windows application.

## 3. Sound Blaster 16 Utility Windows Application

**Creative Remote**
A multi-player "remote control" that enables you to control the Creative CD,
Creative Wave, and Creative MIDI Players.

**Creative CD**
A player that allows you to play audio CDs from your CD-ROM drive,
compile playlist, and gives names to the track on your CD.

**Creative Wave**
A player that allows you to play a wave file, compile a playlist, and record a
MIDI file or audio CD into wave format.

**Creative MIDI**
A player that allows you to play a MIDI file and compile a playlist.

**Creative Mixer**
An audio mixer that allows you to combine and manipulate sounds from
various audio sources.  You can control the volume of an audio source,
select and mix different audio sources during playback and recording.

**Creative Soundo'LE**
A player that allows you to play and record wave data.  It also allows you to
embed sounds into other Windows applications that are OLE compliant,
such as WordPad and Word.

**Creative Wave Studio**
An editor that allows you to record, play, edit, and enhance 8-bit and 16-bit
wave data in the Windows environment.

## 4.3 Install MS-6113 Creative® WaveSynth

### 1. Creative® Wavesynth

#### 1.1 Install Creative® Wavesynth for Windows® 95

The Creative® Wavesynth is a revolutionary way to add music to your computer. It is a software-based wavetable synthesizer that allows you to play high quality music for Windows multimedia applications and computer games. You can think of it as General MIDI music synthesizer that acts like a multi-channel audio mixer with high-quality reverb.

Creative® Wavesynth is the first software synthesizer specially designed for Sound Blaster 16 audio cards and 90MHz Intel® Pentium® processor (and above) computer running Windows® 3.1 or Windows® 95. It uses hand-crafted 16-bit sampled sounds to produce musical notes. These samples are copied to your hard disk when you install Creative® Wavesynth.

**To install MS-6113 Creative Wavesynth, follow the steps below:**
**Step 1**: Power up your computer and boot to Windows® 95.
**Step 2:** Insert the provided **CD** into your CD-ROM.
**Step 3:** Look for **Vibra16/Synth/Setup** on your CD-ROM drive.
**Step 4:** Follow the instructions on the screen to complete
             installation.

### 2. User's Guide

The Creative® Wavesynth provide an on-line help "How to use Wavesynth" to help you understand all the functions of your Creative® Wavesynth.

## 4.4  Enable Creative® 3D Stereo Enhancement

**To enable Creative® 3D Stereo Enhancement, follow the steps below:**

**Step 1**:  Go to the **Control Panel**, and double click on the **System**
           icon.

**Step 2:**  Choose **Device Manager**, and click on the **Sound, video   and**
            **game controllers**.

**Step 3:**  Select **Creative Sound Blaster 16 Plug and Play.**

**Step 4:**  Click on the **Properties** button.

**Step 4:**  Choose **Settings**.

**Step 4:**  Click on **Use Creative 3D Stereo Enhancement**.

## Chapter 5

# INTEL® 82558 FAST ETHERNET LAN DRIVER

## 1. Overview

The 82558 is a sophisticated 32-bit PCI component, with enhanced scatter-gather bus mastering capabilities.  Its true 32-bit architecture enables it to perform high speed data transfers on the PCI bus using four DMA channels.

### 1.1 Features

- IEEE 802.3/802.3u 10BASE-T and 100BASE-TX compatible
- Glueless 32-bit PCI bus master interface
- Backward software compatible to the 82557
- Internal transmit and receive FIFOs (3 kbytes each)
- Back-to-back transmit at 100 Mbps within minimum IFS
- EEPROM support for configuration and customized feature selection
- Advanced configuration and Power Interface Specification, Revision 1.0, and PCI Power Management Specification, Revision 1.0 compliant
- Remote Wake Up (Magic Packet*) support in APM and ACPI modes
- ACPI "interesting" packet wake support in D0 to D3 low power states
- IEEE 802.3u Auto-Negatiation support for 10BASE-T and 100BASE-TX
- Full or half duplex capable at 10 or 100 Mbps
- IEEE 802.3x flow control support

## 2. LAN Driver Setup

### 2.1 Windows® 95

To install the driver, just insert the provided CD-ROM into the CD-ROM drive. The CD-ROM will autorun. Press the button for installing the LAN driver.

### 2.2 Other OS driver

To install the driver for other operating system, just insert the provided CD-ROM into the CD-ROM drive.
Type:

         CD-ROM Path:\E100B\Setup/readme

This will show different procedure for the installation of LAN driver for different kind of operating system. Just follow the procedure given.