MS52PN

**Intel Pentium 4
478-pin Processor
with 533/400 MHz FSB
Based DDR MAINBOARD**

User's Manual

Shuttle® MS52PN

Intel Pentium 4
478-pin Processor
with 533/400 MHz FSB
Based DDR Mainboard
Manual Version 1.0

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M967

Statement of Shuttle Mainboard via the EMI Test

Shuttle mainboards have been via the EMI test in terms of series of regulations: EN55022/CISPR22/AS/NZS3548 Class B, EN55024 (1998/AS/NZS), EN4252.1 (1994), EN61000, ANSI C63.4 (1992), CFR47 Part 15 Subpart B, and CNS13438 (1997). The items tested are illustrated as follows:

(A) Voltage: AC 110V/60HZ & AC 230V/50HZ

(B) Tested Product Information:
    Product Name: PC Mainboard
    Status: Sample
    Model Name: MS52PN
    S/N: N/A
    CPU:
        200 MHz
            Pentium 4 3.2, 2.8 GHz
        133 MHz
            Pentium 4 2.26, 2.40, 2.53, 2.66, 2.80, 3.06 GHz
        100 MHz
            Pentium 4 1.6, 1.8, 2.0, 2.2, 2.4 GHz

    Serial Port: one port with 9 pins
    Parallel Port: one port with 25 pins
    Keyboard Port: one port with 6 pins
    Mouse Port: one port with 6 pins
    USB Port: two ports with 4 pins respectively
    LAN Port: one port with 8 pins
    Line-Out & Line-In & Microphone Ports: one port for each
    Game Port: one port with 15 pins
    DIMM Memory: DDR 400 256 MB *2
    Power Cable: Detachable and Shielded (with a GND pin)
    Monitor: CRT+DVI
    Maximum Resolution: 1280 X 1024 V:60Hz

All CPUs have completely been tested, and values offered by the worst EMI combination of CPU external frequency are listed as follows:

Test Mode	External Frequency	CPU	Case Open/Close
1	200 MHz	P4 3.2G	Close
2	200 MHz	P4 3.2G	Open
3	133 MHz	P4 3.06G	Close
4	133 MHz	P4 3.06G	Open

(C) Remedy for the Tested Product & Its EMI Interference:
        Remedy: N/A
        EMI Interference:
                Crystal: 32.768 KHz(Y3)/24.576 MHz(Y2)/25.000 MHz(Y4)/12.000 MHz(Y5)/
                        14.318 MHz(Y1)
                Clock Generator: N/A

(D) Supported Host Peripherals:

Host Peripheral	Product Name	Model Name
#1	Case	MS52PN
#2	Seventeam Power Supply	ST-250HK
#3	IBM HDD (82.3GB)	IC35L080AVVA07-0
#4	Panasonic FDD	JU-257A606P
#5	CODE CD-ROM	DVD-116

(F) Notices for Assembling Computers:
1. Cases should be made of iron or other metal that has good electric conductivity.
2. Cylinders in a case should be made of metal, and as having a mainboard mounted in a case, make sure screws are all utilized and fastened on a mainboard.
3. An I/O shielding should be contacted with I/O metallic parts of a mainboard.
4. Cables should appropriately be arranged and fixed in a case. Follow instructions:
   - Leave IDE cables not crossed upon CPU and SDRAM;
   - Leave power cables minimum in length, and not crossed upon a mainboard;
   - Leave CPU fan cables minimum in length, and not near CPU;
   - Leave cables on panels and other spare cables tied in a computer case.
5. Make sure an EMI shielding attached to a case has properly been installed.
6. Make sure a 5.25" or 3.5" FDD and screws are fastened to an EMI shielding.
7. Make sure a case is closely in contact with EMI connected points.
8. Make sure there is no cleft in a case which is not deformed.
9. Make sure a PCI or AGP door is bound to a case.
10. Make sure cables of other devices (fans or some others) are fixed in a case.

TABLE OF CONTENTS

WHAT'S IN THE MANUAL

1 INTRODUCTION

1.1 To Different Users

First-Time DIY System Builder

Welcome to the DIY world! Building your own computer system is not as difficult as you may think. To make your first computer DIY experience successful, right from the start, we have designed Chapter 3 Hardware Installation in a step-by-step fashion for all the first-time DIY system builders. Prior to installation, we suggest you read the whole manual to gain a complete understanding of your new MS52PN mainboard.

Experienced DIY User

Congratulate on your purchase of the MS52PN mainboard. You will find installing your new MS52PN mainboard is quite easy. Bundled with an array of onboard functions, the highly-integrated MS52PN mainboard provides you with a total solution to build the stablest and most reliable system. Referring to section 3.2 Jumper Settings and Chapter 4 Software Utility, you will find how to work out your new mainboard. Chapter 5 BIOS Setup also contains the relevant information on how to tune up your system to achieve higher performance.

System Integrator

You have wisely chosen MS52PN to construct your system. MS52PN incorporates all the state-of-the-art technology of the 651C + 962L from SiS. Each integrates the most advanced functions you've ever found in a compact micro-ATX form board.

1.2 Item Checklist:

Check all items with your MS52PN mainboard to make sure nothing is missing. A complete package should include:

✹ One Shuttle MS52PN Mainboard
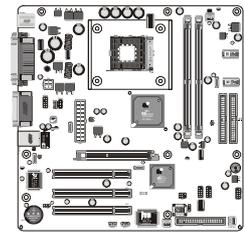
✹ One ATA 133/100/66/33 Ribbon Cable

✹ One Floppy Ribbon Cable

✹ One Twin-Port USB Cable (optional)
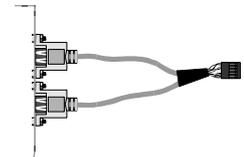
✹ MS52PN User's Manual
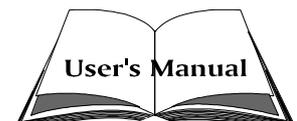
✹ I/O Shielding
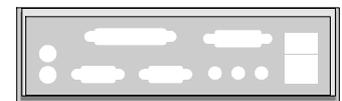
✹ One Bundled CD-ROM, including:
   ➢ MS52PN user's manual in PDF format
   ➢ SIS AGP Driver
   ➢ SIS IDE Driver
   ➢ SIS VGA Driver
   ➢ SIS USB2.0 Driver
   ➢ Realtek LAN Driver
   ➢ C-Media Audio Driver
   ➢ Award Flashing Utility

2 FEATURES

MS52PN mainboard is dedicatedly designed for demanding PC users who desire high performance and maximum intelligent features in a compact package.

2.1 Specifications

✳ CPU Support

Intel pentium4, 478-pin processors with 533/400 MHz FSB.
Supports Hyper-Threading Technology and Prescott CPU.

✳ Chipset

Features SiS 651C N.B. and SiS 962L S.B. for MS52PN.

✳ Onboard 10/100Mbps LAN

The onboard LAN chip is incorporated in the chipset providing the RTL8100C with 10/100Mbps fast Ethernet controller and integrated Ethernet PCI LAN capabilities.

✳ AC'97 Audio

The audio is a 6 channel AC'97 CODEC that is compatible with Intel AC'97 revision 2.2 and Microsoft's PC2001 requirements.

✳ Versatile Memory Support

Supports DDR 333/266/200 SDRAM. It accommodates two unbuffered 2.5V 184-pin slots. Each slot supports up to 1 GB with a total maximum capacity of 2 GB.

✳ PCI Expansion Slots

Provide three 32-bit PCI slots.

✳ AGP Expansion Slot

Provides one AGP2.0 compliant slot that supports up to 4X AGP device.

✳ 6 USB 2.0 Interface Onboard

➢ 2 x USB ports on back panel and two extended USB headers (4 ports) on front panel.

✳ I/O Interface

Provides a variety of I/O interfaces:

- 1 x PS/2 Mouse
- 1 x PS/2 Keyboard
- 1 x Serial port
- 1 x Parallel port
- 1 x VGA port
- 1 x Game port
- 2 x USB ports
- 1 x LAN port
- 1 x Microphone port
- 1 x Line-In port
- 1 x Line-Out port

✸ PCI Bus Master IDE Controller Onboard

Two ultra DMA 133 bus master dual-channel IDE ports support up to four IDE devices (one Master and one Slave per channel).

The IDE bus implements data transfer speeds to 133/100/66/33MB/sec and supports enhanced PIO modes.

80-pin cable backward compatible legacy ATAPI devices, ATAPI IDE CD-ROM, CD-R, CD-RW, and LS-120 supports.

✸ ATX Power Supply Connector

ATX power supply unit can be connected to the onboard 20-pin ATX power connector, and 4-pin ATX power connector. The unit supports Suspend and Soft-On/Off modes by the dual-function power button.

✸ Advanced Configuration and Power Interface

Features four power-saving modes: S1 (Snoop), S3 (Suspend to RAM), S4 (Suspend to DISK), and S5 (Soft-Off). ACPI provides more efficient energy-saving features controlled by your operating system that supports OS Direct Power Management (OSPM) functionality.

✸ System BIOS

Provides licensed Award BIOS V6.0 PG on the 2Mb Flash ROM, and supports Green PC, Desktop Management Interface (DMI).

✸ Form Factor

System board conforms to the micro-ATX form factor specification.

Board dimension: 244mm x 244mm.

✳ Advanced Features

➢ Low EMI - Built in spread spectrum. Unused PCI/SDRAM slots are shut off by the automatic clock for reducing EMI.

➢ Dual Function Power Button - The system can be in any of the two states: one is Suspend mode and the other is Soft-Off mode. Pushing the power button for less than 4 seconds places the system into Suspend mode. When the power button is pressed for longer than 4 seconds, the system will enter Soft-Off mode.

➢ Modem Ring Power-On - The system can be powered on automatically by the activation of modem ringing.

➢ CPU Multiplier Setting - This item allows users to adjust CPU Multiplier in BIOS.

➢ CPU/RAM/AGP Voltage Setting - These items allow users to adjust CPU/RAM/AGP Voltage in BIOS.

✳ Intelligent Features

➢ Voltage Monitoring - Monitors various voltages of key elements, such as the CPU, and other critical system voltage levels to ensure a stable current passing through mainboard components.

➢ Fan Status Monitoring - To prevent the CPU from overheating, the CPU fan is monitored by RPM, with which the cooling fan is required.

➢ Temperature Monitoring - This item allows users to make sure whether the CPU or system runs under a suitable temperature.

3 HARDWARE INSTALLATION

Before removing/installing any of these devices: CPU, DIMMs, Add-On Cards, and Cables, please unplug the onboard power connector.

This section outlines how to install and configure your mainboard. Referring to the following mainboard layout helps you identify various jumpers, connectors, slots, and ports.

3.1 Step-by-Step Installation

Accessories Of MS52PN
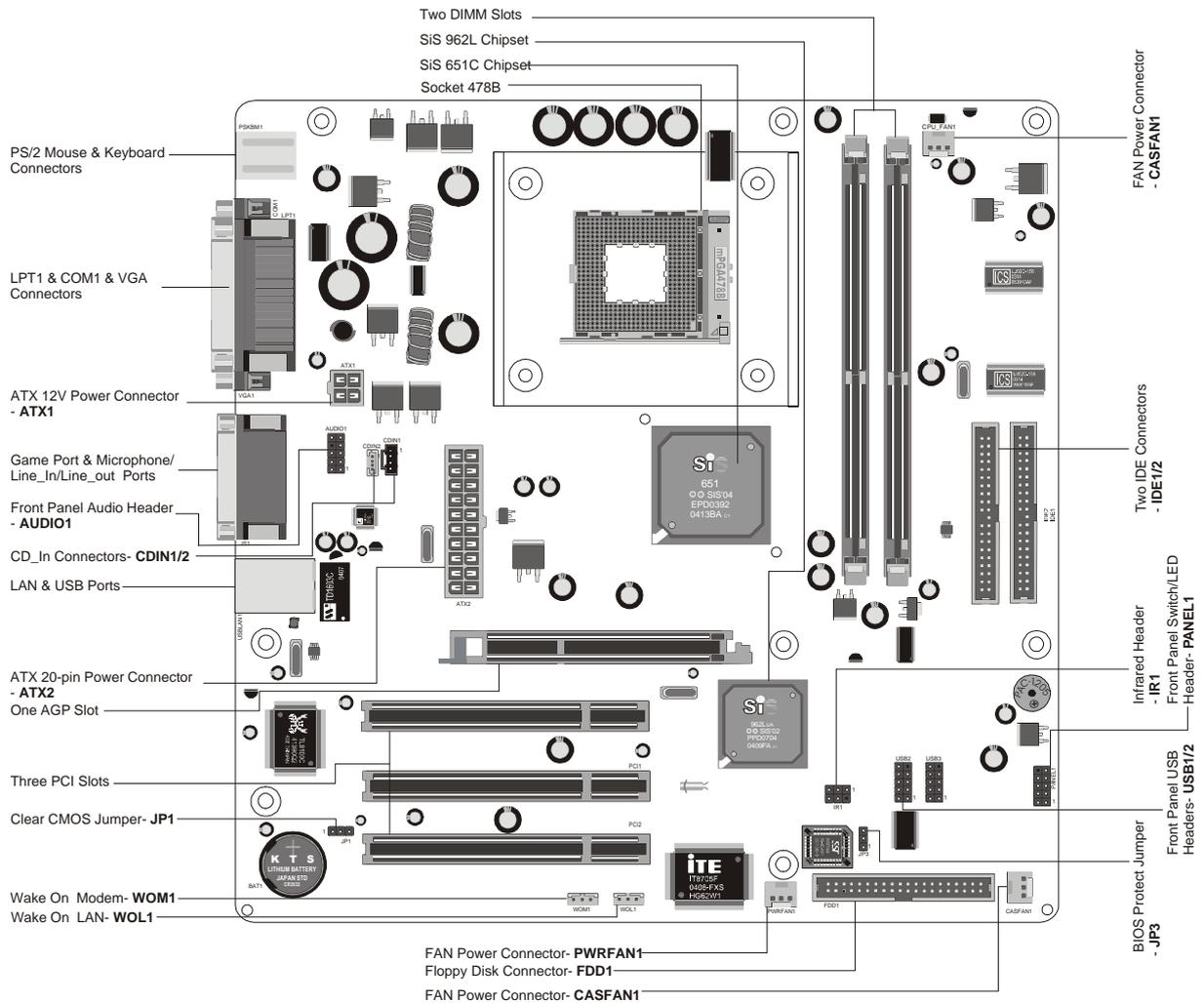
Step 1

CPU Installation:

This mainboard supports Intel Pentium 4 Socket 478 series CPU. Please follow the steps as follows to finish CPU installation.

Note the CPU orientation when you plug it into CPU socket.

1. Pull up the CPU socket lever to 90-degree angle.
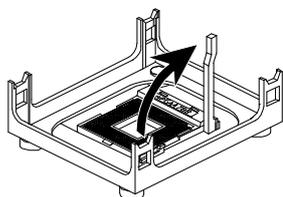
CPU socket lever up to 90-degree angle

2. Locate Pin 1 in the socket and look for a black dot or cut edge on the CPU upper interface. Match Pin 1 and cut edge, and insert the CPU into the socket.
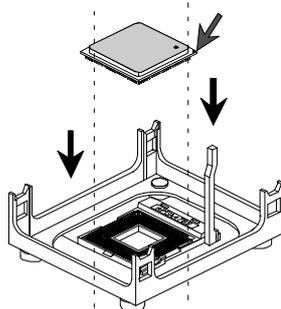
CPU Pin 1 and cut edge

3. Press down the CPU socket lever and finish CPU installation.
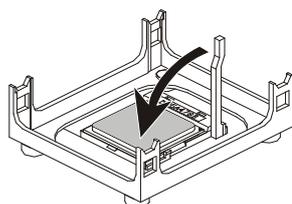
Note:The CPU might be damaged if you do not match the CPU socket Pin 1 and cut edge well.

4. Intel Pentium 4 processors require a set of heatsink and fan to cool down the processor. You need to purchase a heatsink and fan if they are not bundled with your CPU. Required is that install the set and plug its cable in the CPU fan power connector. Note that there are kinds of CPU fan connectors. Normally, if your mainboard supports a hardware monitoring function, a 3-pin fan power connector can have your system detect the CPU fan's speed. A CPU fan with a 2-pin or 4-pin fan power connector does not support the detection of the CPU fan's speed, and must directly be connected to the system's power supply unit.

Step 2

Set Jumpers

The default jumper settings have been set for the common usage standard of this mainboard. Therefore, you need not to reset the jumpers unless you require special adjustments as the following case:

Clear CMOS Setting
BIOS Protection Setting

For first-time DIY system builders, we recommend that you not change the default jumper settings if you are not quite familiar with the mainboard configuration procedures. The factory-set default settings are tuned for optimum system performance. For advanced users who prefer to customize their system, section 3.2 Jumper Settings provides the detailed information on how to configure your mainboard manually.

Step 3

Install DDR SDRAM System Memory

To install memory, insert DDR SDRAM memory module(s) in the DIMM banks. Note that DDR SDRAM modules are directional and will not go in the DIMM banks if they are not properly oriented. After the module is fully inserted into the DIMM bank, lift the clips of both sides of the DIMM bank to lock the module in place.

DDR SDRAM
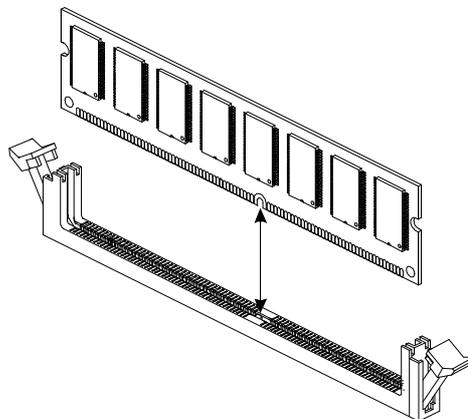
Step 4

Install Internal Peripherals in System Case

Before you place the mainboard into your system case, we recommend that you first assemble all the internal peripheral devices into the computer housing, including, but not limited to, the hard disk drive (IDE/HDD), floppy disk drive (FDD), CD-ROM drive, and ATX power supply unit.

To install IDE & FDD drives, follow these procedures:

1. Set the required jumpers on each device according to the instructions provided by the manufacturer. (IDE, HDD, and CD-ROM have to set jumpers to Master or Slave mode depending on whether you install more than one device of each kind.)

2. Connect the IDE cable and FDD cable on the back panel of the internal peripheral devices to the corresponding headers on board. Note that the cable should be oriented with its colored stripe (usually red or magenta) connected to pin#1 of the IDE or FDD connector on the mainboard and on the device as well.

3. Connect an available power cable from your system power supply unit to the back panel of each peripheral device. Note that the power cable is directional and cannot fit in if not properly positioned.

Step 5

Mount the Mainboard on the Computer Chassis

1. You may find there are a lot of mounting holes on your computer chassis and mainboard. To match the holes on both properly, the key point is to make the back panel of the mainboard in a close fit with your system case, as shown below.
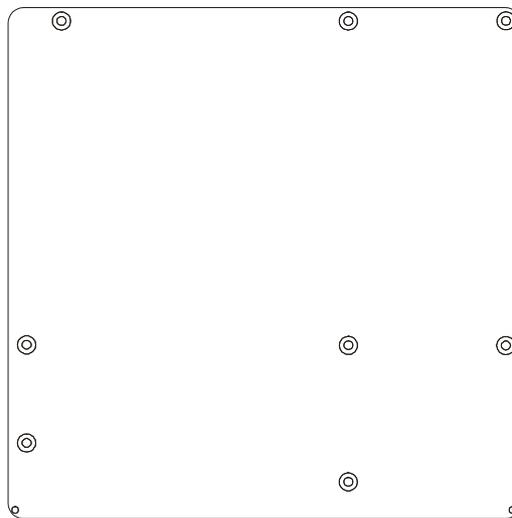
2. Position the studs between the chassis and the mainboard. The studs are used to fix the mainboard and to keep a certain distance between them, for avoiding any electrical shorts in-between.

   (If your computer case is already equipped with mounting studs, you need to tighten the screws to attach the mainboard.)

Note: In most computer housings, you can find 4 or more holes to place studs for fixing the mainboard. If there aren't enough matching holes, screw at least 4 studs to ensure the proper attachment of the mainboard.

Step 6

Connect Front Panel LEDs/Switches/USBs/Audio

You can find there are several cables existing in the system case and originating from the front panel devices (HDD LED, ACPILED, Reset switch, Power switch, Audio and USB devices etc.). These cables serve to connect the front panel LEDs, switches, Audio and USB2/3 connectors, as shown below.
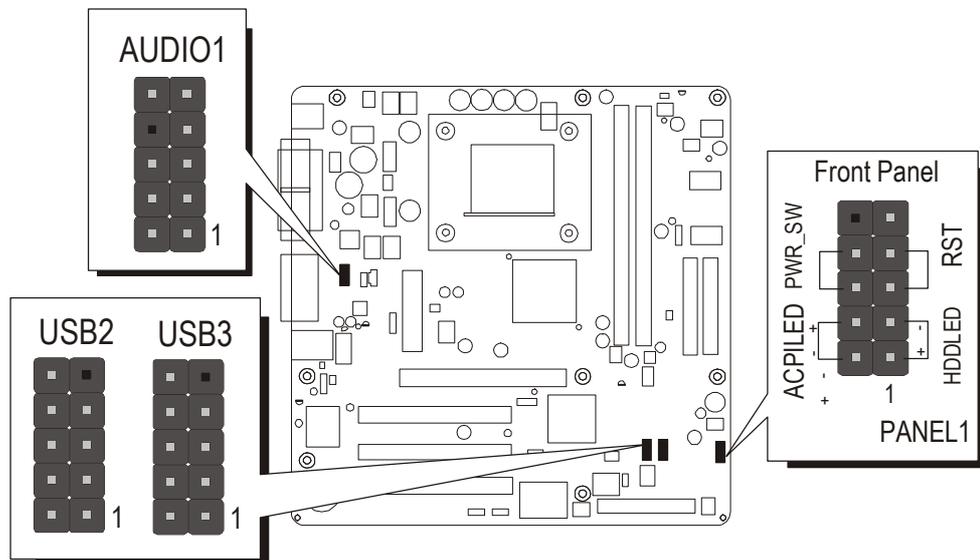
1. HDD LED (HDDLED)
2. Power/Sleep/Message waiting LED (ACPILED)
3. Hardware Reset Switch (RST)
4. ATX Soft Power On/Off (PWR_SW)
5. Front Panel USB Headers (USB 2/USB 3)
6. Front Panel Audio Header (AUDIO1)
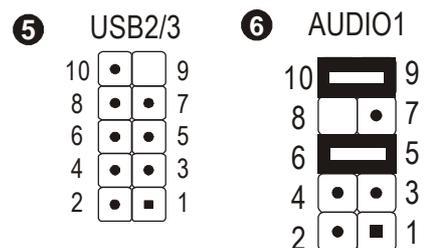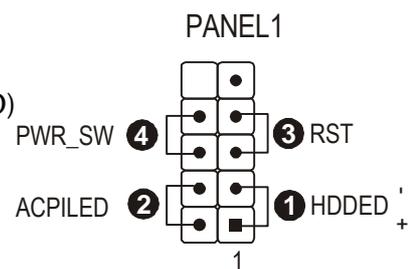
Step 7

Connect IDE and Floppy Disk Drives

1. IDE cable connectors
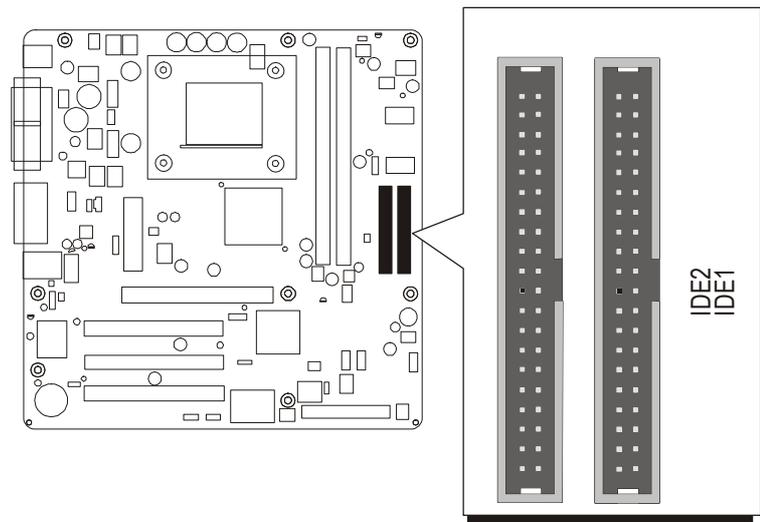
2. Floppy cable connector
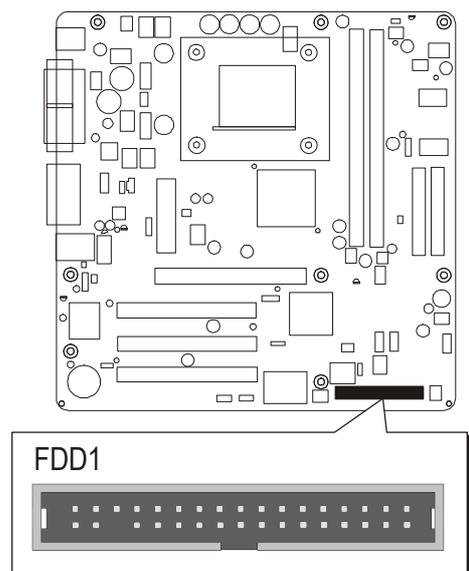
Step 8

Connect Other Internal Peripherals

1. IR header (IR1)
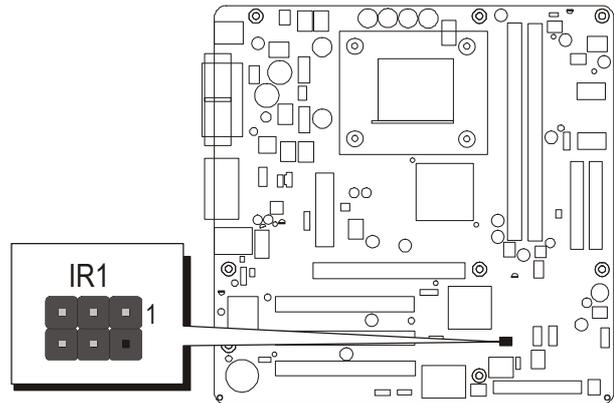
2. CD_IN connectors (CDIN1/CDIN2)
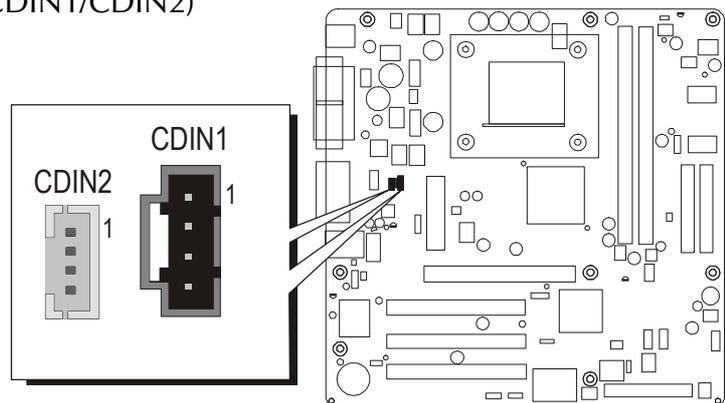
3. Wake On Modem (WOM1);
   Wake On LAN (WOL1)
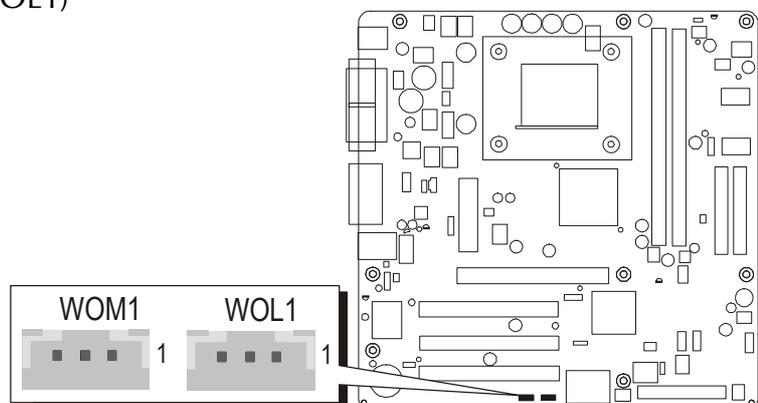
Step 9

Connect the Power Supplies

1. System power connectors (ATX1/ATX2)
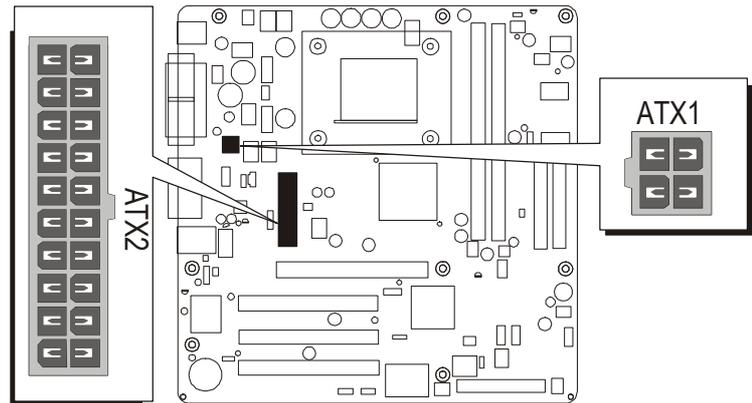
Step 10

Install Add-On Cards in Expansion Slots

1. Accelerated Grapics Port (AGP) Card
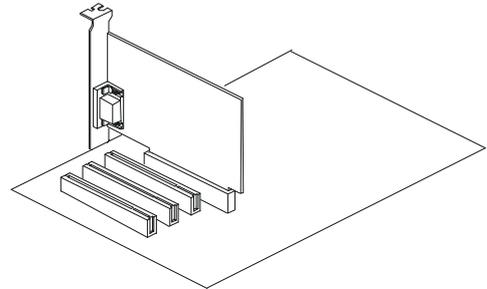
2. PCI Card
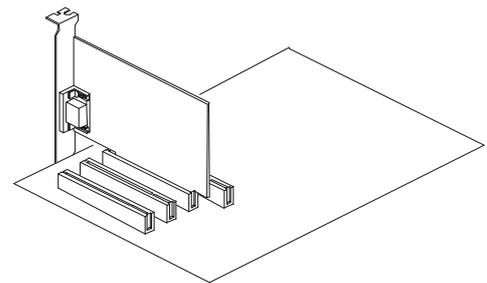
Step 11

Connect External Peripherals to Back Panel

You are now ready to connect the external peripherals to your system's back panel.

1. PS/2 Mouse Port
2. PS/2 Keyboard Port
3. Parallel Port
4. Serial Port
5. VGA Port
6. Game Port
7. Line-Out Port
8. Line-In Port
9. Microphone Port
10. LAN Port
11. USB Ports1/2
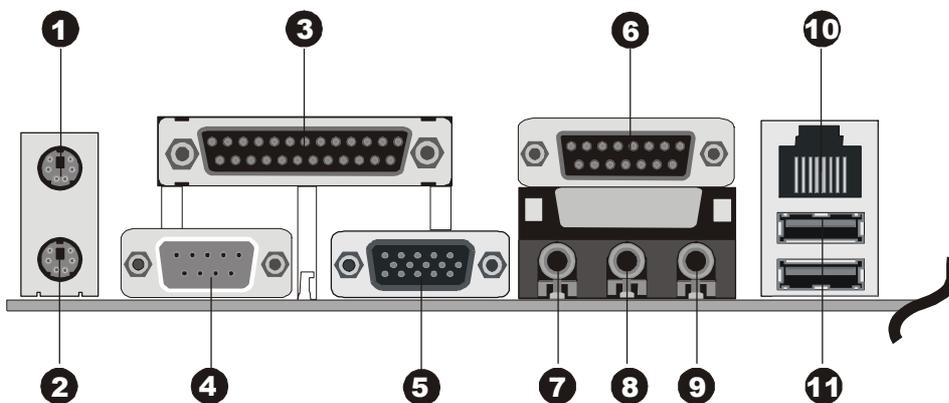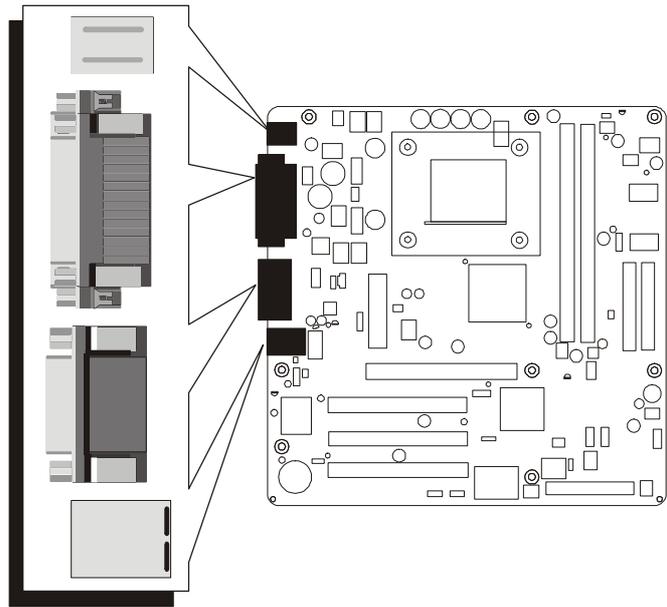
Step 12

System Boot Up For the First-Time

To ensure your system completedly and correctly installed, please refer to the above installation steps once again before first booting up your system.

1. Insert a system-bootable floppy disk (DOS 6.2X, Windows 9X/NT, or others), which contains the FDISK and FORMAT utilities.

2. Turn on the system power.

3. First, you need to use the FDISK utility to create a primary partition of the hard disk. You can also add an extended partition if your primary partition does not use all of the available hard disk space. If you choose to add an extended partition, you will have to create one or more logical partitions to occupy all the space available to the extended partition. The FDISK utility will assign a drive letter (i.e. C:, D:, E:,......) to each partition shown in the FDISK program. After the FDISK procedure, reboot your system by using the same disk.

Note: DOS 6.2X and Windows 95A can only support up to 2.1GB of HDD partition. If you use the FDISK utility with one of the operating systems mentioned above, you can only install your HDD into any partitions no larger than 2.1GB.

4. Now, use the FORMAT utility to format all the partitions you've created. When formatting the primary partition (C:), key in the command, "FORMAT C:/S."

Note: FORMAT C:/S can transfer all the necessary system files into the primary partition of your hard disk. Afterwards, your HDD will become a bootable drive.

5. Install all the necessary drivers for CD-ROM, Mouse, etc.

6. Setup the complete operating system according to your OS installation guide.

Step 13

Install Drivers & Software Components

Please note that all the system utilities and drivers are designed for Win 9x/ 2000/ME/NT/XP operating systems. Make sure your operating system is already installed before running the installation programs on CD-ROM.

1. Insert the MS52PN bundled CD-ROM into your CD-ROM drive. The auto-run program will display the main installation window on screen.
2. Choose "Install SIS AGP Driver" and complete it.
3. Choose "Install SIS IDE Driver" and complete it.
4. Choose "Install SIS VGA Driver" and complete it.
5. Choose "Install SIS USB2.0 Driver" and complete it.
6. Choose "Install Realtek LAN Driver" and complete it.
7. Choose "Install C-Media Audio Driver" and complete it.
8. Quit (from the auto-run installation program).

3.2 Jumper Settings

Several hardware settings are made through the use of mini jumpers to connect jumper pins on the mainboard. Pin #1 could be located at any corner of jumpers, and the corner with a white right angle stands for Pin #1. There are several types of Pin #1 as shown below:

3-pin and multi-pin (> 3) jumpers shown as follows:
Pin #1 to the left:

Pin #1 on the top:

Pin #1 to the right:

Pin #1 on the bottom:

Jumpers with two pins capped are shown as ▭ for Close [On] or ▣● for Open [Off]. To do this, please place a plastic mini cap on the desired pair of pins.

> Caution!
> 1. Do not remove the mainboard from its antistatic protective packaging until you are ready to install it.
> 2. Carefully hold the mainboard by its edges and avoid touching its components. When putting the mainboard down, place it on top of its original packaging film, with the component side up.
> 3. Wear an antistatic wrist strap or take other suitable measures to prevent electrostatic discharge (ESD) as handling this equipment.

Jumpers & Connectors Guide

Refer to the mainboard layout on page 10 and this section to help you identify jumpers, slots, and connectors along with their assigned functions.
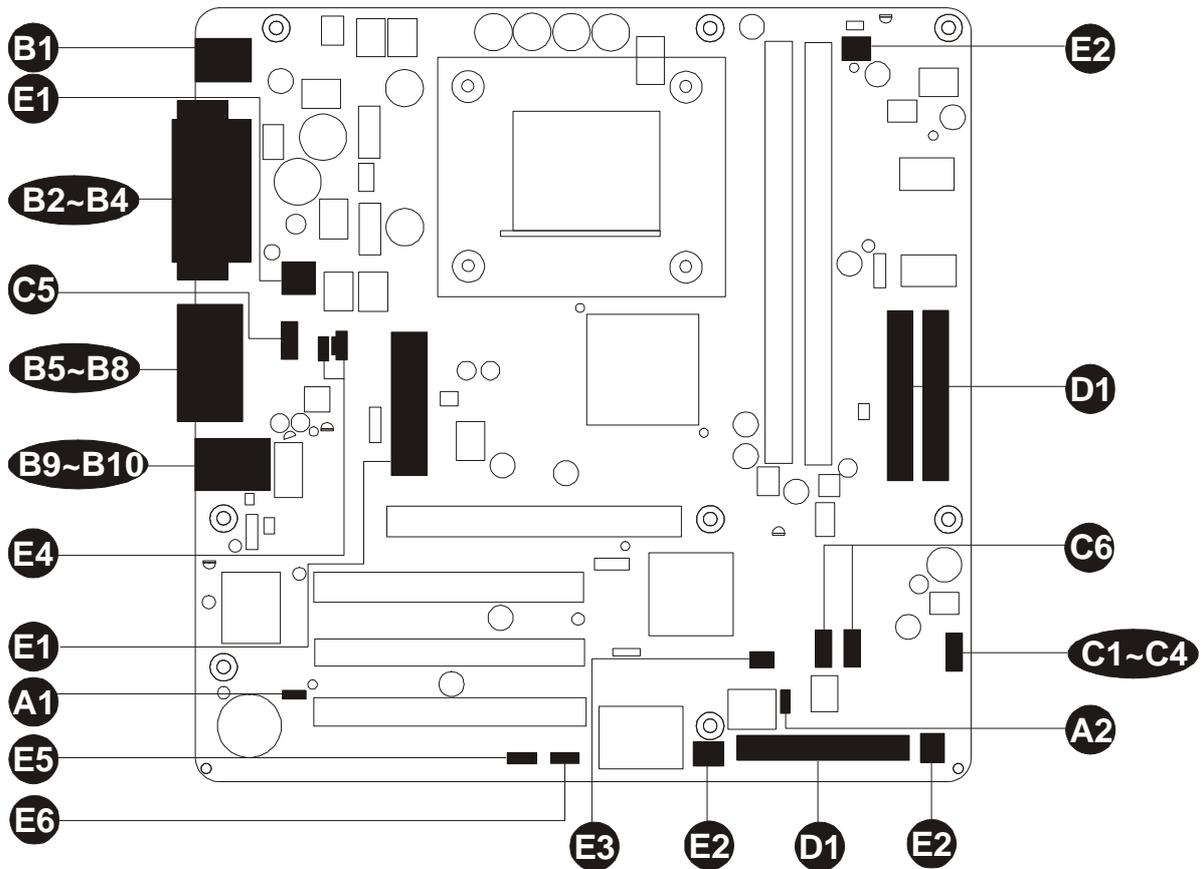
CPU/Memory/Expansion Slots

Socket 478 : CPU socket for Intel Pentium 4, 478-pin processor

DIMM1/2 : Three DIMM slots for 128, 256, 512 MB, and 1GB of 2.5V DDR SDRAM
(The total installed memory does not exceed 2GB.)

AGP : One AGP slot supports up to 4X AGP device

PCI : Three 32-bit PCI expansion slots

Jumpers

(A1)	JP1	: Clear CMOS setting
(A2)	JP3	: BIOS Protect setting

Back Panel Connectors

(B1)	PSKBM1	: PS/2 mouse port
(B1)	PSKBM1	: PS/2 keyboard port
(B2)	LPT1	: Parallel port
(B3)	COM1	: Serial port1
(B4)	VGA1	: VGA port1
(B5)	GAME	: Game port
(B6)	Line-Out	: Line-Out port
(B7)	Line-In	: Line-In port
(B8)	Microphone	: Microphone port
(B9)	USBLAN1	: LAN port
(B10)	USBLAN1	: USB ports1/2

Front Panel Connectors

(C1)	HDD LED	: HDD LED
(C2)	ACPILED	: Power/Sleep/Message waiting LED
(C3)	RST	: Hardware reset switch
(C4)	PWR_SW	: ATX power on/off switch
(C5)	AUDIO1	: Front panel Audio header
(C6)	USB2/3	: Front panel USB headers

Internal-Peripheral Connectors

(D1)	IDE1	: IDE primary interface (dual-channel)
(D1)	IDE2	: IDE secondary interface (dual-channel)
(D1)	FDD1	: Floppy disk drive interface

Other Connectors

(E1)	ATX1/ATX2	: ATX power supply connectors
(E2)	CPUFAN1	: CPU Fan connector
(E2)	PWRFAN1	: Power Fan connector
(E2)	CASFAN1	: Case Fan connector

E3 IR1 : IR header
E4 CDIN1/CDIN2 : Primary/Secondary CD_IN connectors
E5 WOM1 : Wake On Modem connector
E6 WOL1 : Wake On LAN connector

☞ *Jumpers*

Ⓐ1 Clear CMOS Setting (JP1)

JP1 is used to clear CMOS data. Clearing CMOS will result in permanently erasing previous system configuration settings and the original factory-set system settings.

1 Pin 1-2 (Normal)(Default)

1 Pin 2-3 (Clear CMOS)
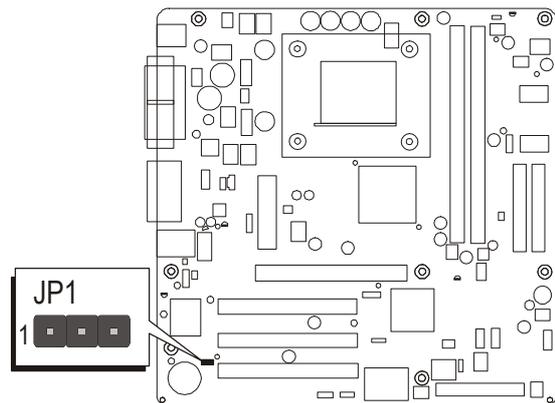
Step 1. Turn off the system power (PC-->Off).
Step 2. Remove the ATX power cable from the ATX power connector.
Step 3. Remove the jumper cap from pins 1-2.
Step 4. Place the jumper cap on pins 2-3 for a few seconds.
Step 5. Restore the jumper cap to pins 1-2.
Step 6. Plug the ATX power cable into the ATX power connector.
Step 7. Turn on the system power (PC-->On).

Ⓐ2 BIOS Protect Setting (JP3)

JP3 is used to BIOS protect.

 Pin 1-2 Write Protect Disabled
1

 Pin 2-3 Write Protect Enabled
1
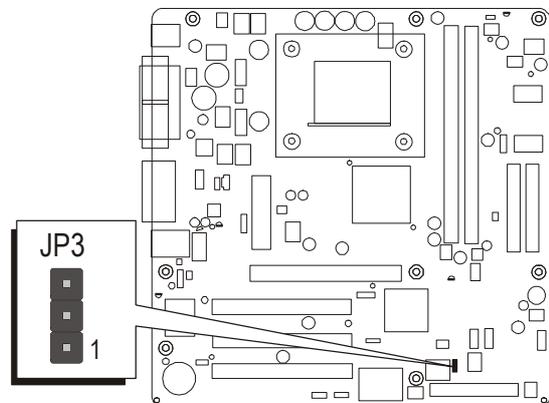
☞ *Back Panel Connectors*

B1 PS/2 Mouse & PS/2 Keyboard Port Connectors

Two 6-pin female PS/2 Mouse & Keyboard connectors are located on the rear panel of the mainboard. In a desktop computer, the PS/2 Mouse connector is situated on the top of the PS/2 Keyboard connector. In a tower computer, the PS/2 Mouse connector is located on the rightside of the PS/2 Keyboard connector.

PS/2 Mouse

PS/2 Keyboard
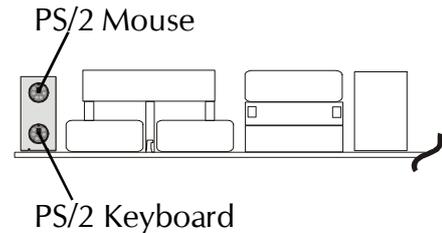
B2 Parallel Port Connector

One DB25 female parallel connector is located on the rear panel of the mainboard. Plug the cable from your parallel device (printer, scanner, etc.) into this connector.

Parallel Port
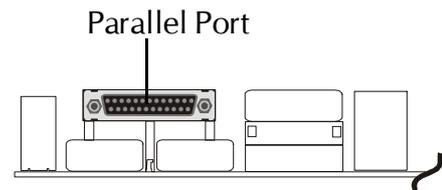
B3 COM1 Port Connector

Attach a serial device cable to the DB9 serial port COM1 at the back panel of your computer.

COM1
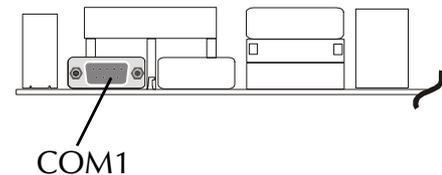
B4 VGA Port Connector

One 15 pin VGA connector is located at the rear panel of the mainboard.

VGA Port
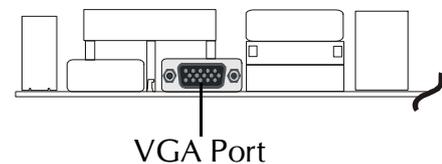
B5 Game Port Connector

The Game port is a 15-pin female connector. This port can be connected to any IBM PC compatible game with a 15-pin D-sub connector.

Game Port
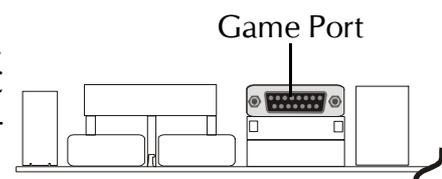
B6 Line-Out Port Connector

Line-Out is a stereo output port through which the combined signal of all internal and external audio sources on the board is output. It can be connected to 1/8-inch TRS stereo headphones or to amplified speakers.
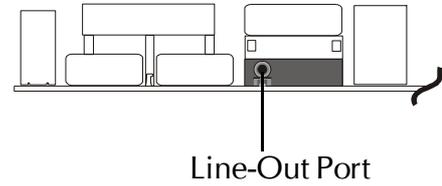
Line-Out Port

B7 Line-In Port Connector

Line-In is a stereo line-level input port that accepts a 1/8-inch TRS stereo plug. It can be used as a source for digital sound recording, and a source to be mixed with the output, or both.

Line-In Port
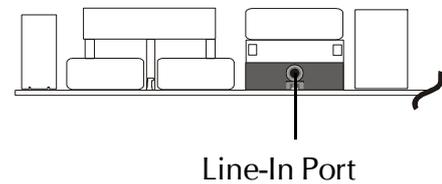
B8 Microphone Port Connector

Microphone is a 1/8-inch jack that provides a mono input. It can use a dynamic mono or stereo microphone with a resistance of not more than 600 Ohms.

Microphone Port
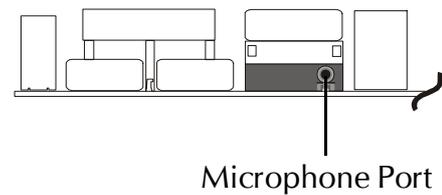
LAN Port

B9 LAN Port Connector

This mainboard can accommodate one device on LAN. Attach a RJ-45 cable to this LAN port connector on back panel.
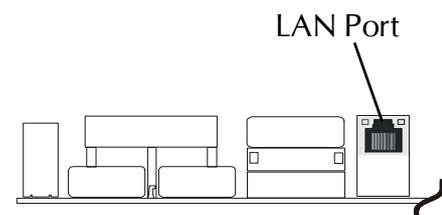
USB Port2

B10 USB Port Connectors

This mainboard offers 2 USB ports on back panel. Plug each USB device jack into an available USB connectors.

USB Port1
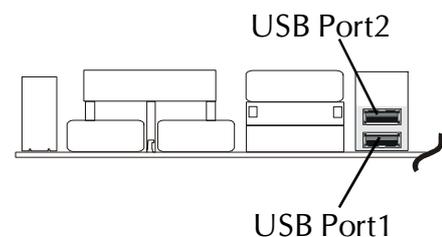
☞ *Front Panel Connectors*

ⓒ❶ HDD LED Connector (HDDLED)

Attach a connector cable from the IDE device LED to the 2-pin (HLED) header. The HDD LED lights up whenever an IDE device is active.
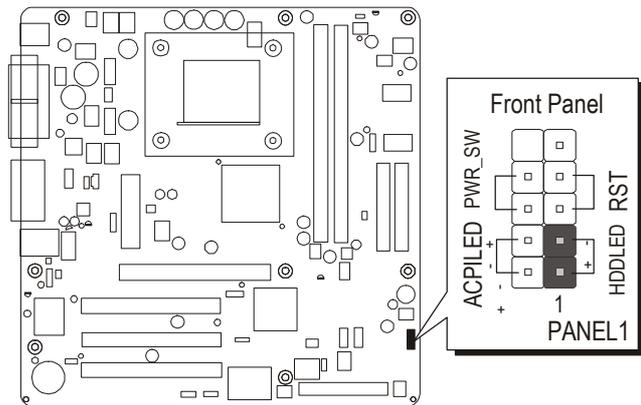
ⓒ❷ Power/Sleep/Message waiting LED (ACPILED)

Connecting pins 2 and 4 to a single or dual color, front panel mounted LED provides power on/off, sleep, and message waiting indication.
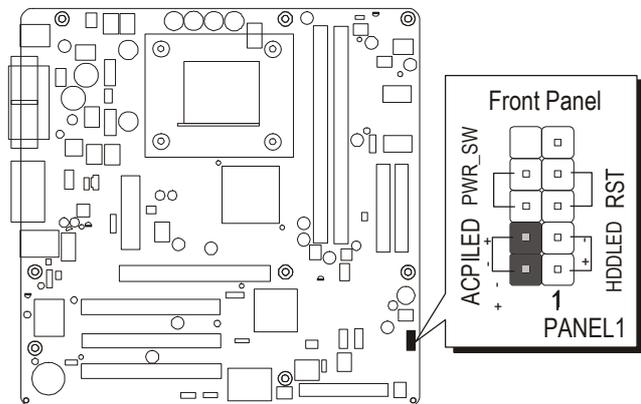
③ **Hardware Reset Switch Connector (RST)**

Attach a cable to the 2-pin (RST) header. Pressing the reset switch causes the system to restart.
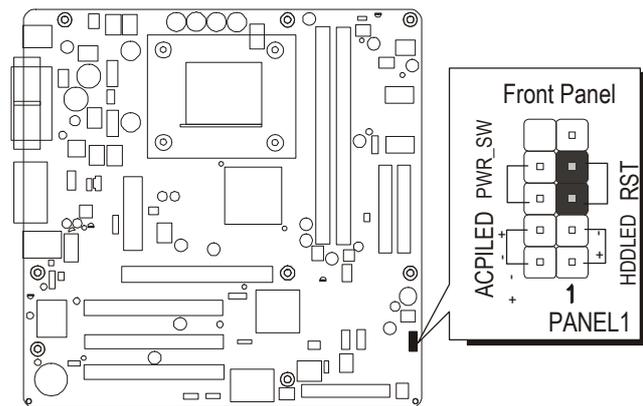
④ **ATX Power On/Off Switch Connector (PWR_SW)**

The Power On/Off Switch is a momentary type switch used for turning on or off the ATX power supply. Attach a connector cable to the 2-pin (PWR_SW) header on the mainboard.
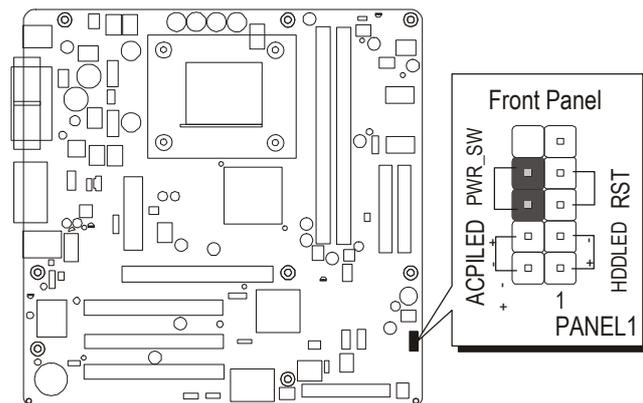
Note : Please notice all the LED connectors are directional. If your chassis's LED does not light up during running, please change it to the opposite direction.

⑤ Front Panel Audio Header (AUDIO1)

This header allows users to install an auxiliary Front-Oriented Audio port for easier access. Either the Line-Out port connector on back panel or the front panel Audio header is available at the same time. If you would like to use this header on front panel, please remove all jumpers from it and install your special extra audio cable instead. Two mini jumpers must be setted on pins 5-6 and pins 9-10 when this header is not used.

AUDIO1

```
10 [▭▭] 9
 8 [ • ] 7
 6 [▭▭] 5
 4 [ • • ] 3
 2 [ • ■ ] 1
```
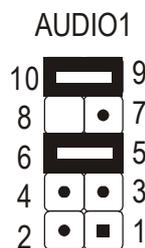
Pin Assignments:

1 = AUD_MIC	2 = AUD_GND
3 = AUD_MIC_BIAS	4 = AUD_VCC
5 = AUD_FPOUT_R	6 = AUD_RET_R
7 = HP_ON	8 = KEY
9 = AUD_FPOUT_L	10 = AUD_RET_L
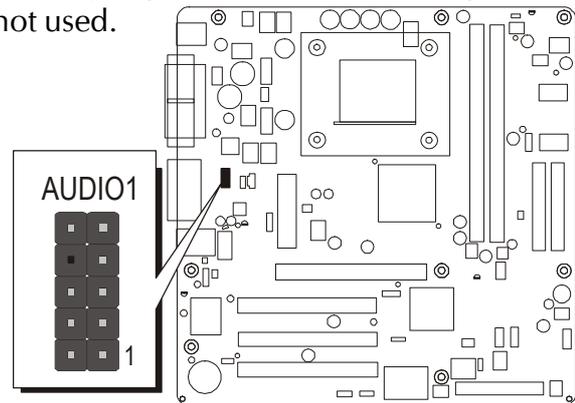
⑥ Front Panel USB Headers (USB2/USB3)

Headers USB2/3 are used to connect cables to USB connectors mounted on front panel or back panel. The USB cable is optional at the time of purchase.

USB2/3

```
10 [ • ] 9
 8 [ • • ] 7
 6 [ • • ] 5
 4 [ • • ] 3
 2 [ • ■ ] 1
```
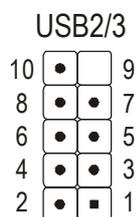
Pin Assignments:

1 = VREG_FP_USBPWR0	2 = VREG_FP_USBPWR0
3 = USB_FP_P0-	4 = USB_FP_P1-
5 = USB_FP_P0+	6 = USB_FP_P1+
7 = GND	8 = GND
9 = KEY	10 = USB_FP_OC0
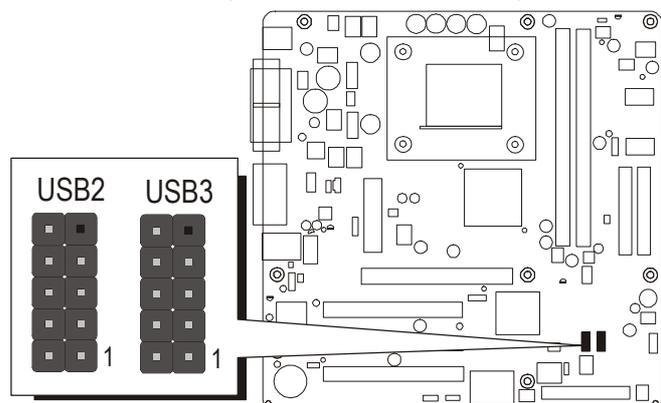
☞ *Internal Peripheral Connectors*

Ⓓ Enhanced IDE and Floppy Connectors (IDE1/IDE2 & FDD1)

MS52PN motherboard features two 40-pin dual-channel IDE device connectors (IDE1/IDE2), providing support for up to four IDE devices, such as CD-ROM and Hard Disk Drive (HDD). This mainboard also includes one 34-pin floppy disk controller (FDC) to accommodate the Floppy Disk Drive (FDD). Moreover, this mainboard comes with one 80-pin ATA 133/100/66/33 ribbon cable to connect IDE HDD, and one 34-pin ribbon cable for FDD connection.
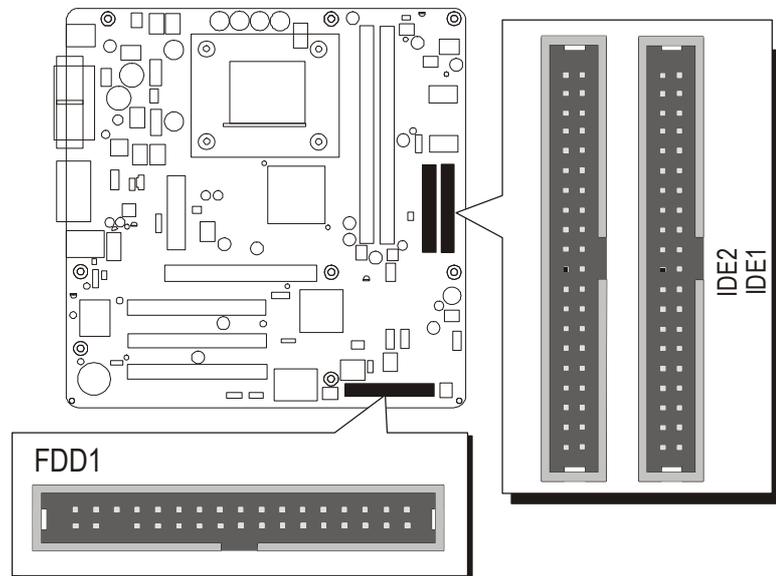
Important: Ribbon cables are directional; therefore, connect the red cable stripe to the same side.

☞ **Other Connectors**

❸1 ATX Power Supply Connectors (ATX1/ATX2)

This motherboard uses 20-pin ATX power header (ATX2), and comes with the other one header (ATX1). Please make sure you plug each in the right direction. It is essential to have these two power supply connectors plugged or your system won't boot up.
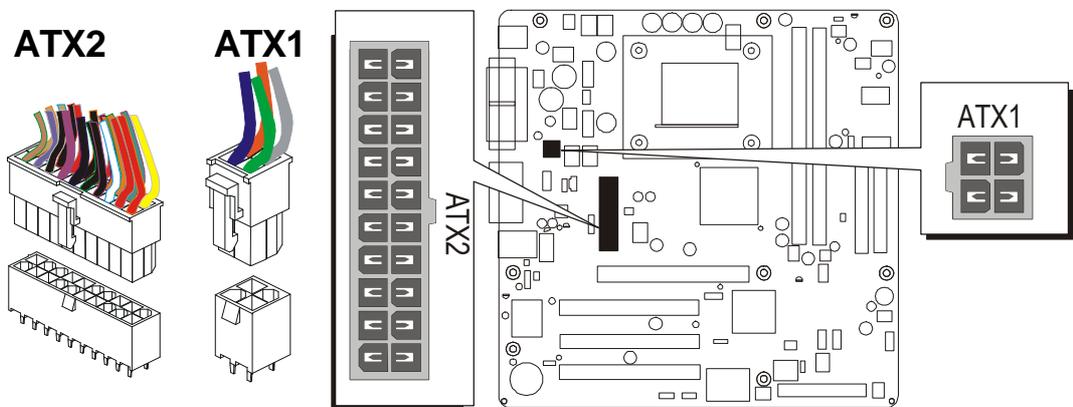
A traditional ATX system remains in the power-off stage when AC power resumes from power failure. However, it is inconvenient for a network server or workstation if there is not an UPS to execute power-on. Thus, this motherboard supports an AC Power Auto Recovery function to solve this problem. You may enable the function, "PWRON After PWR-Fail," in the sub-menu of "Power Management Setup" within the BIOS setup program.

Note 1:	The ATX power connector is directional and will not go in unless the guides match perfectly, making sure that pin#1 is properly positioned.
Note 2:	Make sure the latch of the ATX power connector clicks into place to ensure a solid attachment.
Note 3:	Your ATX power supply must be supplied to ACPI + 5V stand-by power and at least 720mA compatible.
Note 4:	Make sure your power supply have enough power for higher speed processor installed.

☄ Fan Connectors (CPUFAN1/PWRFAN1/CASFAN1)

The mainboard provides three onboard 12V cooling fan power connectors to support the CPUFAN1/PWRFAN1/CASFAN1.

Note: Both cable wiring and type of plug may vary, which depend on the fan maker. Keep in mind that the red wire should always be connected to the +12V header and the black wire to the ground (GND) header.

GND   +12V   SENSE

1

CPUFAN1

1

PWRFAN1 CASFAN1

1   1
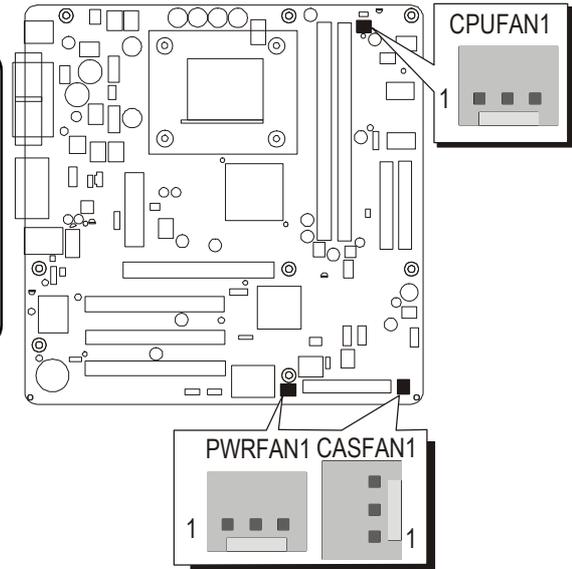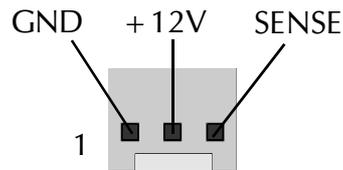
☄ IR Header (IR1)

If you have an Infrared device, this mainboard can implement IR transfer function. This mainboard supports Normal, IrDA, ASKIR, or SCR transfer mode. To enable this function, attach a 6-pin infrared device cable to the IR (IR1) header. Please note that every pin is properly allocated. If not, your IR device may be damaged.

5 3 1
IR1 ▪
6 4 2

IR1

1
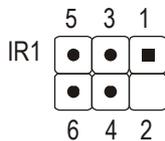
Pin Assignments:
1 = NC   2 = KEY
3 = +5V   4 = GND
5 = IRTX   6 = IRRX
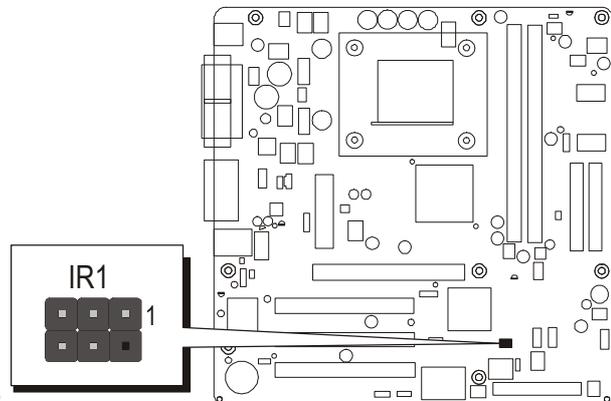
E4 CD_IN Connectors (CDIN1/CDIN2)

Ports CDIN 1 (Black)/CDIN 2can be used to connect stereo audio inputs from CD-ROM, TV-tuner or MPEG card.

CD1/2

```
■ 1
● 2
● 3
● 4
```
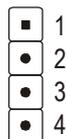
Pin Assignments (CDIN1):

1 = CD In-L

2 = GND

3 = GND

4 = CD In-R

Pin Assignments (CDIN2):

1 = GND

2 = CD In-L

3 = GND

4 = CD In-R

CDIN1

CDIN2   1

1
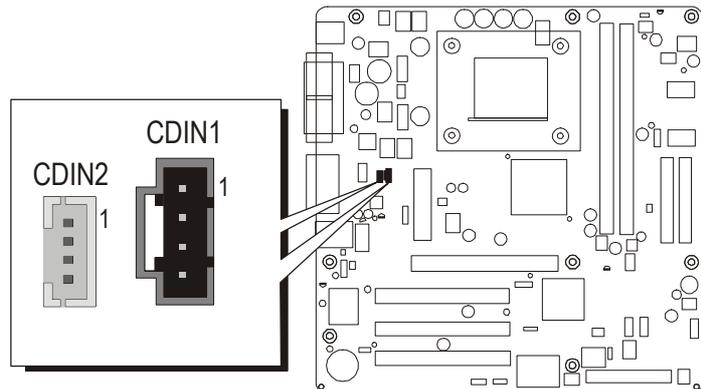
E5 Wake On Modem (WOM1)/ Wake On LAN (WOL1)
E6 Connectors

If you have installed a LAN card/modem, use the cable provided with the card to plug into the motherboard WOL1/WOM1 connector.

Pin Assignments (WOM1):

1 = 5VSB

2 = GND

3 = Ring#

Pin Assignments (WOL1):

1 = 5VSB

2 = GND

3 = Ring#

WOM1   WOL1

■ ■ ■ 1   ■ ■ ■ 1
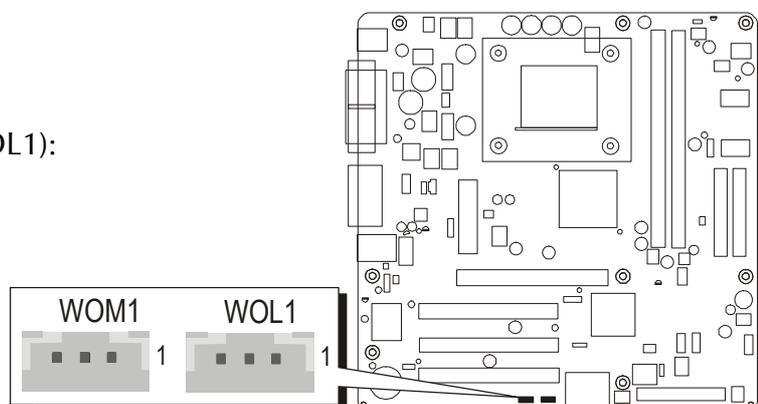
3.3 System Memory Configuration

The MS52PN mainboard has two 184-pin DIMM slots that allow you to install from 32 MB up to 1GB of system memory. Each 184-pin DIMM (Dual In-line Memory Module) slot can accommdate 32 MB, 64 MB, 128MB, 256MB, 512MB, and 1GB compliant 2.5V single or double side 64-bit wide data path DDR SDRAM modules. You do not need to set any jumper to configure memory since the BIOS utility can detect the system memory automatically. You can check the total system memory value in the BIOS Standard CMOS Setup menu. Note: The total installed memory does not exceed 2GB.

1. Install Memory:

Install memory in any or all of the banks. The combination shown as follows.

DIMM Socket	Memory Modules	Module Quantity
DIMM 1	32MB, 64MB, 128MB, 256MB, 512MB and 1GB184-pin 2.5V DDR SDRAM DIMM	x 1
DIMM 2	32MB, 64MB,128MB, 256MB, 512MB and 1GB184-pin 2.5V DDR SDRAM DIMM	x 1

2. Upgrade Memory:

You can easily upgrade the system memory by inserting additional DDR SDRAM modules in available DIMM banks. The total system memory is calculated by simply adding up the memory in all DIMM banks. After upgrade, the new system memory value will automatically be computed and displayed in the field "Standard CMOS Setup" of BIOS setup program.

4 SOFTWARE UTILITY

4.1 Mainboard CD Overview

Note: The CD contents attached in MS52PN mainboard are subject to change without notice.

To start your mainboard CD disc, just insert it into your CD-ROM drive and the CD AutoRun screen should appear. If the AutoRun screen does not appear, double click or run D:\Autorun.exe (assuming that your CD-ROM drive is drive D:)

Navigation Bar Description:

☞ Install MS52PN Software - Installing SIS AGP, SIS IDE, SIS VGA, SIS USB 2.0, Realtek LAN, C-Media Audio Drivers.

☞ Manual - MS52PN mainboard user's manual in PDF format.

☞ Link to Homepage - Link to website homepage.

☞ Browse this CD - Allows you to see contents of this CD.

☞ Quit - Close this CD.
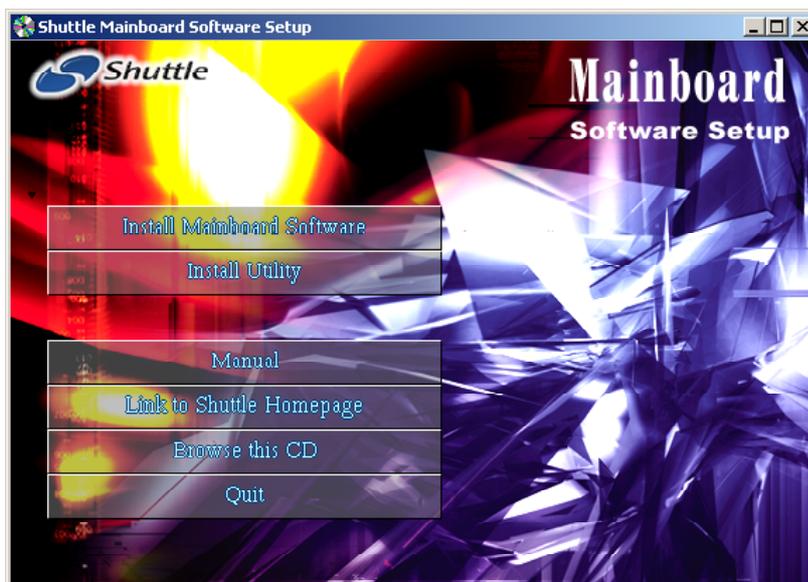
4.2 Install Mainboard Software

Insert the attached CD into your CD-ROM drive and the CD AutoRun screen should appear. Select using your pointing device (e.g. mouse) on the "Install Mainboard Software" bar to run into sub-menu.

The MS52PN Softwaree includes:

    [4.2.A] Install SIS AGP Driver

    [4.2.B] Install SIS IDE Driver

    [4.2.C] Install SIS VGA Driver

    [4.2.D] Install SIS USB2.0 Driver

    [4.2.E] Install Realtek LAN Driver

    [4.2.F] Install C-Media Audio Driver
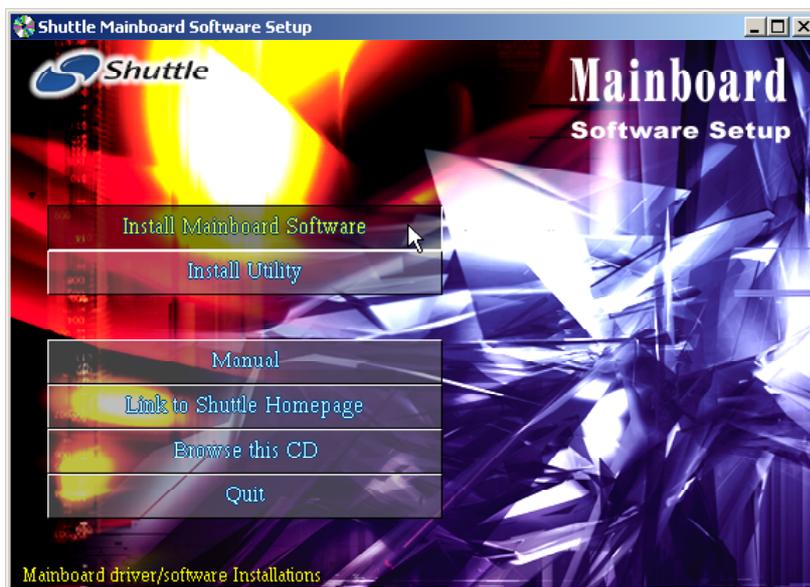
4.2.A Install SIS AGP Driver

Select using your pointing device (e.g. mouse) on the "Install SIS AGP Driver" bar to install the SIS AGP driver.

Once you made your selection, a Setup window run the installation automatically.

When the copying files is done, make sure you reboot the system to take the installation effect.

4.2.B Install SIS IDE Driver

Select using your pointing device (e.g. mouse) on the "Install SIS IDE Driver " bar to install the SIS IDE driver.

Once you made your selection, a Setup window run the installation automatically.

When the copying files is done, make sure you reboot the system to take the installation effect.

4.2.C Install SIS VGA Driver

Select using your pointing device (e.g. mouse) on the "Install SIS VGA Driver" bar to install the SIS VGA driver.

Once you made your selection, a Setup window run the installation automatically.

When the copying files is done, make sure you reboot the system to take the installation effect.

4.2.D Install SIS USB2.0 Driver

Select using your pointing device (e.g. mouse) on the "Install SIS USB2.0 Driver" bar to install the SIS USB2.0 driver.

Once you made your selection, a Setup window run the installation automatically.

When the copying files is done, make sure you reboot the system to take the installation effect.

4.2.E Install Realtek LAN Driver

Select using your pointing device (e.g. mouse) on the "Install Realtek LAN Driver" bar to install Realtek LAN driver.

Once you made your selection, a Setup window run the installation automatically.

When the copying files is done, make sure you reboot the system to take the installation effect.

4.2.F Install C-Media Audio Driver

Select using your pointing device (e.g. mouse) on the "Install C-Media Audio Driver" bar to install Auido driver.

Once you made your selection, a Setup window run the installation automatically.

When the copying files is done, make sure you reboot the system to take the installation effect.

4.3 View the User's Manual

Click on the "Manual" bar, and on the submenu click on the "Install Acrobat Reader" bar if you need to install it. Click on the "Manual" bar to view MS52PN user's manual.

5 BIOS SETUP

MS52PN BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in battery-backed RAM so that it retains the Setup information even if the system power is turned off.

The system BIOS is managing and executing a variety of hardware related functions in the system, including:

System date and time

Hardware execution sequence

Power management functions

Allocation of system resources

5.1 Enter BIOS

To enter the BIOS (Basic Input /Output System) utility, follow these steps:

Step 1.   Power on the computer, and the system will perform its POST (Power-On Self Test) routine checks.

Step 2.   Press < Del > key immediately, or at the following message: Press DEL to enter SETUP, or simultaneously press < Ctrl >, < Alt >, < Esc > keys.

Note1.   If you miss trains of words mentioned in step2 (the message disappears before you can respond) and you still wish to enter BIOS Setup, restart the system and try again by turning the computer OFF and ON again or by pressing the < RESET > switch located at the computer front panel. You may also reboot by simultaneously pressing the < Ctrl >, < Alt >, < Del > keys.

Note2.   If you do not press the keys in time and system does not boot, the screen will prompt an error message, and you will be given the following options:

"Press F1 to Continue, DEL to Enter Setup"

Step 3.   As you enter the BIOS program, CMOS Setup Utility will prompt you the Main Menu, as shown in the next section.

5.2 The Main Menu

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

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

Note that a brief description of each highlighted selection appears at the bottom of the screen.

Setup Items

The main menu includes the following main setup categories. Recall that some systems may not include all entries.

Standard CMOS Features

This menu displays the basic information about your system.

Advanced BIOS Features

Use this menu to set the advanced features available on your system.

Advanced Chipset Features

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

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals.

Power Management Setup

Use this menu to specify your settings for power management.

PnP/PCI Configurations

This option configures how PnP (Plug and Play) and PCI expansion cards operate in your system.

PC Health Status

This entry shows the current system temperature, voltage, and fan speed.

Frequency/Voltage Control

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

Load Fail-Safe Defaults

Use this menu to install fail-safe defaults for all appropriate items in the setup utility.

Load Optimized Defaults

Use this menu to install optimized defaults for all appropriate items in the setup utility.

Set Supervisor/User Password

Use this menu to change, set, or disable supervisor/user password. It allows you to limit access to the system and Setup, or only to Setup.

Save & Exit Setup

Save the changes that you have made in the Setup Utility and exit the Setup Utility.

Exit Without Saving

Abandon all changes that you have made in the Setup Utility and exit the Setup Utility.

✎ *Standard CMOS Features*

Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
                  Phoenix - AwardBIOS CMOS Setup Utility
                          Standard CMOS Features
 ┌──────────────────────────────────────────────┬─────────────────────────┐
 │   Date (mm:dd:yy)           Mon, Jul 12 2004   │      Item Help          │
 │   Time (hh:mm:ss)           22 :  5 : 13       │                         │
 │                                                │  Menu Level    ▶        │
 │ ▶ IDE Channel 0 Master      [ None]            │                         │
 │ ▶ IDE Channel 0 Slave       [ None]            │  Change the day, month, │
 │ ▶ IDE Channel 1 Master                         │  year and century       │
 │ ▶ IDE Channel 1 Slave                          │                         │
 │                                                │                         │
 │   Drive A                   [1.44M, 3.5 in.]   │                         │
 │   Drive B                   [None]             │                         │
 │   Floppy 3 Mode Support     [Disabled]         │                         │
 │                                                │                         │
 │   Video                     [EGA/VGA]          │                         │
 │   Halt On                   [All Errors]       │                         │
 │                                                │                         │
 │   Base Memory                      640K        │                         │
 │   Extended Memory                64512K        │                         │
 │   Total Memory                   65536K        │                         │
 └──────────────────────────────────────────────┴─────────────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```

Date (mm : dd : yy)

Set the system date. Note that if you are running a Windows OS, this items are automatically updated whenever you make changes to the Windows Date.

Time (hh : mm : ss)

Set the system time. The time is converted based on the 24-hour military-time clock. For example, 5:00:00 p.m. is 17:00:00.

IDE Channel 0/1 Master/Slave

Press <Enter> to enter the sub-menu of detailed options.

Drive A/DriveB

Select the type of floppy disk drive installed in your system.
➢ The choice: None, 360K, 5.25 in, 1.2M, 5.25 in, 720K, 3.5 in, 1.44M, 3.5 in, or 2.88M, 3.5 in.

Video

This item defines the video mode of the system. Leave this item at the default value.
➢ The choice: EGA/VGA, CGA 40, CGA 80, or MONO.

Halt On

This item defines the operation of the system POST (Power-On Self Test) routine. You can use this item to select which situation you want the BIOS to stop the POST process and notify you.
➢ The choice: All Errors, No Errors, All, But Keyboard, All, But Diskette, or All, But Disk/Key.

<u>Base Memory/Extended Memory/Total Memory</u>

These items are automatically detected by the system at start up time. These are display-only fields. You can't make change to these fields.

* *

IDE Adapters

The IDE adapters control the hard disk drive. Use a separate sub-menu to configure each hard disk drive.

IDE HDD Auto-Detection

Press <Enter> to auto-detect HDD on this channel. If detection is successful, it fills the remaining fields on this menu.

IDE Primary Master

Selecting 'Manual' lets you set the remaining fields on this screen and select the type of fixed disk.

 ➢ The choice: None, Auto, or Manual.

Access Mode

Choose the access mode for this hard disk.

 ➢ The choice: CHS, LBA, Large, or Auto.

Capacity

Note that the disk drive capacity (approx.) is usually slightly greater than the size of a formatted disk given by a disk checking program.

> The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual', and the 'Access Mode' item is set to 'CHS'.

Cylinder

Set the number of cylinders for this hard disk.

 ➢ Min = 0, Max = 65535

Head

Set the number of read/write heads.

 ➢ Min = 0, Max = 255

Precomp

Warning: Setting a value of 65535 means no hard disk.

 ➢ Min = 0, Max = 65535

Landing Zone

Set the Landing Zone size.

 ➢ Min = 0, Max = 65535

Sector

Number of sector per track.

 ➢ Min = 0, Max = 255

* *

✎ *Advanced BIOS Features*

This section allows you to configure your system for basic operation.

```
          Phoenix - AwardBIOS CMOS Setup Utility
                    Advanced BIOS Features
┌────────────────────────────────────────────┬────────────────────┐
│  ► CPU Feature            [Press Enter]   ▲ │     Item Help      │
│  ► Hard Disk Boot Priority [Press Enter]    │                    │
│    CPU L1 & L2 Cache      [Enabled]         │  Menu Level    ►   │
│    CPU L3 Cache           [Enabled]         │                    │
│    Hyper-Threading Technology[Enabled]      │                    │
│    Quick Power On Self Test [Enabled]       │                    │
│    First Boot Device      [Floppy]          │                    │
│    Second Boot Device     [Hard Disk]       │                    │
│    Third Boot Device      [CDROM]           │                    │
│    Boot Other Device      [Enabled]         │                    │
│    Swap Floppy Drive      [Disabled]        │                    │
│    Boot Up Floppy Seek    [Disabled]        │                    │
│    Boot Up NumLock Status [On]              │                    │
│    Gate A20 Option        [Fast]            │                    │
│    ATA 66/100 IDE Cable Msg. [Enabled]      │                    │
│    Typematic Rate Setting [Disabled]        │                    │
│  x Typematic Rate (Chars/Sec) 6             │                    │
│  x Typematic Delay (Msec)     250           │                    │
│    Security Option        [Setup]           │                    │
│    APIC Mode              [Enabled]         │                    │
│    OS Select For DRAM > 64MB [Non-OS2]      │                    │
│    HDD S.M.A.R.T. Capability [Disabled]     │                    │
│    Video BIOS Shadow      [Enabled]         │                    │
│    Small Logo(EPA) Show   [Disabled]     ▼  │                    │
├────────────────────────────────────────────┴────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│    F5: Previous Values   F6: Fail-Safe Defaults   F7: Optimized Defaults │
└──────────────────────────────────────────────────────────────────┘
```

CPU Feature

> Scroll to this item and press <Enter> to view the following screen, and the following items are only available when the motherboard supports Prescott CPU:
>
> ➢ The choice: Enabled or Disabled.
>
> Thermal Management
>
> This item sets CPU's thermal control rule to protect CPU from overheat.
> ➢ The choice: Thermal Monitor 1 or Thermal Monitor 2.
>
> TM2 Bus Ratio
>
> This item helps you to set the frequency (bus ratio) of the throttled performance that will be initiated when the on die sensor goes from not hot to hot.
> ➢ Key in a DEC number: Min = 0, Max = 255.
>
> TM2 Bus VID
>
> This item helps you to set the voltage of the throttled performance that will be initiated when the on die sensor goes from not hot to hot.
> ➢ The choice: 0.8375V ~ 1.6000V.
>
> Limit CPUID MaxVal
>
> This item limits the CPUID maximum value. Enable this item to install WinNT.
> ➢ The choice: Enabled or Disabled.

Hard Disk Boot Priority

This item let you select hard disk boot priority.
➢ The choice: Pri.Master/Slave, Sec.Master/Slave, USB HDD 0 ~ 2, Bootable Add-in Cards.

CPU L1&L2&L3 Cache

All processors that can be installed in this mainboard use internal level1(L1) , external level 2(L2) cache memory and (L3) to imporve performance.

Leave this item at the default value for better performance.

➢ The choice: Enabled or Disabled.

Note: CPU support, L3 item appear.

Hyper-Threading Technology

This item is only available when the chipset supports Hyper-Threading and you are using a Hyper-Threading CPU.

➢ The choice: Enabled or Disabled.

Quick Power On Self Test

Enable this item to shorten the power on testing (POST) and have your system start up faster. You might like to this item after you are confident that your system hardware is operating smoothly.
➢ The choice: Enabled or Disabled.

First/Second/Third Boot Device

Use these three items to select the priority and order of the devices that your system searches for an operating system at start-up time.
➢ The Choice: Floppy, LS120, Hard Disk, CDROM, ZIP100, USB-FDD, USB-ZIP,USB-CDROM, LAN, or Disabled.

Boot Other Device

If you enable this item, the system searches all other possible locations for and operating system if it fails to find one in the devices specified under the First, Second, and Third boot devices.
➢ The choice: Enabled or Disabled.

Swap Floppy Drive

If you have two floppy diskette drives in your system, this item allows you to swap the assigned drive letters so that drive A becomes drive B, and drive B becomes drive A.
➢ The choice: Enabled or Disabled.

Boot Up Floppy Seek

If this item is enabled, it checks the size of the floppy disk drives at start-up time. You don't need to enable this item unless you have a legacy diskette drive with 360k capacity.

➢ The choice: Enabled or Disabled.

Boot Up NumLock Status

This item defines if the keyboard Num Lock key is active when your system is started.

➢ The choice: Off or On.

Gate A20 Option

This item defines how the system handles legacy software that was written for an earlier generation of processors. Leave this item at the deafult value.

➢ The choice: Normal or Fast.

ATA 66/100 IDE Cable Msg.

This item allows you to set ATA 66/100 IDE cable massage.

➢ The choice: Enabled or Disabled.

Typematic Rate Setting

If this item is enabled, you can use the following two items to see the typematic rate and the typematic delay settings for your keyboard.

➢ The choice: Enabled or Disabled.

Typematic Rate (Chars/Sec)

This item sets how many times the keystroke will be repeated in a second when you hold a key down.

➢ The choice: 6, 8, 10, 12, 15, 20, 24, or 30.

Typematic Delay (Msec)

Sets the delay time after a key is held down.

➢ The choice: 250, 500, 750, or 1000.

Security Option

If you have installed password protection, this item defines if the password is required at system start up, or if it is only required with a user tries to enter the Setup Utility.

➢ The choice: Setup or System.

APIC Mode

This option is used to enable or disable APIC (Advanced Programmable Interrupt Controller) functionality.

➢ The choice: Enabled or Disabled.

OS Select For DRAM > 64MB

This item is only required if you have installed more than 64 MB of memory and you are running the OS/2 operating system. Otherwise, leave this item at the default.

➢ The choice: Non-OS2 or OS2.

HDD S.M.A.R.T Capability

The S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) system is a diagnostics technology that monitors and predicts device performance. S.M.A.R.T. software resides on both the disk drive and the host computer. The disk drive software monitors the internal performance of the motors, media, heads, and electronics of the drive. The host software monitors the overall reliability status of the drive. If a device failure is predicted, the host software, through the Client WORKS S.M.A.R.T applet, warns the user of the impending condition and advises appropriate action to protect the data.

➢ The choice: Enabled or Disabled.

Video BIOS Shadow

This function, when enabled allows VGA BIOS to be copied to the system DRAM for enhanced performance.

➢ The choice: Enabled or Disabled.

Small Logo(EPA) Show

Enables or disables the display of the EPA logo during boot.

➢ The choice: Enabled or Disabled.

✍ *Advanced Chipset Features*

These items define critical timing parameters of the mainboard. You should leave the items at their default values unless you are very familiar with the technical, specifications of your system hardware. If you change the values incorrectly, you may introduce fatal errors or recurring instability into your system.

```
                  Phoenix - AwardBIOS CMOS Setup Utility
                         Advanced Chipset Features

   ▶ DRAM Clock/Timing Control  [Press Enter]            Item Help
   ▶ AGP & P2P Bridge Control    [Press Enter]
   ▶ OnChip AGP Control          [Press Enter]      Menu Level    ▶
     System BIOS Cacheable       [Enabled]
     Video   RAM Cacheable       [Enabled]




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

DRAM Clock/Timing Control

Press <Enter> to enter the sub-menu of detailed options.

Current CPU/DRAM Frequency

These two items show the CPU and DRAM frequency.

Performance Mode

Enable this item to enhance the system's performance.
➢ The choice: Enabled or Disabled.

DRAM Frequency

This item decides DRAM frequency installed in your system.
➢ The choice: Auto, 100, 133 or 166.

DRAM Timing Control

Enables you to select the CAS latency time in HCLKs of 2, 2.5, or 3. The value is set at the factory depending on the DRAM installed.
➢ The choice: Auto or Manual.

DRAM CAS LATENCY

This item controls the timing delay (in clock cycles) before the DRAM starts a read command after receiving it.
➢ The choice: 2T, 2.5T or 3T.

RAS Active Time (tRAS)

This item allows you to set the amount of time a RAS can be kept open for multiple accesses. High figures will improve performance.
➢ The choice: 4T ~ 9T.

RAS Precharge Time (tRP)

This is the duration of the time interval during which the Row Address Strobe signal to a DRAM is held low during normal Read and Write Cycles.

➢ The choice: 2T ~ 5T.

RAS to CAS Delay (tRCD)

This is the amount of time a CAS is performed after a RAS.

➢ The choice: Auto, 2T ~ 5T.

AGP & P2P Bridge Control

Press <Enter> to enter the sub-menu of detailed options.

AGP Aperture Size (MB)

Select the size of Accelerated Graphics Port (AGP) aperture. The aperture is a portion of the PCI memory address range dedicated to graphics memory address space. Host cycles that hit the aperture range are forwarded to tha AGP without any translaton.

➢ The choice: 32M, 64M, 128M, 256M, or 512M.

Graphic Window WR Combin

This item allows you to select the AGP Mode.

➢ The choice: Enabled or Disabled.

AGP Fast Write Support

This item enables and disables AGP Fast Write Support.

➢ The choice: Enabled or Disabled.

AGP Data Rate

This item allows you to control AGP card data transfer rate.

➢ The Choice: Auto, 1X, 2X, 4X or 8X.

OnChip AGP Control

Press <Enter> to enter the sub-menu of detailed options.

VGA Share Memory Size

This item shows the VGA memory size borrowed from main memory capacity.

➢ The choice: 32MB or 64MB.

System BIOS Cacheable

This feature is only valid when the system BIOS is shadowed. It enables or disables the caching of the system BIOS ROM at F0000h-FFFFFh via the L2 cache. This greatly speeds up accesses to the system BIOS.

➢ The choice: Enabled or Disabled.

Video RAM Cacheable

This feature enables or disables the caching of the video RAM at A0000h-AFFFFh via the L2 cache.

➢ The choice: Enabled or Disabled.

❧ *Integrated Peripherals*

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      Integrated Peripherals
┌──────────────────────────────────────────┬─────────────────────────┐
│ ▶ OnChip IDE Device       [Press Enter]   │        Item Help        │
│ ▶ OnChip PCI Device       [Press Enter]   ├─────────────────────────┤
│ ▶ Onboard SuperIO Device  [Press Enter]   │  Menu Level    ▶        │
│   Onboard LAN Device      [Enabled]       │                         │
│   Onboard LAN Boot ROM    [Disabled]      │                         │
│   IDE HDD Block Mode      [Enabled]       │                         │
│   Init Display First      [PCI Slot]      │                         │
│                                           │                         │
│                                           │                         │
│                                           │                         │
│                                           │                         │
│                                           │                         │
│                                           │                         │
├──────────────────────────────────────────┴─────────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
│        F5: Previous Values    F6: Fail-Safe Defaults  F7: Optimized Defaults│
└──────────────────────────────────────────────────────────────────┘
```

OnChip IDE Device

Press <Enter> to enter the sub-menu of detailed options.

Internal PCI/IDE

Use these items to enable or disable the internal PCI IDE channels that are integrated on the motherboard.

➢ The Choice: Disabled, Primary, Secondary or Both.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE inter-face supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

➢ The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, or Mode 4.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If both of your hard drive and your system software support Ultra DMA, select Auto to enable BIOS support.

➢ The choice: Auto or Disabled.

IDE DMA Transfer Access

This item allows you to enabled the transfer access of the IDE DMA.

➢ The Choice: Enabled or Disabled.

IDE Burst Mode
This option, when enabled will instruct the system to send every write transaction to the write buffer.
➢ The Choice: Enabled or Disabled.

OnChip PCI Device
Press <Enter> to enter the sub-menu of detailed options.

USB Controller
This item enables the USB controller. Leave this at the default "Enabled" if you want to connect USB devices to your computer.
➢ The Choice: Enabled or Disabled.

USB Ports Number
This item allows you to set USB port number.
➢ The choice: 3 ~ 6 Ports.

USB 2.0 Support
Enable this item if your system supports USB 2.0.
➢ The Choice: Enabled or Disabled.

USB Keyboard Support
Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.
➢ The Choice: Enabled or Disabled.

USB Mouse Support
Enable this item if you plan to use a mouse connected through the USB port in a legacy operating system (such as DOS) that does not support Plug and Play.
➢ The Choice: Auto or Disabled.

AC97 Audio
This item allows you to control the OnChip Audio.
➢ The Choice: Auto or Disabled.

OnChip SuperIO Device
Press <Enter> to enter the sub-menu of detailed options.

Onboard FDC Controller
This item specifices onboard floppy disk drive controller. This setting allows you to connect your floppy disk drives to the onboard floppy connector.
➢ The choice: Enabled or Disabled.

Onboard Serial Port 1

The option is used to assign the I/O address and interrupt request (IRQ) for the onboard serial port 1 (COM1).
➢ The Choice: Disabled, 3F8-IRQ4, 2F8-IRQ3, 3E8-IRQ4, 2E8-IRQ3, or Auto.

Onboard Serial Port 2

The option is used to assign the I/O address and interrupt request (IRQ) for the onboard serial port 2 (COM2).
➢ The Choice: Disabled, 3F8-IRQ4, 2F8-IRQ3, 3E8-IRQ4, 2E8-IRQ3, or Auto.

UART Mode Select

This item allows you to select an operating mode for the IrDA infrared.
➢ The choice: Normal, IrDA, ASKIR, or SCR.

UR2 Duplex Mode

This item allows you to select the IR half or full duplex function.
➢ The choice: Full or Half.

Onboard Parallel Port

Allows you to determine an I/O address and interrupt request (IRQ) for the onboard parallel port.
➢ The choice: 378/IRQ7, 278/IRQ5, 3BC/IRQ7, or Disabled.

Parallel Port Mode

Select an operating mode for the onboard parallel port. Select SPP unless you are certain your system supports other modes.
➢ The choice: SPP, EPP, ECP, or ECP+EPP.

ECP Mode Use DMA

When the parallel port mode is set to ECP, this item becomes seletable.
➢ The choice: 1 or 3.

Game Port Address

This item defines an I/O address for the game port.
➢ The choice: Disabled, 201, or 209.

Midi Port Address

This item defines an I/O address for the MIDI port.
➢ The choice: Disabled, 330, or 300.

Midi Port IRQ

This item defines an interrupt request for the MIDI port.
➢ The choice: 5 or 10.

Onboard LAN Device

    This item allows you to set LAN device.

    ➢ The choice: Enabled or Disabled.

Onboard LAN Boot ROM

    Decide whether to invoke the boot ROM of the onboard LAN chip.

    ➢ The choice: Enabled or Disabled.

IDE HDD Block Mode

    If your IDE hard drive supports block mode select Enabled for auto-
matic detection of the optimal number of block read/writes per sector
the drive can support.

    ➢ The choice: Enabled or Disabled.

Init Display First

    The item allows you to set init display.

    ➢ The choice: PCI Slot or AGP.

✎ *Power Management Setup*

The Power Management Setup allows you to configure your system to most effectively saving energy while operating in a manner consistent with your own style of computer use.

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

    ACPI Suspend Type          [S3(STR)]              ┌──────────────────┐
    Suspend Mode               [Disabled]             │     Item Help    │
    Video Off Option           [Susp,Stby -> Off]     ├──────────────────┤
    Video Off Method           [DPMS Supported]       │ Menu Level    ▶  │
    MODEM Use IRQ              [AUTO]                  │                  │
    HDD Off After             [Disabled]              │                  │
    Power Button Override      [Instant Off]          │                  │
    Power On After Power Fail  [Always Off]           │                  │
  ▶ PM Wake Up Events          [Press Enter]          │                  │
    Delay Prior to Thermal     [ None]                │                  │
                                                      │                  │
                                                      │                  │
                                                      └──────────────────┘
  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
       F5: Previous Values    F6: Fail-Safe Defaults  F7: Optimized Defaults
```

ACPI Suspend Type

This item allows you to select sleep state when suspend. In the default, S1(POS), the suspend mode is equivalent to a software power down; S3(STR), to the system that shuts down with the exception of a refresh current to the system memory.

➢ The choice: S1(POS), S3(STR), or S1&S3.

Suspend Mode

When this item is not disabled and after the setup time of system inactivity, all devices except the CPU will be shut off.

➢ The choice: Disabled, 1 Min, 2 Min, 4 Min, 6 Min, 8 Min, 10 Min, 20 Min, 30 Min, 40 Min or 1 Hour.

Video Off Option

This item specifies on/off for the monitor when it enters the power-saving mode.

➢ The choice:Always On, Suspend -> Off, Susp, Stby ->Off or All Modes-> Off.

Video Off Method

This determines the manner in which the monitor is blanked.

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

➢ The choice: V/H SYNC+Blank, Blank Screen, or DPMS Support.

MODEM Use IRQ

If you want an incoming call on a modem to automatically resume the system from a power-saving mode, use this item to specify the interrupt request line (IRQ) that is used by the modem.
➢ The choice: Auto or 3 ~ 11.

HDD Off After

The IDE hard drive will spin down if it is not accessed within a specified length of time.
➢ The choice: Disabled or 1 Min ~ 15 Min.

Power Button Override

The item allows you install a software power down that is controlled by the power button on your system.
➢ The choice: Delay 4 Sec. or Instant-Off.

PWRON After PWR-Fail

This item defines your computer to shut off, automatically restart, or return to its last operating status after power fails.
➢ The choice: Always Off, Always On or Former-Sts.

PM Wake Up Events

Press <Enter> to enter the sub-menu of detailed options.

IRQ [3-7, 9-15], NMI

This option determines whether any activity for IRQ 3-7/9-15 will cause the system to wake from a power saving mode.
➢ The choice: Enabled or Disabled.

IRQ 8 Break Suspend

Determines whether the system will monitor IRQ 8 activity and wake the system from a power saving mode when IRQ 8 is activated.
➢ The choice: Enabled or Disabled.

Ring Power Up Control

Use this item to enable LAN or modem activity to wakeup the system from apower saving mode.
➢ The choice: Enabled or Disabled.

Resume By PCI PME

This item specifies whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected.
➢ The choice: Enabled or Disabled.

Resume By PCI PME

This item specifies whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected.

➢ The choice: Enabled or Disabled.

Resume By USB (S3)

This option allows the activity of the USB devices (keyboard and mouse) to wake-up the system from S3 sleep state.

➢ The choice: Enabled or Disabled.

PS2KB Wake up from S3/S4/S5

Enables you to choose either to press a keyboard hot key to awaken the system from power saving mode.

➢ The choice: Hot Key, Any Key or Password.

PS2MS Wake up from S3/S4/S5

This option enables you to allow mouse activity to awaken the system from power saving mode.

➢ The choice: Disabled, Click or Click & Move.

Power Up by Alarm

When set to Enabled, the following three fields become available and you can set the date, hour, and minute to turn on your system.

➢ The choice: Enabled or Disabled.

Month of Alarm

➢ The choice: NA, 1 ~ 12.

Day of Month Alarm

➢ Key in a DEC number: Min = 0, Max = 31.

Time(hh : mm: ss) of Alarm

This item selects the alarm Time.

[hh]   ➢ Key in a DEC number: Min = 0, Max = 23.

[mm]   ➢ Key in a DEC number: Min = 0, Max = 59.

[ss]   ➢ Key in a DEC number: Min = 0, Max = 59.

** Reload Global Timer Events **

Primary/Secondary IDE

When these items are enabled, the system will restart the power-saving timeout counters when any activity is detected on any of the drives or devices on the primary or secondary IDE channels.

➢ The choice: Enabled or Disabled.

FDD, COM, LPT Port

When this item is enabled, the system will restart the power-saving timeout counters when any activity is detected on the floppy disk drive, serial ports, or the parallel port.

➢ The choice: Enabled or Disabled.

PCI PIRQ[A-D]#

When disabled, any PCI device set as the Master will not power on the system.

➢ The choice: Enabled or Disabled.

Delay Prior to Thermal

The item allows you to set delay prior to thermal.

➢ The choice: None, 1Min, 2 Min, 4 Min, 8 Min, 16 Min, 32 Min or 64 Min.

✎ *PnP/PCI Configurations*

This category configures how PnP and PCI operate in your system. Correctly setting up the IRQ and DMA (both PnP and PCI use) assignments will make your system work stably. It is strongly recommended that only technical users make changes to the default settings.

```
          Phoenix - AwardBIOS CMOS Setup Utility
                    PnP/PCI Configurations
 ┌───────────────────────────────────────────┬──────────────────────────┐
 │  Reset Configuration Data    [Disabled]    │        Item Help         │
 │                                            ├──────────────────────────┤
 │  Resources Controlled By     [Auto(ESCD)]  │ Menu Level    ▶          │
 │▶ IRQ Resources               [Press Enter] │                          │
 │                                            │ Default is Disabled.     │
 │  PCI/VGA Palette Snoop        [Disabled]   │ Select Enabled to        │
 │  Assign IRQ For USB           [Enabled]    │ reset Extended System    │
 │  INT Pin 1 Assignment         [Auto]       │ Configuration Data       │
 │  INT Pin 2 Assignment         [Auto]       │ ESCD) when you exit      │
 │  INT Pin 3 Assignment         [Auto]       │ Setup if you have        │
 │  INT Pin 4 Assignment         [Auto]       │ installed a new add-on   │
 │  INT Pin 5 Assignment         [Auto]       │ and the system           │
 │  INT Pin 6 Assignment         [Auto]       │ reconfiguration has      │
 │  INT Pin 7 Assignment         [Auto]       │ caused such a serious    │
 │  INT Pin 8 Assignment         [Auto]       │ conflict that the OS     │
 │                                            │ cannot boot              │
 │                                            │                          │
 ├───────────────────────────────────────────┴──────────────────────────┤
 │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
 │    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults │
 └────────────────────────────────────────────────────────────────────────┘
```

Reset Configuration Data

When enabled, any PnP configuration data stored in the BIOS will be cleared from memory, with new data created.
➢ The choice: Enabled or Disabled.

Resources Controlled By

As stays auto(ESCD), the system will dynamically allocate resources to PnP devices as they are required. As set to manual, the following item become available.
➢ The choice: Auto(ESCD) or Manual.

IRQ Resources

When the previous item is set to manual, this item allows you respectively assign an interruptive type for IRQ-3, 4, 5, 7, 9, 10, 11, 12, 14, and 15.
➢ The choice: PCI Device or Reserved.

PCI/VGA Palette Snoop

The item is designed to solve problems caused by some non-standard VGA cards.
➢ The choice: Enabled or Disabled.

Assign IRQ For USB

Names the interrupt request (IRQ) line assigned to the USB on your system.
➢ The choice: Enabled or Disabled.

INT Pin 1 ~ 8 Assignment

Names the interrupt request (IRQ) line assigned to a device connected to the PCI interface on your system.

➢ The Choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, or 15.

✎ **PC Health Status**

```
             Phoenix - AwardBIOS CMOS Setup Utility
                       PC Health Status

 Shutdown Temperature    [Disabled]              Item Help
 CPU Core Voltage
        +1.8U                            Menu Level    ▶
        +3.3U
        +5.0U
        +12U
 StandBy  3.3U
 StandBy  5.0U
 Voltage Battery
 CPU    Temperature
 System Temperature
 CPUFAN    Speed
 CASFAN1   Speed



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

Shutdown Temperature
   Enables you to set the maximum temperature that system can reach
   before powering down.
   ➢ The choice: 60°C/140°F, 65°C/149°F, 70°C/158°F, or Disabled.

   The following items provide you with information about the system's
   current operating status. You cannot make changes to one of them.

   CPU Core Voltage

                  +1.8V

                  +3.3V

                  +5.0V

                  +12V

   StandBy   3.3V

   StandBy   5.0V

   Voltage Battery

   CPU Temperature

   System Temperature

   CPUFAN Speed

   CASFAN1 Speed

✎ *Frequency/Voltage Control*

```
             Phoenix - AwardBIOS CMOS Setup Utility
                     Frequency/Voltage Control
┌─────────────────────────────────────────────┬──────────────────────┐
│ CPU Clock Ratio          [ 0 X]              │      Item Help       │
│ Auto Detect DIMM/PCI Clk [Enabled]           │                      │
│ Spread Spectrum          [Enabled]           │ Menu Level    ▶      │
│ CPU Frequency            [Default]           │                      │
│                                              │                      │
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│                                              │                      │
├─────────────────────────────────────────────┴──────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
│    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults │
└─────────────────────────────────────────────────────────────────────┘
```
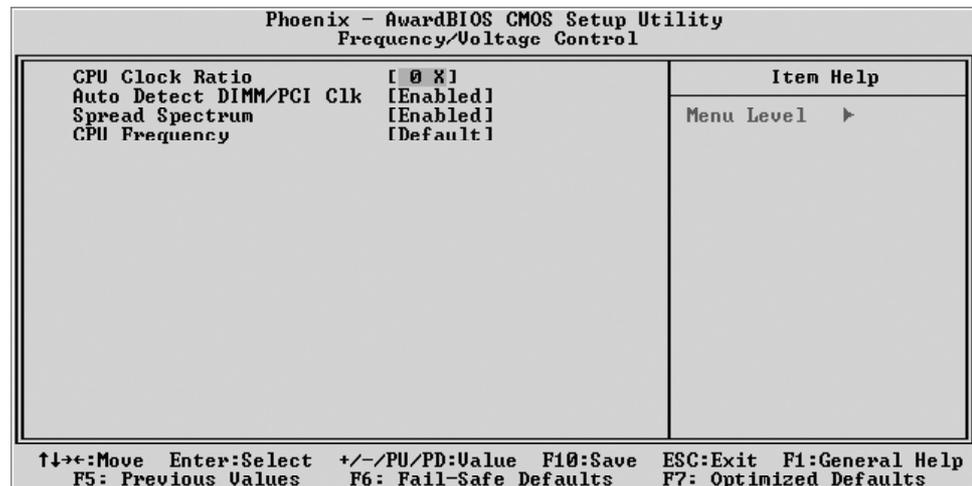
CPU Clock Ratio

Use the CPU Host/SDRAM/PCI Clock to set the frontside bus frequency for the installed processor (usually 133 MHz, 100 MHz or 66 MHz). Then use CPU Clock Ratio Jumpless to set a multiple. The multiple times the frontside bus must equal the core speed of the installed processor e.g., 3.5 (multiple) x100 MHz (frontside bus) = 350 MHz (installed processor clock speed).

➢ Key in a DEC number: Min = 8, Max = 51.

Auto Detect DIMM/PCI Clk

When this item is enabled, BIOS will disable the clock signal of free DIMM and PCI slots.

➢ The choice: Enabled or Disabled.

Spread Spectrum

If you enable spread spectrum, it can significantly reduce the EMI (Electro-Magnetic Interference) generated by the system.

➢ The choice: Enabled or Disabled.

CPU Frequency

Use the CPU Host Clock to set the frontside bus frequency for the installed processor (usually 133 MHz, 100 MHz or 66 MHz).

➢ The choice: Default, 100 MHz or 133 MHz.

✍ *Load Fail-Safe Defaults*

When you press < Enter > on this item, you will get a confirmation dialog box with a message similar to:

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

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

✍ *Load Optimized Defaults*

When you press < Enter > on this item, you will get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N

Pressing 'Y' loads the default values that are factory-set for optimal performance system operation.

✎ *Set Supervisor/User Password*

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              Phoenix - AwardBIOS CMOS Setup Utility

  ▶ Standard CMOS Features          ▶ Frequency/Voltage Control
  ▶ Advanced BIOS Features             Load Fail-Safe Defaults
  ▶ Advanced Chipset Features          Load Optimized Defaults
  ▶ Integrated Peripherals             Set Password
  ▶ Power Management Setup             Save & Exit Setup
  ▶ PnP/PCI Configurati┌───────────────────────┐ut Saving
  ▶ PC Health Status   │ Enter Password:       │
                       └───────────────────────┘
  Esc : Quit       F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
  F10 : Save & Exit Setup

                    Change/Set/Disable Password
```

Steps to set supervisor/user password are described as follows:

New Password Setting:
1. While pressing <Enter> to set a password, a dialog box appears to ask you enter a password.
2. Key in a new password. The password can not exceed eight characters.
3. System will request you to confirm the new password again.
4. When completed, new code takes effect.

No Password Setting:
If you want to disable the password, just press <Enter> as a password input is requested.

If You Forget Password:
If you forget the password, the only way to access the system is to clear the CMOS memory. Please refer to page 26 on clear CMOS setting.

✎ Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

SAVE to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus of CMOS - a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

✎ Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit Without Saving (Y/N)? N

This allows you to exit from Setup without storing in CMOS any change. The previous selections remain in effect. This exits from the Setup utility and restarts your computer.