

# Advanced Pentium Motherboard

## User's Manual

**SL5598**

**USER'S MANUAL**

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# EASY INSTALLATION



The following “Easy Installation” steps are intended for users familiar with the assembly of a computer system. For those individuals requiring more specific information please refer to the more detailed descriptions located within the later chapters of this manual. Note: You must keep your power cable unplugged until the following installation steps are completed.

## Getting Started:

**T**ouch a grounded metal surface to release static electricity stored in your body before unpacking your motherboard. For details please refer to **Precaution** section in **Chapter 3**.

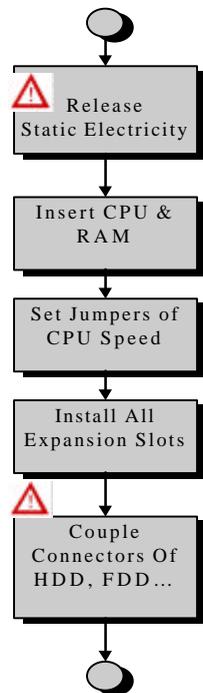
**I**nstall the CPU by correctly aligning the CPU with the Socket7 as noted in the motherboard diagram. Once aligned, press down on the CPU gently but firmly and lock it into place. Install either the 3.3 volt unbuffered SDRAM into the 168 pin DIMMs or FPM/EDO DRAM into the 72 pin SIMMs. See **Sec. 3.2 & Sec. 3.3**.

Set CPU speed jumper in accordance to **Sec.3.2**.

**A**fter completing the above 3 steps, install any expansion cards ( PCI, ISA) into riser card and have the riser card installed firmly into the slot for riser card on board. See **Sec. 3.4**.

**P**lug in all cables included in the package except for the power cord. Please see **Sec. 3.5**.

Recheck all steps to ensure no mistakes have been made and then plug in the power cord and turn on the power to enter the BIOS setup, **Chapter 4**.



# **EASY INSTALLATION**

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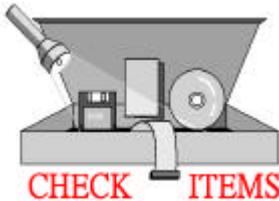
# 1. INTRODUCTION



## How To Use This Manual

This manual provides information necessary for Original Equipment Manufactures (OEMs) and home users to build a PC-AT compatible system using the Pentium PCI/ISA motherboard.

Follow the installation procedure presented on the “**EASY INSTALLATION**” page. Each step refers to another section within this manual where you will find more detailed information if needed.



## Check Your Device Items

The standard package will contain the following items marked with a “✓”, If you find any these items missing or damaged please contact your retailer immediately.

- ✓ The SL5598 motherboard
- ✓ 1 IDE ribbon cable
- ✓ 1 floppy ribbon cable
- ✓ 1 CD-ROM Diskette with VGA Driver
- ✗ Infrared (IrDA) module with ribbon cable (optional)

## **2. FEATURES**

**Photo Of The Motherboard**

## 2. FEATURES



### Features Of The Motherboard

The SL5598 motherboard integrates the Pentium® microprocessor, memory, I/O and is designed to fit into a standard LPX form factor chassis. Page 12 illustrates the layout for the SL5598 motherboard. Below are the key features provided by this motherboard:

#### Processor/Cache

Processor	Intel/AMD 75 ~ 300 MHz Cyrix 6X86 & 6X86L, PR120+ ~ 166+ Cyrix 6X86MX, PR133 ~ PR233 IDT-C6 150 ~ 200
Cache	0/256/512KB, Write Back or Write Through Direct Mapped organization, Pipeline Burst Cache soldered on the motherboard.

#### System Memory

Memory Size	8 MB minimum to 256 MB maximum.
Memory Sites	4 SIMM Sockets, 2 DIMM Sockets, Burst Mode Read-Write support.
DRAM Type	Supports EDO/FPM DRAM type can be 1M, 2M, 4M, 8M, 16M bit deep by n bit wide DRAM's, and both symmetrical and asymmetrical type DRAM are supported. Supports SDRAM 1M, 2M, 4M, 8M, 16M, 32M bit deep by n bit wide DRAMs, and both single and double sided.
Access Time	70ns or faster for FPM/EDO or 60ns or faster for SDRAM

#### Chipset

SiS5598 Pentium PCI/ISA Chipset.

#### Integrated Graphics

Graphics Controller	SiS5598 integrated VGA Controller.
Video Memory	UMA supports 0.5M ~ 4M FPM/EDO DRAM and SDRAM.

#### Integrated I/O

I/O Controller	Winbond W83877TF
Serial Ports	Two Asynch serial ports, two 9 Pin connectors using High Speed 16550 compatible ports with 16-byte FIFOs
Infrared Interface	One 6 pin infrared port with IrDA and ASKIR
Parallel Port	One 25 pin supporting EPP, ECP and Centronics
Hard Disk Controller	PCI Bus Mastering IDE. Native and Compatible Mode Support. IDE Transfer with Scatter Gather. Multiword DMA Transfers Mode 0,1,2. Enhanced IDE PIO Modes 3 & 4. Separate IDE Bus FIFOs for PCI burst transfers. Supports Ultra DMA/33 Bus Master Programming Interface for ATA windows 95 Compliant Controller. Plug and Play Compatible.
Hard Disk Connector	2 PCI IDE Connectors for 4 Drives Support

## 2. FEATURES

Floppy Controller	1.2, 1.44 and 2.88 MB support
Keyboard Port	PS/2 (Integrated in the SiS5598)
Mouse Port	PS/2 (Integrated in the SiS5598)
Real Time Clock	Integrated in the SiS5598
Serial Bus	USB (Universal Serial Bus), Microsoft and Intel spec. compliant, integrated in the SiS5598.

### Integrated Sound (Optional)

Sound Chip	ESS1869 3D Audio Chip
CODEC	Built-in, 16-bit Stereo
FM Synthesis	Yamaha OPL3 compatibility (Included with ESS1869)
Wavetable sound	ESS ES692S-100 Single Chip Wavetable (optional)

### Integrated Hardware Monitor (Optional)

Hardware monitor	Winbond 83781D(optional), 2 thermistor temperature sensors, 4 positive voltage input, 2 op amps for negative voltage monitoring, 1 fan speed monitoring
------------------	---

### System BIOS

BIOS Type	AWARD Software Inc., 2MB Flash BIOS
Hard Disk Driver	IDE, Auto-configuring
Plug&Play Support	Steerable DMA Channels and Interrupts. ISA Plug&Play
Special Features	Windows 95 ready. Multi-Boot. PCI add-in card auto-configuration.

### Power Management

Green Features	APM1.2. Meets EPA Mod 2.0 (SMI, Stop Clock, HDD and Upgrade Monitor Shutdown)
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### Jumpers and Front Panel Connectors

Connectors	PC Speaker. HD LED. Power LED. K/B Lock, Reset Switch, Sleep Switch, CPU FAN, Chassis Fan.
Jumpers	CPU Speed. CPU Multiplier. Clear CMOS, External VGA Selection.

### Headers and Rear Panel Connectors

Headers	Floppy. IDE 1&2. IrDA. CD-IN. Feature connector. MIDI/AUDIO.
Connectors	VGA Port. Serial 1&2. Keyboard & Mouse. Parallel port. USB 1&2. (Line In, Line Out, Mic In, MIDI, Modem-In on Audio Paddle Card)

### Mechanical

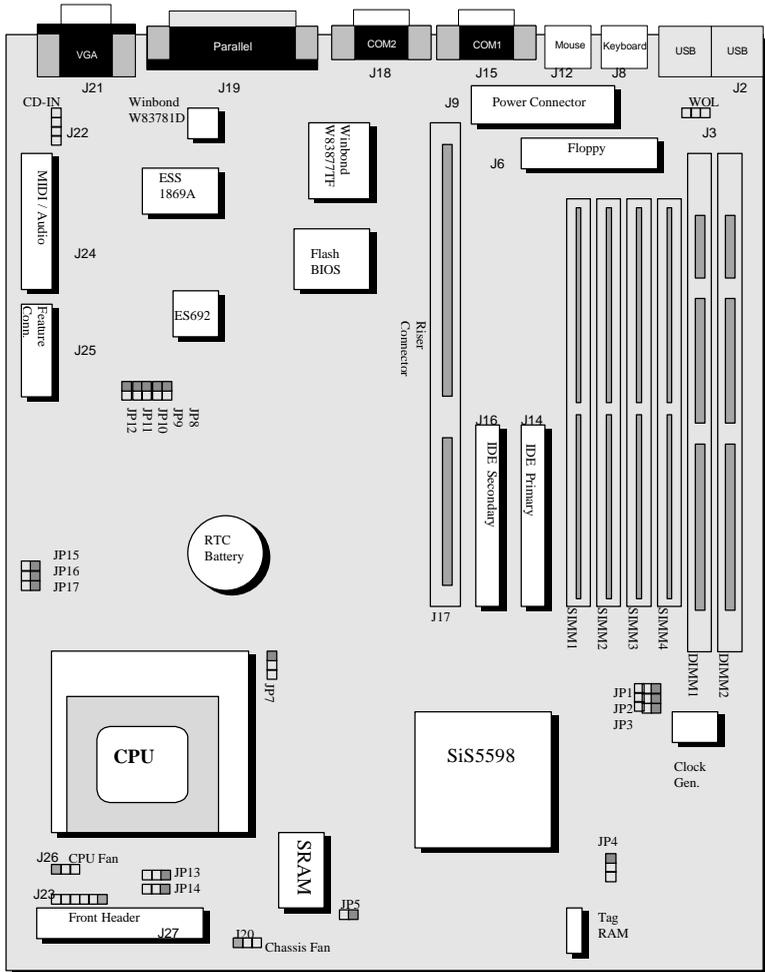
Board Style	LPX form factor
Board Size/Type	9.0" x 11.0", four layer board

### Expansion Slots

Description	One EISA riser slot for ISA and PCI buses
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# 3. INSTALLATION

## Motherboard Layout & Main Parts



# 3. INSTALLATION

## Significant Parts List

### Front Panel Connectors

Power LED	Page 28
Keyboard Lock	Page 28
Speaker	Page 28
Power Switch (Optional)	Page 28
4 Sec Power Switch (Optional)	Page 28
Reset	Page 28
Sleep	Page 29
HDD LED	Page 29
IrDA	Page 29

### Back Panel Connectors

PS/2-style keyboard and mouse connectors	Page 30
USB connectors	Page 30
Two serials ports	Page 30
One parallel port	Page 30
One VGA port	Page 30

### Expansion Slots/Sockets

Socket7 CPU Slot	Page 16
SIMM/DIMM Sockets	Page 21
Riser Card Slot	Page 24

### Power/IDE/FDD Connectors

IDE connectors	Page 26
Power connector	Page 27
FDD connector	Page 27

### Additional Connectors

CPU Fan	Page 31
Chassis Fan	Page 31
WOL Connector	Page 31
MIDI/Audio (Optional)	Page 31
CD-IN (Optional)	Page 32
Feature Connector	Page 32

# 3. INSTALLATION

## Precaution Before Start

### Static Electricity Damage:



Static electricity can easily damage your motherboard. Observing a few basic precautions will help safeguard against damage that could result in expensive repairs. Please read the following before you begin installation.

1. Keep the motherboard and other system components in their anti-static packaging until you are ready to install them.
2. Touch a grounded surface before you remove any system component from its protective anti-static packaging. Unpacking and installation should be done on a grounded, anti-static mat. The operator should be wearing an anti-static wristband grounded at the same points as the anti-static mat.
3. After removing the motherboard from its original packaging, place only on a grounded, anti-static surface, component side up. Immediately inspect the board for damage. Due to shifting during shipping it is suggested that the installer press down on the entire socket ICs to ensure they are properly seated. Do this only with the board placed on a firm flat surface.
4. During configuration and installation touch a grounded surface frequently to discharge any static electrical charge that may have built up in your body. The best precaution, as stated above, is to wear a grounded wrist strap. When handling the motherboard or an adapter card avoid touching its components. Handle the motherboard and adapter cards either by the edges or by the adapter card case-mounting bracket.

### Misplaced Jumper Damage:

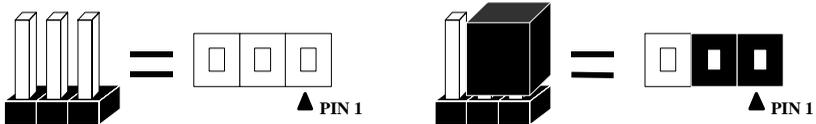


There are critical headers used for connectors or power sources. These are clearly marked separately from the jumpers listed in “Motherboard Layout”. Incorrectly setting jumpers and connectors may lead to damage to your motherboard. Please pay special attention to avoid connecting these headers in the wrong directions.

# 3. INSTALLATION

## 3.1 Slots and Connectors

The SL5598 motherboard requires jumper setting for CPU type, voltage and speed. Please refer to Jumper setting List in sec.3.2.2.



In following pages, the triangle ▲ mark indicates for pin 1 of connectors.

### Slots/Connectors List

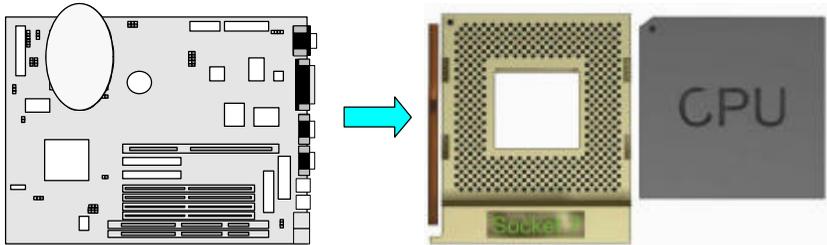
- J1: DIMM2
- J2: USB
- J3: WOL (Optional)
- J4: DIMM1
- J5: SIMM4
- J6: Floppy Connector
- J7: SIMM3
- J8: PS/2 Keyboard
- J9: Power Connector (Standard)
- J10: ATX Power Connector (Optional)
- J11: SIMM2
- J12: PS/2 Mouse
- J13: SIMM1
- J14: Primary IDE
- J15: COM1
- J16: Secondary IDE
- J17: Riser Card Slot
- J18: COM2
- J19: Printer
- J20: Chassis Fan
- J21: VGA
- J22: CD-In
- J23: IrDA
- J24: MIDI/Audio
- J25: Feature Connector
- J26: CPU Fan
- J27: Front Panel Connectors

# 3. INSTALLATION

## 3.2 CPU (Central Processing Unit, U20)

The Pentium P54C/P55C, Cyrix 6X86L/6X86MX, IDT-C6 and AMD-K5/K6 processors have various voltage choices depending on the CPU suppliers. The motherboard can also be upgraded with Pentium processors that run at higher speeds. When upgrading the processor, use the BIOS configuration mode to change the processor speed.

To complete CPU installation, please install CPU to socket firmly and arrange jumper settings carefully, according to Section. 3.2.1 and 3.2.2.

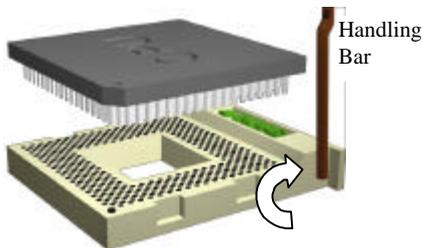


### 3.2.1 Install CPU

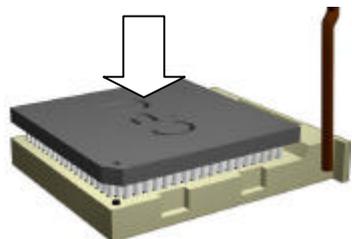
The following steps install your CPU and configure the types, voltage and speed in accordance to the Processor Jumper Setting List.

Step 1: Pull the handling bar of the socket upward to the other end to loosen the socket's openings.

Step 2: Place the CPU on the middle of the socket, orienting its beveled corner to line up with the socket's beveled corner. Make sure the pins of the CPU fit evenly to the socket openings.



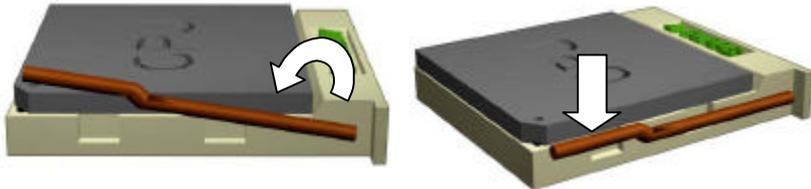
Step 1: Pull handling bar



Step 2: Place CPU

# 3. INSTALLATION

Step 3: Replace the handling bar downward to fasten the CPU to the socket.

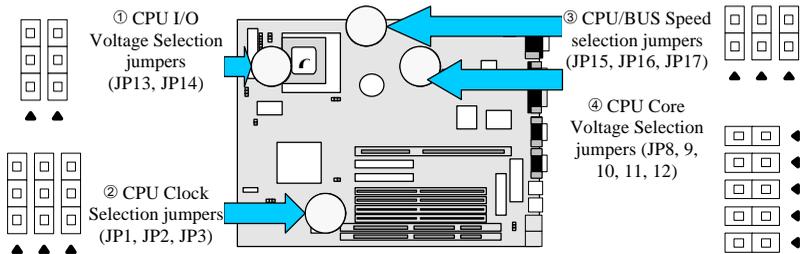


Step 3: Fasten the CPU to socket.

Warning : It is strongly recommended that a heatsink and CPU cooling fan be used to prevent the CPU from overheating. Applying a thermal of jelly between the CPU and the heatsink/fan will further cool the CPU.

## 3.2.2 Arrange Jumper Setting

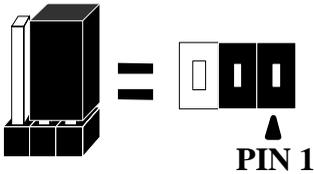
Because different CPUs may require a varied configuration of **Clock, CPU/BUS speed, I/O voltage and Core voltage**, please refer to the following Jumper setting list to setup your jumper.



# 3. INSTALLATION

Setting CPU I/O Voltage

CPU TYPE (I/O Voltage)	JP14	JP13
P54C, K5, 6X86		
P55C, K6, 6X86L, M2		



Setting CPU Clock

CPU Clock (MHz)	JP3 (WS2)	JP2 (WS1)	JP1 (WS0)
50			
55			
60			
66			

Setting CPU/BUS Speed

Intel CPU/BUS	JP17 (BF0)	JP16 (BF1)	JP15 (BF2)
X1.5 / X3.5			

# 3. INSTALLATION

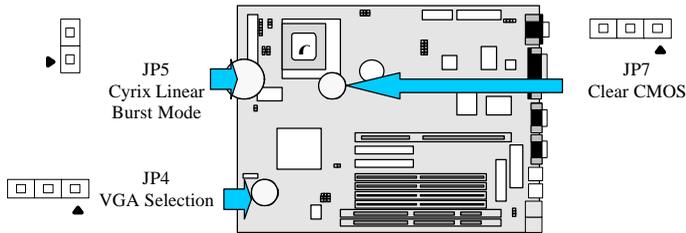
X2.0			
X2.5			
X3.0			
X4.0			

## Setting CPU Core Voltage

Vcore	JP8	JP9	JP10	JP11	JP12
2.2V					
2.8V					
2.9V					
3.2V					
3.38V					
3.52V					

# 3. INSTALLATION

## 3.2.3 Other Jumper Settings



### Cyrix Linear Burst Mode (JP5)

The SL5598 has a jumper JP5, which allows you to enable L2 cache, running at linear burst mode for Cyrix CPU. Make sure this jumper is open for normal operation for other kind of processors.

### VGA Selection (JP4)

SL5598 also has a 3-pin jumper allows you to enable or disable onboard VGA function.

### Clear CMOS (JP7)

If an unknown password is set in the BIOS, it can be cleared by inserting a cap over JP7.

Cyrix Linear Burst Mode

Description	JP5
Interleaved Burst	
Linear Burst	

VGA Selection

Description	JP4
External VGA	
Onboard VGA	

Clear CMOS

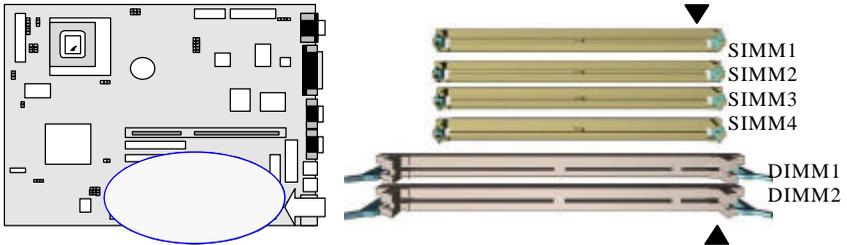
Description	JP7
Default	
Clear CMOS	

# 3. INSTALLATION

## 3.3 System Memory (DRAM )(J1, 4, 5, 7, 11, 13)

### 3.3.1 SIMM (Single Inline Memory Module) and DIMM (Dual Inline Memory Module)

The SL5598 features four (4) 72-pin SIMM and two (2) 168-pin DIMM sockets. The system memory size can be configured in a variety of ways by using different combinations of the four 72-pin DRAM SIMM or two 168-pin



DIMM.

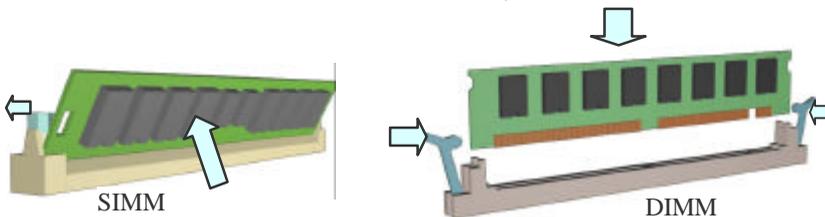
### 3.3.2 Installation Procedure

**Step1:** Pin 1 of the SIMM must match pin 1 of the SIMM socket, same to the DIMM.

**Step2:** Insert SIMM module into SIMM socket at a 45 degree angle. Push it ahead to 90 degree angle until it locks firmly into the SIMM socket.

Insert the DIMM module into the DIMM socket vertically. After inserting the DIMM module completely into the socket, push up on the socket latches securing the DIMM into place

If pin 1 of the DIMM module does not line up with pin 1 of the socket, the DIMM module will not be inserted correctly into the socket. Same to SIMM.



**Be careful not to misfit the DIMM Module into DIMM sockets in the wrong**

## 3. INSTALLATION

direction. This module can only be inserted into DIMM socket one way. Please note the “▲” for pin 1 location. To release the memory module, push both latches down and carefully rock the module forward and backward while slowly lifting it upward.

# 3. INSTALLATION

## 3.3.3 Memory Module Combinations

### SIMM Combinations:

Total Memory (SIMM 1-4)	Bank A (SIMM 1&2)	Bank B (SIMM 3&4)
8MB	4MBx2	None
16MB	8MBx2	None
32MB	16MBx2	None
64MB	32MBx2	None
16MB	4MBx2	4MBx2
24MB	4MBx2	8MBx2
40MB	4MBx2	16MBx2
72MB	4MBx2	32MBx2
24MB	8MBx2	4MBx2
32MB	8MBx2	8MBx2
48MB	8MBx2	16MBx2
80MB	8MBx2	32MBx2
40MB	16MBx2	4MBx2
48MB	16MBx2	8MBx2
64MB	16MBx2	16MBx2
96MB	16MBx2	32MBx2
72MB	32MBx2	4MBx2
80MB	32MBx2	8MBx2
96MB	32MBx2	16MBx2
128MB	32MBx2	32MBx2
128MB	64MBx2	None
256MB	64MBx2	64MBx2

Note:

1. The memory module must be 70ns (nanoseconds) or faster using either FPM or EDO types.
2. Configuration must be one pair in sequence inserted at a time(i.e. SIMM1 and SIMM 2, or all four sockets at once)
3. Each pair of modules must be the same size and speed and may be single sided or doubled-side. Module sizes: Single-side SIMMs: 4MB, 8MB, 16MB; Double-side SIMMs: 8MB, 32MB, 64MB.

# 3. INSTALLATION

## DIMM Combinations

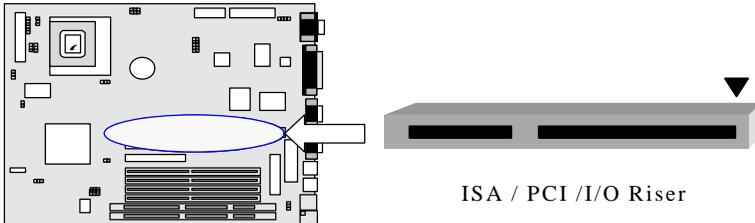
Total Memory (DIMM1 and DIMM2)	DIMM1	DIMM2
8MB	8MB	EMPTY
16MB	8MB	8MB
16MB	16MB	EMPTY
32MB	16MB	16MB
32MB	32MB	EMPTY
64MB	32MB	32MB
64MB	64MB	EMPTY
128MB	64MB	64MB
128MB	128MB	EMPTY
256MB	128MB	128MB

The SL5598 mainboard features two 168-pin DIMM sockets with each supporting 8MB to 128MB of SDRAM/EDO using 1MBx64, 2MBx64, 4MBx64 and 8MBx64 DIMM (Asymmetrical single and double sided). The DRAM interfaces on a 64-bit wide, data path. Also supported is 3.3 volts 66.67Mhz unbuffered Synchronous DRAM (SDRAM) and 3.3 volts 60ns or faster unbuffered EDO DRAM. The EDO DRAM and SDRAM are defined above.

# 3. INSTALLATION

## 3.4 Expansion Slots ( J17 )

The SL5598 system will support an ISA only, PCI only or shared ISA-PCI slots riser card. The ISA/PCI I/O riser card contains decoupling capacitors between the voltage planes and ground to assist in both EMI and general voltage plane noise reduction. The ISA/PCI I/O riser will be inserted into the system PWA during the system assembly process. The riser connects to the system PWA through the J17 connector.



### ISA Interface

The SL5598 incorporates a fully ISA bus compatible master and slave interface. It is capable of driving Max. five (5) ISA slots without external data buffers. This drive capability is required to ensure signal integrity for the ISA bus under loading conditions with the ISA/PCI I/O riser and expansion cards installed. The ISA interface also provides byte swap logic and I/O recovery support.

### ISA Bus Speed

Dividing the PCI clock by 3 or 4 generates the ISA system clock. The division by 3 setting is used for 25MHz PCI bus speed, division by 4 is used for 30 and 33MHz. The frequencies supported are 8.25MHz, 7.5MHz and 8.33MHz respectively. The ISA bus frequency is selected during the system's power up or hard reset through a hardware strapping option (Divide x3 or x4) and the selected PCI bus clock speed.

### AT Bus Refresh

The SL5598 system board supports *hidden* refresh cycles which allows the CPU to continue to execute unless an AT bus cycle is attempted coincident with the AT bus refresh cycle (ISA Bus refresh cycles are completely decoupled from DRAM Refresh). Transactions driven by PCI masters that target ISA or IDE resources while refresh is active are held off with wait states until the refresh is complete.

# 3. INSTALLATION

## PCI Interface

The main function of PCI arbiter is to take charge of the PCI bus ownership assignment. This PCI arbiter supports at most 4 external PCI masters and 4 internal PCI masters. This arbitration operation is applied to the Host Bridge and CPU.

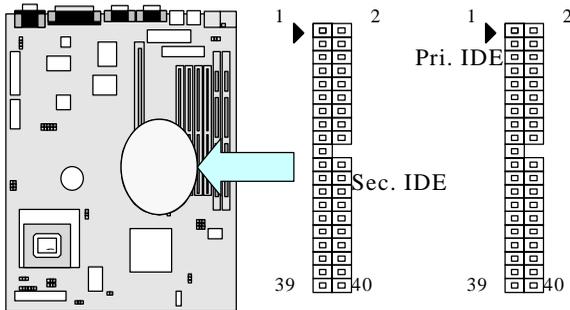
The arbitration scheme, which we design, is done at two layers. CPU has the highest priority (i.e. CPU will be the PCI bus owner if there is a request from the Host Bridge. If there is no request from the Host Bridge, rotational priority scheme will be applied to these masters).

The SiS5598 Pentium PCI/ISA chipset provides high performance PCI Arbiter. The SL5598 supports up to 2 PCI Masters, fully compliant to PCI2.1.

# 3. INSTALLATION

## 3.5 Connectors

The SL5598 motherboard contains IDE, floppy, power input, front panel, back panel and additional connectors.



### 3.5.1 Primary IDE Connector (J14, 39-pin block)

The primary IDE connector supports two primary channel IDE devices via a ribbon cable. When two IDE devices are installed using the primary IDE connector, make sure that the second IDE device is set to slave mode as indicated in the device's manual.

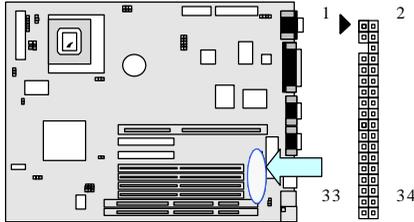
### 3.5.2 Secondary IDE Connector (J16, 39-pin block)

This connector supports two secondary channel IDE devices as well as the 120MB Floppy drives via a ribbon cable. When two IDE devices are installed using the secondary IDE connector, make sure that the second IDE device is adjusted to slave mode as instructed in the device's manual.

**WARNING:** When you connect a ribbon cable to these ports, you must orient the cable connector so that the PIN 1 edge of the cable is at the PIN 1 edge of the onboard connector.

# 3. INSTALLATION

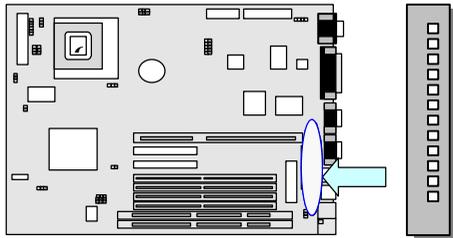
## 3.5.3 Floppy Drive Connector (J6, 33-pin block)



The FDC sub-system is capable of controlling three types of floppy drives (1.2, 1.44 and 2.88MB) or compatible tape drives. The connection to the floppy drive is via a header (J19). The floppy disk interface includes 48mA drivers and inputs on the drive interface.

**WARNING:** When you connect a ribbon cable to this port, you must orient the cable connector so that the PIN 1 edge of the cable is at the PIN 1 end of the onboard port as well.

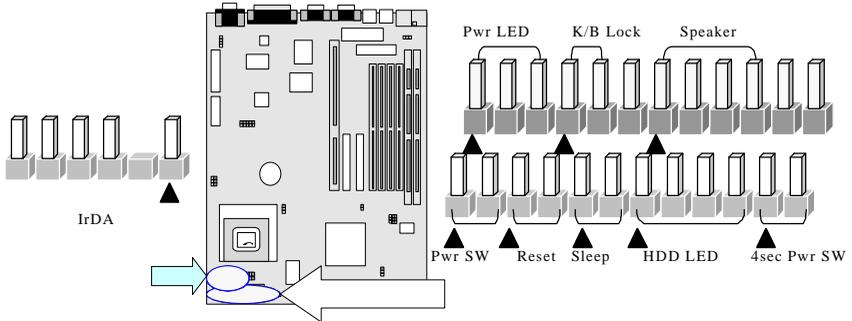
## 3.5.4 Power Input Connector (J9, 20-pin block)



The Power Input connector supports a standard AT power supply. When connecting make sure the lock key matches the hook attached on a power supply cable. The power cord should be unplugged when you connect it.

# 3. INSTALLATION

## 3.5.5 Front Panel connectors (J27) and IrDA Connector (J23)



Front Panel includes headers for the following eight I/O connectors:

Power LED, Keyboard Lock, Speaker, Power Switch(optional), Reset, Sleep, HDD LED and 4sec Power switch(Optional).

### Power LED (3-pin)

Can be connected to a LED that will light when the computer is powered on.

### Keyboard Lock (2-pin)

Allows you to lock your keyboard with a button or a key manually.

### Speaker Connector (4-pin)

It is used to drive a chassis-mounted speaker if desired.

### Power Switch & 4 sec Power Switch( Optional, 2-pin & 2-pin)

This connector may or may not support the ATX case-mounted Power Switch, it is optional, which in turn supports System Suspend function. When the BIOS sets the Power Button function to “Delay 4 sec.”, the system can be set to the suspended mode once you push the power switch for no longer then 4 seconds. If the power switch is pushed down for over 4 seconds the system will be totally Power Off. When the BIOS setting sets the Delay 4 second to “Instant-off”, then Power Switch function work as regular power switch.

### Reset Switch Connector (2-pin)

Supports the front panel case-mounted reset button. It is advised that the reset switch be used for rebooting the system in order to extend the life of the system’s power supply.

# 3. INSTALLATION

## **Sleep Switch (2-pin)**

When the APM (Advanced Power Management) feature is enabled in the system BIOS and the operating system's APM driver is loaded, the system can enter the sleep (standby) mode in one of the following ways:

- ◆ Optional front panel sleep/resume button
- ◆ Prolonged system inactivity using the BIOS inactivity timer feature (Section 4.5)

The 2-pin header supports a front panel sleep/resume switch, which must be a momentary SPST type that is normally open

## **HDD LED Connector (4-pin)**

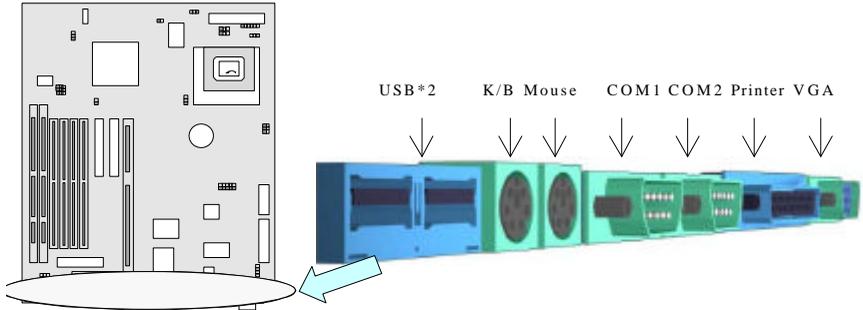
The SL5598 supports one straight 4-pin header for connecting to front Panel Hard Disk activity LED indicator.

## **Infrared (IrDA) connector (6-pin)**

The SL5598 offers an IrDA infrared header that supports third party infrared modules. The case must reserve space for the IR module if you want to use the IrDA function. This option supports wireless transmission and reception of infrared data. The module mounts in a small opening on the system case that supports this feature. The efficient distance is 100cm and the transfer rate is 115,200 bits/sec.

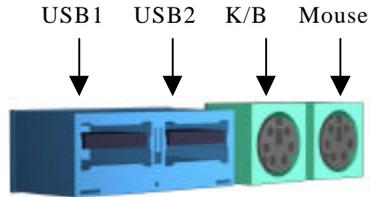
# 3. INSTALLATION

## 3.5.6 Back Panel Connectors



### Universal Serial Bus (USB) Ports

The SL5598 motherboard has two USB connectors. USB devices provide a more convenient operating environment and improve data transferring capacity. True Plug & Play, this new bus technology will support over 127 different peripherals through a Hub.

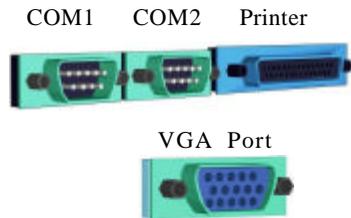


### PS/2 Keyboard and Mouse Ports

The SL5598 motherboard offers one PS/2 Keyboard and one PS/2 Mouse port.

### Parallel Port (Printer)

The SL5598 includes a parallel port (EPP/ECP compatible). The parallel port is capable of being disabled or remapped to either the secondary LPT address or the primary LPT address through BIOS if another parallel port is installed.



### Serial Port (COM)

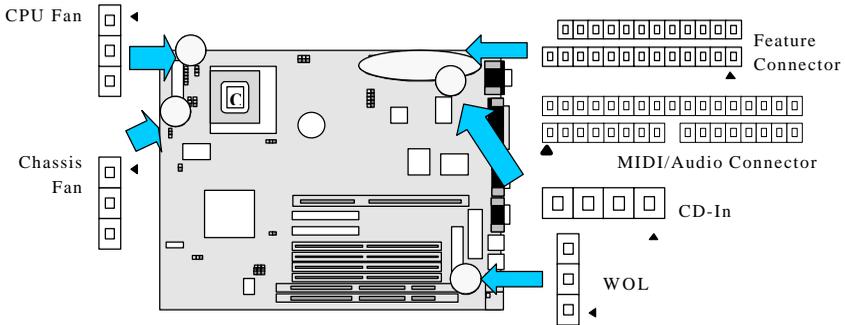
The SL5598 motherboard has two (2) serial ports. The electrical characteristics are compliant with the EIA-232-D Serial Communications Specifications. The serial ports may be remapped over other installable serial ports or disabled through the BIOS.

# 3. INSTALLATION

## VGA Port

The SL5598 supplies a VGA function on board with a integrated chip.

## 3.5.7 Additional Connectors



## WOL (Wake On LAN)

The WOL is used for remote wakeup of the computer through a network. WOL requires a PCI add-in network interface card (NIC) with remote wakeup capabilities. The remote wakeup header on the NIC must be connected to the onboard Wake on LAN header. For Wake on LAN, the 5-V standby line for the power supply must be capable of delivering  $5V \pm 5\%$  at 720mA.

## Chassis Fan

This header can supply power for Chassis Fan, which may be mounted inside your case to cool down your system components. If your chassis has a Chassis Fan, this header will support it.

## CPU Fan

Your Pentium Cartridge may have an attached heatsink and Fan which would utilize this connector for the CPU Fan.

## MIDI/Audio Connector (Optional)

The MIDI/Audio header provides access to the Line-Out, Line-In and Mic-In Connectors. For the music enthusiast the header also provides access to receive & send MIDI data between instruments or other MIDI capable systems. The MIDI interface is MPU-401 UART compatible with FIFOs. The same header connector provides the Joystick game compatible interface. The header is connected to a bracket assembly with all the necessary connectors with a ribbon

# 3. INSTALLATION

cable.

## **CD-IN Connector (Audio) (Optional)**

A 1 x 4 connector is built into the SL5598 motherboard for audio input from CD-ROM drives.

## **Feature Connector**

The VESA feature connector is available for synchronizing graphics output with an external NTSC or PAL signal, and will allow a shared frame buffer interface to maximize Multimedia performance. The feature connector will use pass-through signals from a video add-in card to utilize the system's VGA circuitry. The SL5598 also supports other VESA standards such as the "VESA DPMS protocol" to switch a DPMS compliant monitor into power savings mode and the "VESA Bi-directional Monitor Data", (DDC-2) that allows the transfer of monitor identification and resolution supported data for ease of use.

# 3. INSTALLATION

## 3.5.8 Ready To Turn On Power

- **Review**



1. Is the CPU installed correctly and locked firmly into socket? (Sec. 3.2)
2. Are all the DRAM modules installed properly? (Sec. 3.3)
3. Are all expansion card (Riser Card,VGA, Sound.... etc.) inserted? (Sec. 3.4)
4. Are all the connectors described in Sec 3.5 properly connected to their variable devices? (Sec. 3.5)

- **Yes, I have checked and completed the above steps!**

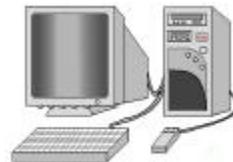


Now get ready to turn on your device by following these steps.

1. Mount your motherboard to the chassis frame and close the chassis cover.
2. Switch off all power.
3. Connect the power supply cord to inlet of the system case.
4. Connect the power supply cord into an outlet of power supply.
5. Connect monitor signal cable to system VGA port, and the monitor power cord to power outlet.
6. Turn on monitor and system power.

**Once Powered on**, the power LED on the front panel of the system case will light. For ATX power supplies, the system LED will light when the ATX power switch is pressed.

The system will then perform a power-on test on each item one at a time. Additional messages will appear on screen at this time. If the screen blinks or the tests stops more than 30 seconds, the system may have failed the power-on test. If this happens, please recheck the above steps or call your retailer for assistance. If all the “power-on” tests pass you are ready to enter BIOS setup. Do this now by holding down the <Delete> button on the keyboard. Follow the instructions in the next chapter, **BIOS SETUP**.



# 3. INSTALLATION

# 4. BIOS SETUP



The SL5598 motherboard uses AWARD BIOS, which is stored in a Flash EEPROM and can be upgraded by a floppy disk-based program. The BIOS has a built-in Setup Program which allows users to modify the basic system configuration settings. The settings are then stored in a dedicated battery-backed memory, called CMOS RAM that retains the information when the

power is turned off. The BIOS provides critical low-level support for the system's central processing, memory and I/O subsystems. The AWARD BIOS has been customized by adding important, nonstandard, features such as virus and password protection, power management, and detailed fine-tuning of the chipset which controls the system. The remainder of this manual is intended to guide you through the process of configuring your system using the BIOS Setup.

## 4.1 How To Enter BIOS Setup

The AWARD BIOS is immediately activated when you first turn on the computer. The BIOS reads system configuration information in CMOS RAM and begins the process of checking the system and configuring it through the power-on self test (POST). When these preliminaries are completed, the BIOS searches for an operation system on the data storage devices (hard drive, floppy drive, etc.). The BIOS launches the operating system and hands over control of system operation to it.

To begin Setup, press the <Delete> key during boot-up before or while a message similar to this appears briefly at the bottom of the screen during POST (Power On Self Test):

### **Press DEL if you want to enter SETUP**

If the above message disappears before you have responded and you still wish to enter Setup, reboot the system to try again by pressing the "RESET" button on the system case. You may also restart by simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys.

### **Press F1 to continue, DEL to enter SETUP**

# 4. BIOS SETUP

## 4.1.1 Setup Keys

The following table of keystrokes is used to navigate during Setup:

<↑> , <↓>	Move to previous or next item
<←> , <→>	Move to the item in the left or right hand
<Esc>	Main Menu – Quit and not save changes into CMOS Other Pages -- Exit current page and return to Main Menu
<PgUp> / <+>	Increase the numeric value or make changes
<PgDn> / <->	Decrease the numeric value or make changes
<F1>	General help, only for Status Page Setup Menu and Option Page Setup Menu
<F2>	Change color from total 16 colors. F2 to select Shift-F2 color forward, Shift-F2 to select color backward
<F3>	Calendar, only for Status Page Setup Menu
<F5>	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
<F7>	Load the Setup default
<F10>	Save all the CMOS changes, only for Main Menu

## 4.1.2 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press Esc or the F1 key again.

## 4.1.3 In Case of Problems

If after making and saving system changes with Setup, you discover that your computer is no longer able to boot-up, the Award BIOS supports an override to the CMOS settings that resets your system to its default configuration.

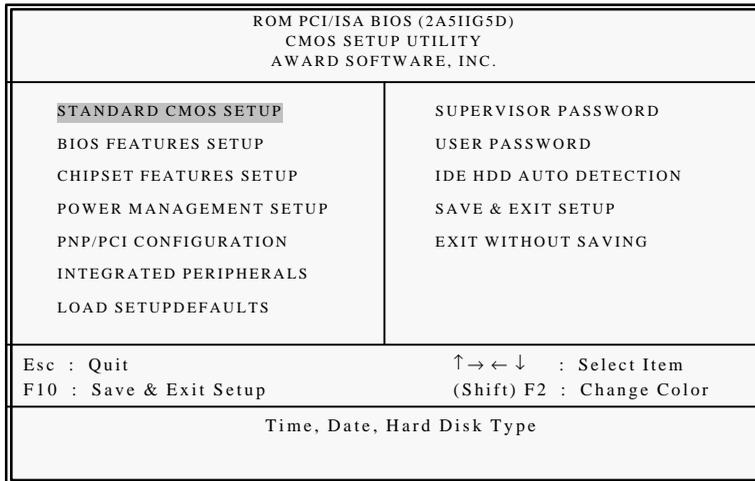
The best advice is to alter only settings that you thoroughly understand. In particular, do not change settings in the Chipset screen without a good reason. Your system manufacturer has carefully chosen the Chipset defaults for the best performance and reliability. Even a seemingly small change to the Chipset setup may cause the system to become unstable.

# 4. BIOS SETUP

## 4.2 Main Setup Menu

When you enter the Award BIOS CMOS Setup Utility, a Main Menu (Figure 1) appears 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.

A brief description of each highlighted selection appears at the bottom of the screen.



**Figure 1: Main Menu**

# 4. BIOS SETUP

Following is a brief summary of each Setup category.

Standard CMOS	Options in the original PC AT-compatible BIOS.
BIOS Features	Award enhanced BIOS options.
Chipset Features	Options specific to your system chipset.
Power Management	Advanced Power Management (APM) options.
PnP/PCI Configuration	Plug and Play standard and PCI Local Bus configuration options.
Integrated Peripherals	I/O subsystems that depend on the integrated peripherals controller in your system.
Supervisor/User Password Setting	Change, set, or disable a password. In BIOS versions that allow separate user and supervisor passwords, only the supervisor password permits access to Setup. The user password generally allows only power-on access.
IDE HDD Auto Detection	Automatically detect and configure IDE hard disk parameters.
Load Setup Defaults	Setup defaults are factory settings for optimal-performance system operations.
Save & Exit Setup	Save settings in nonvolatile CMOS RAM and exit Setup.
Exit Without Save	Abandon all changes and exit Setup.

# 4. BIOS SETUP

## 4.3 Standard CMOS Setup Menu

In the Standard CMOS Menu (Figure2) you can set the system clock and calendar, record disk drive parameters and the video subsystem type, and select the type of errors that stop the BIOS POST.

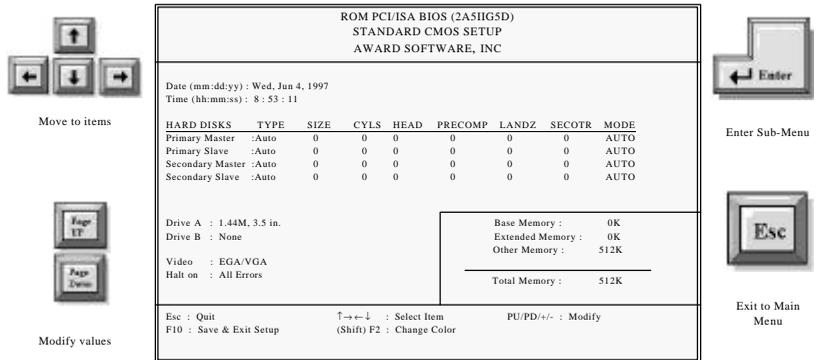


Figure 2: Standard CMOS setup

### Date

The BIOS determines the day of the week from the other date information. This field is for information only. Press the left or right arrow key to move to the desired field (date, month, year). Press the PgUp or PgDn key to increment the setting, or type the desired value into the field.

### Time

The time format is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Press the left or right arrow key to move to the desired field. Press the PgUp or PgDn key to increment the setting, or type the desired value into the field.

### Hard Disks

The BIOS supports up to four IDE drives. This section does not show information about other IDE devices, such as a CD-ROM drive, or other hard drive types, such as SCSI drives.

**NOTE:** We recommend that you select type *AUTO* for all drives.

## 4. BIOS SETUP

The BIOS can automatically detect the specifications and optimal operating mode of almost all IDE hard drives. When you select type AUTO for a hard drive, the BIOS detects its specifications during POST, each time the system boots.

If you do not want to select drive type AUTO, other methods of selecting the drive type are available:

- 1) Match the specifications of your installed IDE hard drive(s) with the preprogrammed values for drive types 1 through 45.
- 2) Select USER and enter values into each drive parameter field.
- 3) Use the IDE HDD AUTO DETECTION function in Setup.

The following is a brief explanation of drive specifications:

- **Type:** The BIOS contains a table of pre-defined drive types. Each defined drive type has a specified number of cylinders, number of heads, write precompensation factor, landing zone, and number of sectors. Drives whose specifications do not accommodate any pre-defined type are classified as type USER.
- **Size:** Disk drive capacity (approximate). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.
- **Cyls:** Number of cylinders
- **Head:** Number of heads
- **Precomp:** Write precompensation cylinder
- **Landz:** Landing zone
- **Sector:** Number of sectors
- **Mode:** Auto, Normal, large, or LBA
- **Auto:** The BIOS automatically determines the optimal mode.
- **Normal:** Maximum number of cylinders, heads, and sectors supported are 1024, 16, and 63.
- **Large:** For drives that do not support LBA and have more than 1024 cylinders.
- **LBA (Logical Block Addressing):** During drive accesses, the IDE controller transforms the data address described by sector, head, and cylinder number into a physical block address, significantly improving data transfer rates. For drives with greater than 1024 cylinders.

## 4. BIOS SETUP

### Drive A/B type

Select the correct specifications for the diskette drive(s) installed in the computer.

None	No diskette drive installed
360K, 5.25 in	5-1/4 inch PC-type standard drive; 360 kilobyte capacity
1.2M, 5.25 in	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity
720K, 3.5 in	3-1/2 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in	3-1/2 inch double-sided drive; 1.44 megabyte capacity
2.88M, 3.5 in	3-1/2 inch double-sided drive; 2.88 megabyte capacity

### Video

Select the type of primary video subsystem in your computer. The BIOS usually detects the correct video type automatically. The BIOS supports a secondary video subsystem, but is not selected during Setup.

EGA/VG A	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SEGA, SVGA or PGA monitor adapters.
CGA 40	Color Graphics Adapter, power up in 40 column mode.
CGA 80	Color Graphics Adapter, power up in 80 column mode.
MONO	Monochrome adapter, includes high resolution monochrome adapters.

### Halt on

During the “power-on self-test” (POST), the computer stops if the BIOS detect any hardware errors. You can instruct the BIOS to ignore certain errors during POST and continue the boot-up process. These are the selections:

No errors	POST does not stop for any errors.
All errors	If the BIOS detect any non-fatal error, POST stops and prompts you to take corrective action.
All, But keyboard	POST does not stop for a keyboard error, but stops for all other errors.
All, But Diskette	POST does not stop for diskette drive errors, but stops for all other errors.
All, But Disk/Key	POST does not stop for a keyboard or disk error, but stops for all other errors.

## 4. BIOS SETUP

### **Memory**

Values in the Memory field cannot be changed and are only for your information. The fields show the total installed Random Access Memory (RAM) and amounts allocated to base memory, extended memory, and other (high) memory. RAM is counted in kilobytes (KB: approximately one thousand bytes) and megabytes (MB: approximately one million bytes).

RAM is the computer's working memory, where the computer stores programs and data currently being used, so they are accessible to the CPU. Modern personal computers may contain up to 64 MB, 128 MB, or more.

### **Base Memory**

Base Memory is typically 640 KB. It is also referred to as conventional memory. The DOS operating system and conventional applications utilize this type of memory.

### **Extended Memory**

Extended Memory is above the 1 MB boundary. Early IBM personal computers could not use memory above 1 MB, but current PCs and their software can use extended memory.

### **Other Memory**

Between 640 KB and 1 MB; which is often called High memory, DOS may load Terminate-and-Stay-Resident (TSR) programs, such as device drivers, to free as much conventional memory as possible for applications. Lines in your CONFIG.SYS files that begin with LOADHIGH will load programs into high memory.

### **Total Memory**

System total memory is the sum of base memory, extended memory, and other memory.

# 4. BIOS SETUP

## 4.4 BIOS Features Setup Menu

This screen (Figure 3) contains industry-standard options additional to the core PC AT BIOS. This section describes all fields offered by Award Software in this screen. Some fields may vary from those in your Setup program. Your system board designer may omit or modify some fields.

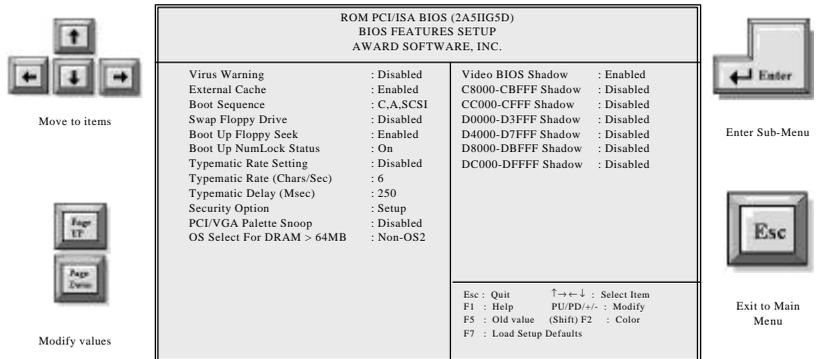


Figure 3: BIOS Features Setup Menu

### Virus Warning

When enabled, you will receive a warning message if a program (specifically, a virus) attempts to write to the boot sector or the partition table of the hard disk drive. You should then run an anti-virus program. Keep in mind that this feature protects only the boot sector, not the entire hard drive.

**NOTE:** Many disk diagnostic programs that access the boot sector table can trigger the virus warning message. If you plan to run such a program, we recommend that you first disable the virus warning.

### External Cache

Cache memory is additional memory that is much faster than conventional DRAM (system memory). When the CPU requests data the system transfers the requested data from the main DRAM into cache memory for even faster access by the CPU. The External Cache field may not appear if your system does not have external cache memory.

### Boot Sequence

The original IBM PCs loaded the DOS operating system from drive A (floppy disk). Because of this, IBM PC-compatible systems are designed to search for an operating system first on this drive, and then on drive C (hard disk). However, the BIOS now

## 4. BIOS SETUP

offers 10 different boot sequence options of three drives each. In addition to the traditional drives A and C, options include IDE hard drives D, E, and F; as well as an SCSI hard drive and a CD-ROM drive.

### Swap Floppy Drive

This field is effective only in systems with two floppy drives. Selecting *Enabled* assigns physical drive B to logical drive A, and physical drive A to logical drive B.

### Boot Up Floppy Seek

When *Enabled*, the BIOS tests (seeks) floppy drives to determine whether they have 40 or 80 tracks. Only 360-KB floppy drives have 40 tracks; drives with 720 KB, 1.2 MB, and 1.44 MB capacity all have 80 tracks. Because very few modern PCs have 40-track floppy drives, we recommend that you set this field to *Disabled* to save time.

### Boot Up NumLock Status

Toggle between *On* or *Off* to control the state of the NumLock key when the system boots. When toggled *On*, the numeric keypad generates numbers instead of controlling cursor operations.

### Typematic Rate Setting

When *Disabled*, the following two items (Typematic Rate and Typematic Delay) are irrelevant. Keystrokes repeat at a rate determined by the keyboard controller in your system. When *Enabled*, you can select a Typematic Rate and Typematic Delay.

#### Typematic Rate (Chars/Sec)

When the Typematic Rate setting is *Enabled*, you can select a Typematic rate (the rate at which characters repeat when you hold down a key) of 6, 8, 10, 12, 15, 20, 24 or 30 characters per second.

#### Typematic Delay (Msec)

When the Typematic Rate setting is enabled, you can select a Typematic Delay (the delay before keystrokes begin to repeat) of 250, 500, 750 or 1000 milliseconds.

### Security Option

If you have set a password, select whether the password is required each time the System boots, or only when you enter Setup.

### PCI/VGA Palette Snoop

Some display cards that are not standard VGA such as graphics accelerators or MPEG cards may not show the correct colors. This setting can correct the problem once it is set to *Enabled*. For default setting leave at *Disabled*.

### OS select for DRAM > 64MB

Select *OS2* only if you are running OS/2 operating system with greater than 64 MB of RAM on your system.

## 4. BIOS SETUP

### **Shadow**

Software that resides in a Read-Only Memory (ROM) chip on a device is called *firmware*. The Award BIOS permits *shadowing* of firmware such as the system BIOS, video BIOS, and similar operating instructions that come with some expansion peripherals, such as, an SCSI adapter.

Shadowing copies firmware from ROM into system RAM, where the CPU can read it through the 16-bit or 32-bit DRAM bus. Firmware not shadowed must be read by the system through the 8-bit X-bus. Shadowing improves the performance of the system BIOS and similar ROM firmware for expansion peripherals, but it also reduces the amount of high memory (640 KB to 1 MB) available for loading device drivers, etc.

Enable shadowing into each section of memory separately. Many system designers hard-wire shadowing of the system BIOS and eliminate a System BIOS Shadow option.

Video BIOS shadows into memory area C0000-C7FFF. The remaining areas shown on the BIOS Features Setup screen may be occupied by other expansion card firmware. If an expansion peripheral in your system contains ROM-based firmware you need to know the address range the ROM occupies to shadow it into the correct area of RAM.

# 4. BIOS SETUP

## 4.5 Chipset Features Setup Menu

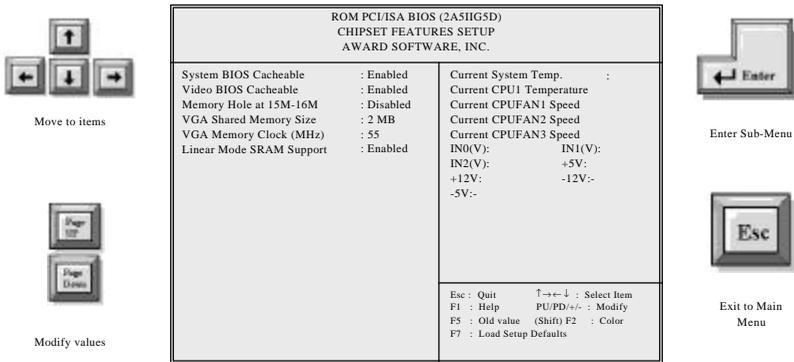


Figure 4: Chipset Features Setup Menu

### System BIOS Cacheable

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

### Video BIOS Cacheable

Selecting *Enabled* allows caching of the video BIOS ROM at C0000h to C7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

### Memory Hole At 15M-16M

You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached. The user information of peripherals that need to use this area of system memory usually discusses their memory requirements.

### VGA Shared Memory Size

You can share the system memory in this item for VGA use.

### VGA Memory Clock (MHz)

Set the Memory speed.

### Linear Mode SRAM Support

To enable the Linear Mode SRAM Support or not.

# 4. BIOS SETUP

## 4.6 Power Management Setup Menu

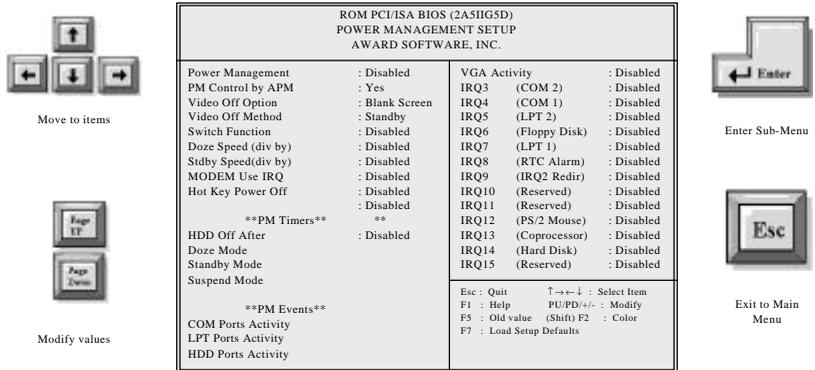


Figure 5: Power Management Setup Menu

### Power Management

This option allows you to select the type (or degree) of power saving for Doze, Standby, and Suspend modes. See the section *PM Timers* for a brief description of each mode. The following table describes each power management mode:

Disable	Global Power Management will be disabled
Max Saving	Maximum power savings. <b>Only Available for SL CPUs.</b> Inactivity period is 1 minute in each mode.
User Define	Set each mode individually. Select time-out periods in the <i>PM Timers</i> section, following.
Min Saving	Minimum power savings. Inactivity period is 1 hour in each mode (except the hard drive).

### PM Control by APM

If Advanced Power Management (APM) is installed on your system, selecting “Yes” provides you with greater power savings.

## 4. BIOS SETUP

### **Video Off Option**

Determines the method how video display enters power saving mode.

### **Video Off Method**

Determines the manner in which the monitor is blanked.

V/H SYNC+Blank	System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.
DPMS Support	Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values.
Blank Screen	System only writes blanks to the video buffer.

### **Switch Function**

This allows you to enable or disable Green Button Function for power saving.

### **Doze Speed (div by)**

Set the CPU's speed during Doze mode. The speed is reduced to a fraction of the CPU's normal speed.

### **Stdby Speed (div by)**

Set the CPU's speed during Doze mode. The speed is reduced to a fraction of the CPU's normal speed.

### **Modem Use IRQ**

Enter the Interrupt that is used by the modem if one is installed. Select 'NA' if no modem is installed

## 4. BIOS SETUP

### **Doze Mode/Standby Mode/Suspend Mode**

Time of inactivity required to enter the next consecutive power saving mode. These selections are only available when the above Power Management feature is set to 'User Define'.

### **COM Ports Activity**

When set to Enabled, any event occurring at a COM (serial) port will awaken a system which has been powered down MODEM use

### **LPT Ports Activity**

When set to Enabled , any event occurring at a LPT (printer) port will awaken a system which has been powered down.

### **HDD Ports Activity**

When set to Enabled, any event occurring at a hard or floppy drive port will awaken a system which has been powered down .

### **VGA Activity**

When set to Enabled, any event occurring at VGA will awaken a system which has been powered down.

# 4. BIOS SETUP

## 4.7 PCI Configuration Setup Menu

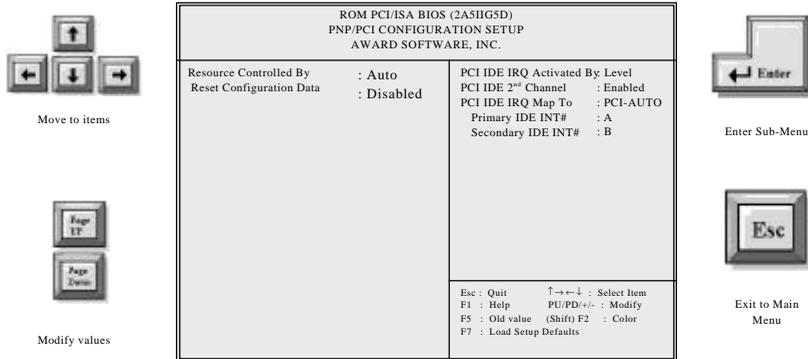


Figure 6: PNP/PCI Configuration Setup Menu

### Resources Controlled by

The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. By selecting "Auto", the IRC and DMA are automatically assigned by the BIOS and those fields disappear from the menu.

### Reset Configuration Data

Normally, this field is left *Disabled*. Selecting *Enabled* will reset the Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

### PCI IRQ Activated By

Leave the IRQ trigger set at Level unless the PCI device assigned to the interrupt specifies Edge-triggered interrupts.

### PCI IDE 2<sup>nd</sup> Channel

The IDE standard supports two channels (interfaces) with two devices on each. Enable the second channel if your system has two PCI IDE connectors in use, either on the system board or on expansion boards. Disable the second channel if a second IDE connector is not present or not in use.

### PCI IDE IRQ Map To

This field lets you select PCI IDE IRQ mapping or PC AT (ISA) interrupts. If your system does not have one or two PCI IDE connectors on the system board, select values

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according to the type of IDE interface(s) installed in your system (PCI or ISA). Standard ISA interrupts for IDE channels are IRQ14 for primary and IRQ15 for secondary.

### **Primary/Secondary IDE INT#**

Each PCI peripheral connection is capable of activating up to four interrupts: INT# A, INT# B, INT# C and INT# D. By default, a PCI connection is assigned INT# A. Assigning INT# B has no meaning unless the peripheral device requires two interrupt services rather than just one. Because the PCI IDE interface in the chipset has two channels, it requires two interrupt services. The primary and secondary IDE INT# fields default to values appropriate for two PCI IDE channels, with the primary PCI IDE channel having a lower interrupt than the secondary.

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## 4.8 Integrated peripherals Menu

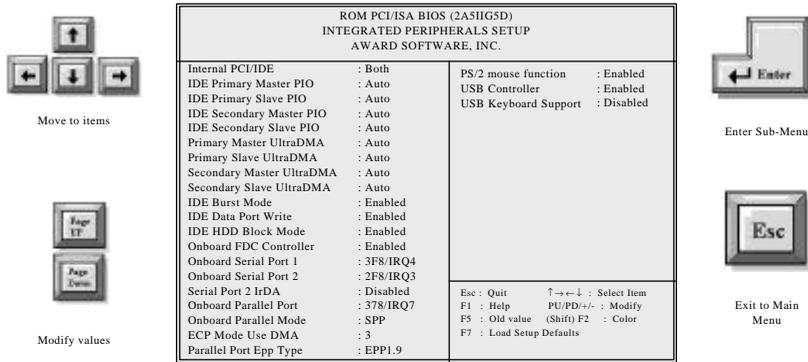


Figure 7: Integrated Peripherals setup Menu

### Internal PCI/IDE

The SiS 5598 chipset contains a PCI IDE interface that supports two IDE channels: Primary (IRQ14) and Secondary (IRQ15). Each channel supports two IDE devices so the system is capable of supporting a total of four IDE devices. Select Primary, Secondary, or both to activate chipset IDE interface(s) installed on your system board.

### IDE Primary/Secondary Master/Slave PIO

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

### IDE Primary/Secondary Master/Slave UDMA

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

### IDE Burst Mode

Selecting Enabled reduces latency between each drive read/write cycle, but may cause instability in IDE subsystems that cannot support such fast performance. If you are experiencing disk drive errors, try setting this value to Disabled. This field does not appear when the Internal PCI/IDE field, above, is Disabled.

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### IDE Data Port Write

Selecting *Enabled* speeds up processing of drive reads and writes, but may cause instability in IDE subsystems that cannot support such fast performance. If you are experiencing disk driver errors, try setting this value to *Disabled*. This field does not appear when the Internal PCI/IDE field, above, is *Disabled*.

### IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select *Enabled* for automatic detection of the optimal number of block read/writes per sector the drive can support.

### Onboard FDC Controller

Select *Enabled* if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install an add-in FDC or the system has no floppy drive, select *Disabled* in this field.

### Onboard Serial Port 1/2

Select an address and corresponding interrupt for the first and second serial ports.

### Serial Port 2 IRDA

Select *Enabled* if your system has a Ir module installed on the system and you wish to use it.

### Onboard Parallel Port

Select a logical LPT port name and matching address for the physical parallel (printer) port.

### Onboard Parallel Mode

Select an operating mode for the onboard parallel (printer) port. Select *Normal* unless your hardware and software require one of the other modes offered in this field.

SPP	Standard parallel port mode (Default)
EPP	Bi-directional mode
ECP	Fast, buffered
ECP+EPP	Bi-directional and buffered

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### **ECP Mode Use DMA**

Select a DMA channel for the port.

### **PS/2 Mouse Function**

Select *Enabled* if your system contains a PS/2 port and you have a PS/2 mouse in use.

### **USB Controller**

This allows you to enable USB Bus or not.

### **USB Keyboard Support**

Select *Enabled* if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.

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### 4.9 Load Setup Defaults

The chipset defaults are settings that provide for maximum system performance. While Award has designed the custom BIOS to maximize performance, the manufacturer has the right to change these defaults to meet their needs.

### 4.10 Supervisor Password

When you select this function, a message appears at the center of the screen:

**ENTER PASSWORD:**

Type a password, up to eight characters and press Enter. Typing a password clears any previously entered password from CMOS memory. Once you press the Enter key the following message appears:

**CONFIRM PASSWORD:**

Re-enter the same password and press Enter.

To abort the process at any time, press Esc.

In the *Security Option* item in the **BIOS Features** Setup screen, select *System* or *Setup*:

System     Enter a password each time the system boots and whenever you enter Setup.

Setup       Enter a password whenever you enter Setup.

**NOTE: To clear the password, simply press Enter when asked to enter a password. Then the password function is disabled.**

### 4.11 User Password

When you select this function, a message appears at the center of the screen:

**ENTER PASSWORD:**

Type the password, up to eight characters, and press Enter. Typing a password clears any previously entered password from CMOS memory. Now the message changes:

**CONFIRM PASSWORD:**

Again, type the password and press Enter.

To abort the process at any time, press Esc.

For the *Security Option* item in the **BIOS Features** Setup screen, select *System* or *Setup*:

System     Enter a password each time the system boots and whenever you enter Setup.

Setup       Enter a password whenever you enter Setup.

**NOTE: To clear the password, simply press Enter when asked to enter a password. The password function is then disabled.**

### 4.12 IDE HDD Auto Detection

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BIOS setup will display all possible modes that are supported by the HDD including NORMAL, LBA & LARGE. If HDD does not support LBA modes, no 'LBA' option will be shown. If numbers of the cylinders are less than or equal to 1024, no 'LARGE' option will be show. Users can select a mode which is appropriate for them

### **4.13 Save & Exit Setup**

This feature allows the changes to be made to the CMOS setup to be saved. The system will resume booting after a successful save.

### **4.14 Exit Without Saving**

Abandon all CMOS value changes and exit setup without saving.