

# User's Manual

M000 Motherboard



**CREATIVE**  
CREATIVE LABS



# *Getting Started*

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## **M000 Motherboard**

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Version 2.0

November 1998



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## Safety Information

**CAUTION:** This device is intended to be installed by the user in a CSA/TUV/UL certified/listed IBM AT or compatible personal computers in the manufacturer's defined operator access area. Check the equipment operating/installation manual and/or with the equipment manufacturer to verify/confirm if your equipment is suitable for user-installed application cards.

**ATTENTION:** Ce carte est destiné à être installé par l'utilisateur, dans un ordinateur compatible certifié CSA/TUV/UL ou listé IBM AT, à l'intérieur de la zone définie par le fabricant. Consulter le mode d'emploi ou le fabricant de l'appareil pour vérifier ou confirmer si l'utilisateur peut y installer lui-même des cartes périphériques.

## Notice for the USA

**FCC Part 15:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, this notice is not a guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.

**CAUTION:** To comply with the limits for the Class B digital device, pursuant to Part 15 of the FCC Rules, this device must be installed in computer equipment certified to comply with the Class B limits.

All cables used to connect the computer and peripherals must be shielded and grounded. Operation with non-certified computers or non-shielded cables may result in interference to radio or television reception.

## Modifications

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.

## Notice for Canada

This apparatus complies with the Class "B" limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations.

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## Compliance

This product conforms to the following Council Directive:

- Directive 89/336/EEC, 92/31/EEC (EMC)

## Declaration of Conformity

According to the FCC96 208 and ET95-19

Importer's Name: ***Creative Labs Inc.***

Importer's Address: ***1901 McCarthy Boulevard  
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declares under its sole responsibility that the product

Trade Name: ***Creative Labs***

Model Number: ***M000***

**has been tested according to the FCC / CISPR22/85 requirement for Class B devices and found compliant with the following standards:**

EMI/EMC: ANSI C63.4 1992, FCC Part 15 Subpart B

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesirable operation.

Ce matériel est conforme à la section 15 des règles FCC. Son Fonctionnement est soumis aux deux conditions suivantes:

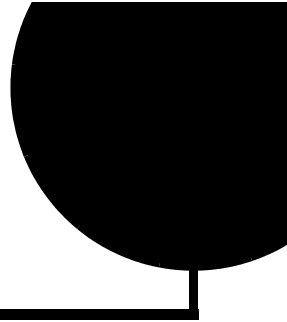
1. Le matériel ne peut être source D'interférences et
2. Doit accepter toutes les interférences reçues, Y compris celles pouvant provoquer un fonctionnement indésirable.

***Compliance Manager  
Creative Labs, Inc.  
November 5, 1998***



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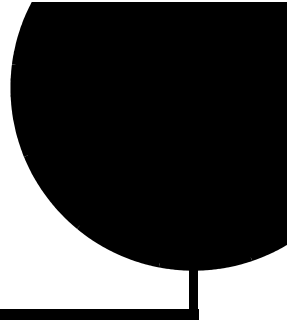






# Introduction

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This manual provides you with information on how to set up and use your motherboard:

- ❑ Chapter 1, “The M000 Motherboard”  
Gives you a list of the motherboard’s capabilities and features. It also provides the motherboard’s technical specifications and a diagram of the motherboard’s layout.
- ❑ Chapter 2, “The Pentium® II Processor”  
Gives you a brief introduction of the Intel® Pentium II processor and shows you how to mount the processor on the motherboard.
- ❑ Chapter 3, “The Celeron™ Processor”  
Gives you a brief introduction of the Intel Celeron processor and shows you how to mount the processor on the motherboard.
- ❑ Chapter 4, “Connectors”  
Provides information on the connectors on your motherboard.
- ❑ Chapter 5, “Jumper Settings”  
Provides information on the location and settings of the jumpers on your motherboard.
- ❑ Chapter 6, “Memory Configuration and BIOS Settings”  
Provides instructions on how to specify BIOS settings in the CMOS Setup utility. It also provides a list of descriptions for the setup items.







## Document Conventions

The following typographical conventions are used throughout this document:

**Table i: Document conventions**

<b>This</b>	<b>Represents</b>
<b>bold</b>	Text that must be entered exactly as it appears.
<i>italic</i>	Title of a book or a placeholder, which represents the information you must provide.
UPPERCASE	Directory name, file name, or acronym.
	The notepad icon indicates information that is of particular importance and should be considered before continuing.
	The alarm clock designates a caution or warning that can help you avoid situations involving risk.



# The M000 Motherboard

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This chapter is organized as follows:

- ❑ Features
- ❑ Specifications

## Features

M000 is a highly integrated IBM PC/AT compatible system board designed to meet the industry's most demanding desktop applications.

This motherboard is based on the Intel 82440LX AGPset chipset which features the Intel® Pentium® II processor or the Intel Celeron™ processor (depending on the configuration of the computer you have purchased) with MMX technology. It provides 256 KB or 512 KB of level 2 high-performance pipelined burst cache, and four 168-pin Dual Inline Memory Module (DIMM) sockets. These DIMM sockets can support up to a total of 512 MB of SDRAM or EDO DRAM.



M000 also comes with an Accelerated Graphics Port (AGP) slot, a high-performance hardware interface for graphics-intensive applications, such as 3D applications. The AGP slot is independent of the Peripheral Component Interconnect (PCI) bus and is designed to be used exclusively with graphic display devices. The M000 supports 3.3 V AGP devices with data transfer rates up to 133 MHz, and it allows a data throughput rate of 500 MB/sec.

M000 is built with four PCI bus slots, thus providing a high bandwidth data path for intensive data movement functions. In addition, M000 has three ISA slots.

The Intel's 82440LX AGPset chipset provides an integrated Bus Mastering IDE controller with two high-performance IDE interfaces. You can connect up to four IDE devices to the controller and achieve data transfer rates of up to 33 MB/sec.

The onboard Giga I/O controller provides standard PC I/O functions: floppy drive interface, two First In First Out (FIFO) serial ports, an Infrared Data Association (IrDA) device port, and a parallel port that supports Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capabilities Port (ECP).

## Specifications

### Intel Chipset

- Features Intel's 440LX AGPset with I/O subsystems.

### CPU Support

- Intel Pentium II 233 MHz, 266 MHz, 300 MHz, and 333 MHz or Intel Celeron processor 266 MHz, 300 MHz and 333 MHz or Intel Celeron processor 300 A and 333 A (with L2 cache).

### Versatile Memory Supports

- Four DIMM sockets that support 168-pin 3.3V SDRAM and EDO DRAM memory modules, with maximum possible memory size of up to 512MB. Configurable support for Error Checking and Correcting (ECC).

### PCI and ISA Expansion Slots

- Provides four 32-bit PCI slots and three 16-bit ISA slots.

### AGP Slot

- Supports AGP cards for high-performance, component-level connection targeted at 3D graphical display applications.

## Onboard GiGA-I/O

- ❑ Provides one floppy drive port, one optional PS/2 mouse connector, two high-speed UART compatible serial ports and one parallel port with ECP and EPP capabilities. Serial Port 2 can also be directed from COM2 to the infrared module for wireless connections.

## + Onboard PCI Bus Master IDE Controller

- ❑ Two Ultra DMA/33 Bus Master IDE ports that support four IDE devices and provide data transfer rates of up to 33 MB/sec. This controller supports Enhanced PIO Modes 3 and 4, and Bus Master IDE DMA Mode 2 devices.

## Onboard 20-pin ATX Power Supply

- ❑ Provides ATX power connector onboard supports soft-on/off function.

## System BIOS

- ❑ Provides licensed Award V4.51PG BIOS on Flash Electrically Erasable Programmable Read-Only Memory (EEPROM). Supports Green PC, DMI and bundled with NCR SCSI BIOS.

## ACPI

- ❑ Support ACPI (Advanced Configuration and Power Interface) function. ACPI provides more energy-saving features for future operating systems that support OS Direct Power Management (OSPM) functionality.

## Board Size

- ❑ ATX form factor 305mm x 170mm.

+

## Advanced Features

### CPU Plug and Play

- CPU Plug and Play function. This means that there is no need to adjust the onboard system clock and CPU multiplier. When the system is switched on for the first time, BIOS will set the CPU clock speed to 233 MHz automatically. If your CPU speed is higher than 233 MHz, just adjust the CPU speed in the CMOS setup.

### Low EMI

- Built-in Spread Spectrum.  $\pm 1.5\%$  modulation and automatic clock shut-off of unused PCI/SDRAMS slots to reduce the EMI.

### Dual Function Power Button

- The system can be in one of two modes, Suspend or Soft-off. If you hold the Power button down for less than 4 seconds, the system will go into the Suspend mode. If you hold the Power button for more than 4 seconds, the system will go into the Soft-off mode.

### Wake-On-LAN

Automatic switching on of the system when LAN is activated.  
(This function supports Intel LAN cards only.)

### Modem Ring Power-on

- Automatic switching on of the system when the modem ring is activated.

### PS/2 Keyboard & Mouse Power-on

- Automatic switching on of the system by stroking the keyboard or double-clicking the PS/2 mouse.

## More Advanced Features (optional)

### + Voltage Monitoring

- ❑ System voltage levels are monitored to ensure stable current to the motherboard components. Voltages include VCORE and VL2 for the CPU, and +5V, +12V, -5V, -12V for the system.

### FAN Status Monitoring

- ❑ CPU fans are monitored for RPM and failure to prevent overheating of the CPU. (A CPU cooling fan with RPM sensor is required.)

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Figure 1-1 on page 1-6 is a diagram of the M000 motherboard for your reference.

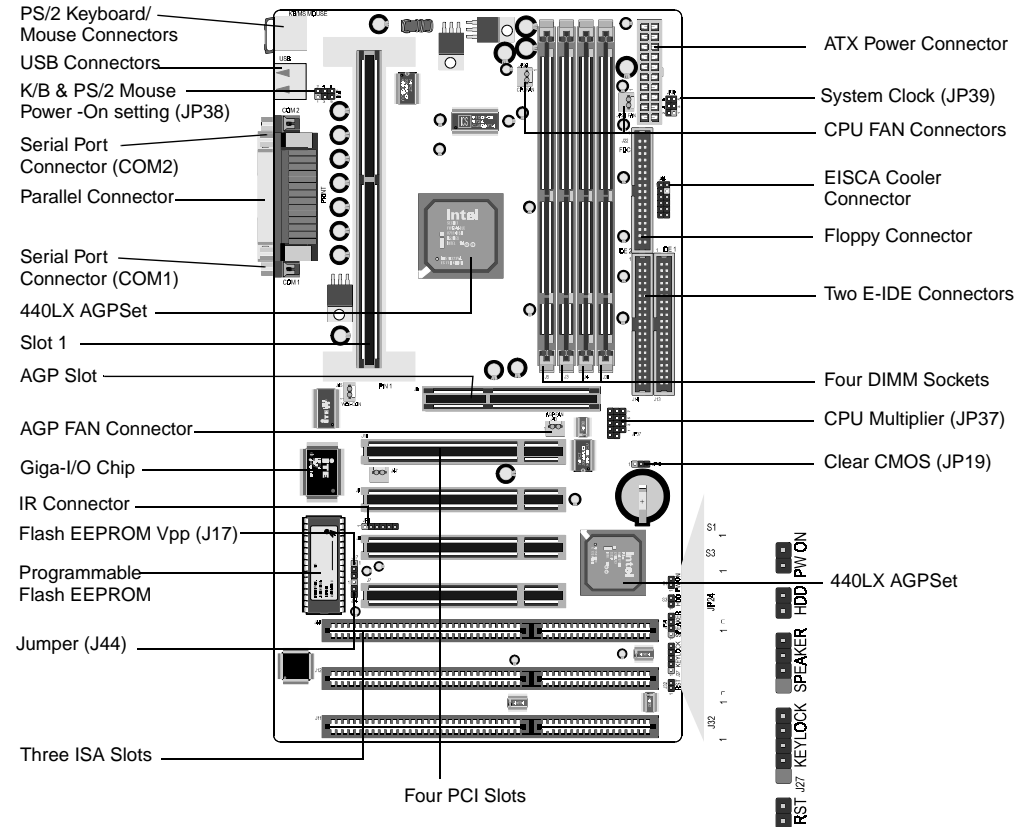


Figure 1-1: The M000 motherboard

# The Pentium<sup>®</sup> II Processor

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This chapter consists of the following sections:

- About the Pentium II Processor
- Installing the Hardware for the Pentium II Processor

## About the Pentium II Processor

The Pentium II processor and the Celeron<sup>™</sup> processor are the latest additions to the P6 processor family. They combine the architectural advances in the Pentium Pro processor with the instruction set extensions of MMX technology. They are fully compatible with the huge base of Intel architecture-based PC software.

In addition, the Pentium II processor delivers new levels of performance for advanced media and communications software including powerful, realistic graphics and imaging capabilities, video conferencing, and the ability to run full-screen, full-motion video. The combination of these advanced features makes the Pentium II processor the ideal choice for executing modern 32-bit CPU-intensive and multimedia-enhanced application work loads using advanced 32-bit operating systems.

The Pentium II processor has a separate 32 KB, on-chip, non-blocking Level 1 cache which runs at the same speed as the processor. It also has a 512 KB or 256 KB onboard Level 2 non-blocking cache which runs at half the speed of the processor.



# Installing the Hardware for the Pentium II Processor

The Pentium II processor uses Single Edge Contact (SEC) cartridge packaging technology which enables high volume availability and improved handling protection.

Figure 2-1 shows the front, rear, and top views of the Pentium II processor (without heat sink mounted).

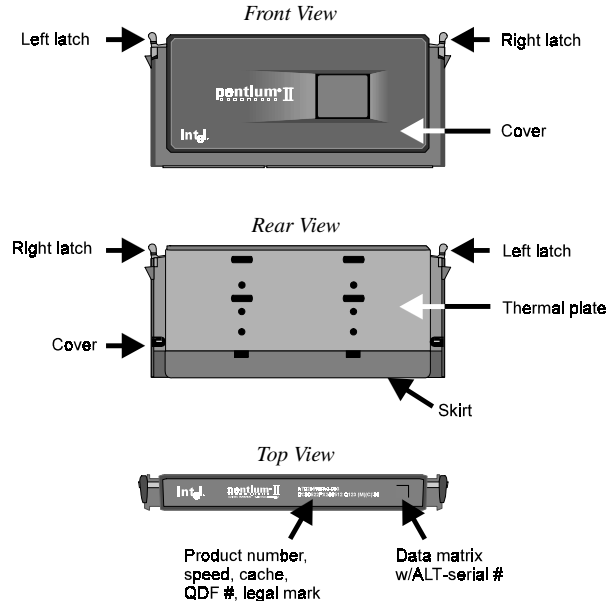


Figure 2-1: Different views of the Pentium II processor.

The Pentium II processor requires the Retention Mechanism (RM) and the Heat Sink Support (HSS) to hold the base processor in the SEC cartridge.

The following sections will show you how to install the RM and HSS. If you should need help with the mechanism, please contact your dealer.

Before you proceed, do the following:

1. Switch off the computer.
2. Remove the motherboard from the chassis.
3. Place it on a workbench.
4. Remove all DIMM chips, cables, and cards from the motherboard so that it is bare.

## Components of the Pentium II Processor's Retention Mechanism

The Retention Mechanism (RM) consists of the following parts:

### ❑ Retention Mechanism (RM)

A plastic guide with captive nuts that hold the SEC cartridge in the Slot 1 connector.

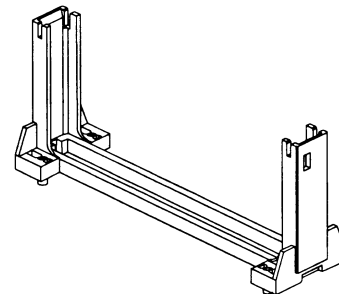


Figure 2-2: The Retention Mechanism.

### ❑ RM Attachment Pins

Plastic pins inserted through the RM to secure it to the motherboard.

Four pins are required for each assembly.

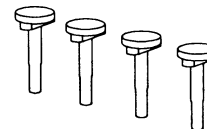


Figure 2-3: The RM attachment pins.

## Step 1: To install the Retention Mechanism

1. Locate the Retention Mechanism (RM) mounting holes and the “Pin 1” mark of Slot 1 on the motherboard (see Figure 2-4).

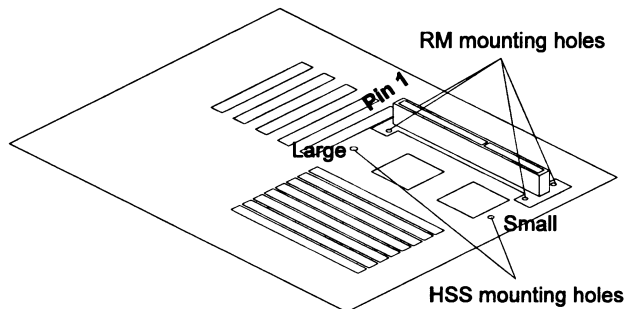


Figure 2-4: Locating the mounting holes on the motherboard.

2. Mount the RM onto Slot 1. Make sure that the square cut mark of the RM has the same orientation as Pin 1 of Slot 1 (see Figure 2-5). Then, insert four RM attachment pins through the RM to secure it to the motherboard.

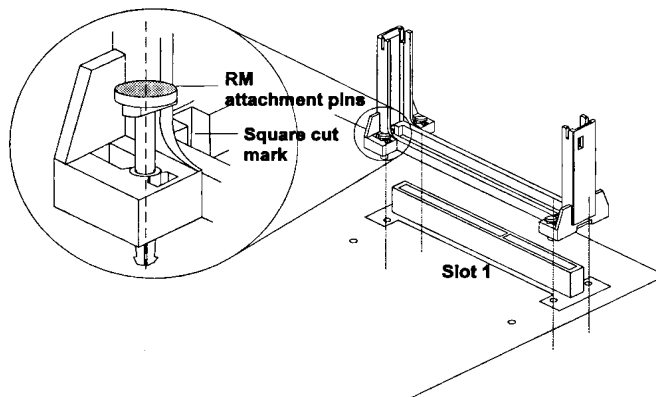


Figure 2-5: Mounting the RM onto Slot 1.



Four pins are required for each assembly.

# Components of the Pentium II Processor's Heat Sink Support



The Heat Sink Support (HSS) consists of the following parts:

❑ **HSS Base**

A plastic support bar mounted to the motherboard under the ATX heat sink.

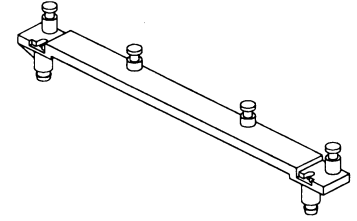


Figure 2-6: The HSS base.

❑ **HSS Pins**

Plastic pins inserted through the HSS base to secure it to the motherboard.

Two pins are required for each assembly.

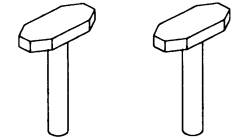


Figure 2-7: The HSS pins.

❑ **HSS Top Bar**

A plastic bar that clips onto the HSS base through the fins of the ATX heat sink.

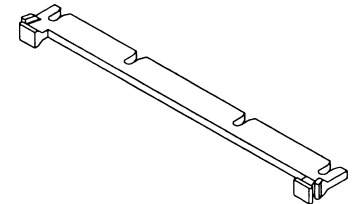


Figure 2-8: The HSS top bar.



## Step 2: To install the Heat Sink Support

Before you install the heat sink support, please verify if your Pentium II processor is the Intel boxed processor or the OEM type Pentium II processor with active heat sink (see Figure 2-9). If you have an Intel boxed processor, ignore this section. Intel boxed processor kits include their own heat sink support accessories and installation manuals. Refer to Intel's installation manual if you are using an Intel boxed processor.

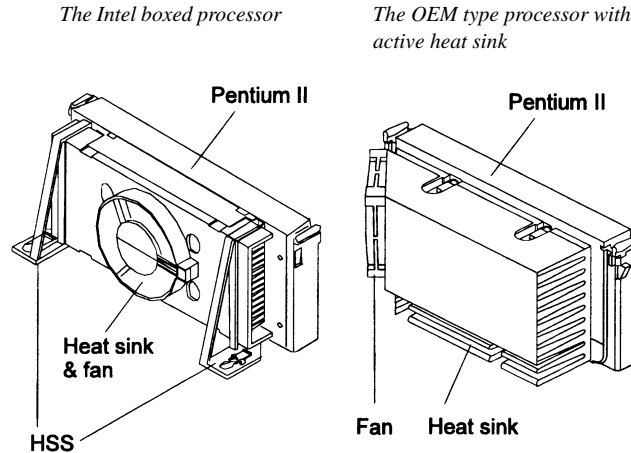


Figure 2-9: The two types of Pentium II processors.

1. Locate the Heat Sink Support (HSS) mounting holes on the motherboard. Note that one hole is larger than the other. See Figure 2-10. Then, line up the two plastic pegs on the bottom of the HSS base with the corresponding holes on the motherboard. Note that one peg is larger than the other.

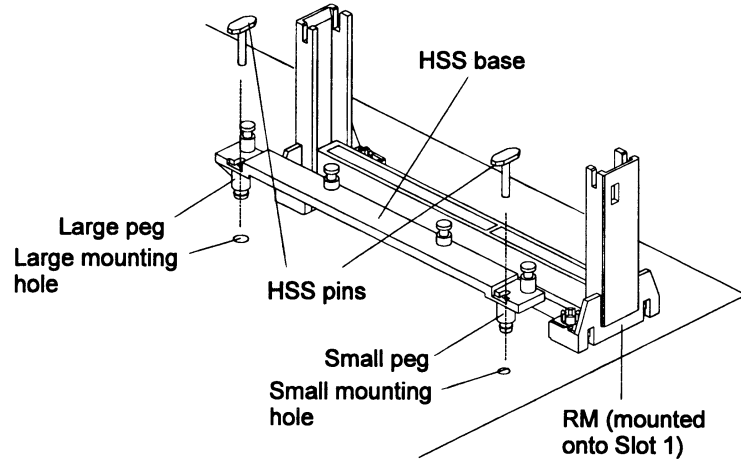


Figure 2-10: The large and small HSS mounting holes on the motherboard.

2. Push the pegs firmly into the holes to mount the HSS base onto the motherboard.
3. Insert the HSS pins through the HSS base to secure it to the motherboard (see Figure 2-10).
4. Proceed to Step 3: To mount the Pentium II Processor.

## Step 3: To mount the Pentium II Processor

1. Push the latches on the processor toward the center of the processor until they click into place (see Figure 2-11).

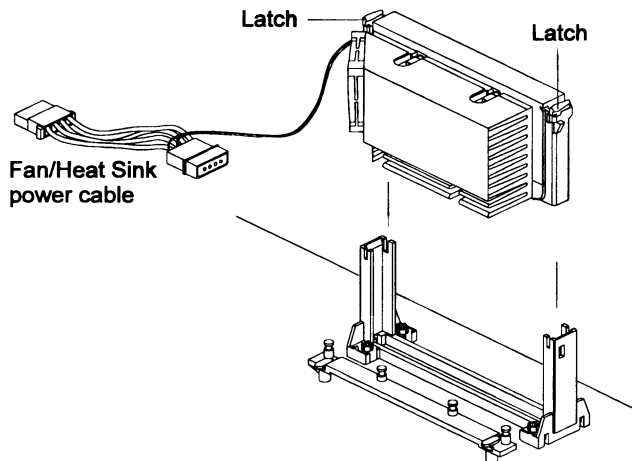


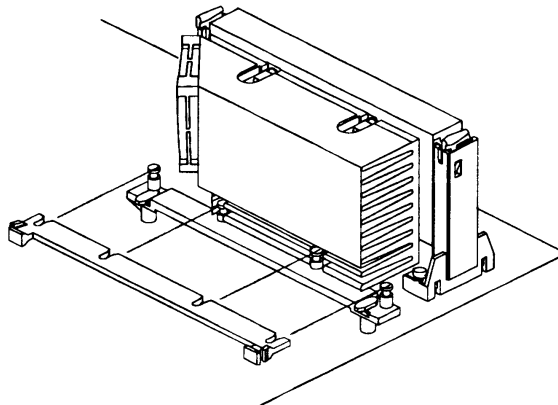
Figure 2-11: Mounting the Pentium II processor.

2. Hold the processor so that the fan shroud is facing toward the HSS base on the motherboard.
3. Slide the processor into the RM. Ensure that the alignment notch in the processor fits over the plug in Slot 1.
4. Push the processor down firmly, with even pressure on both sides of the top, until it is seated.
5. Push the latches on the processor outward until they click into place in the RM.



The latches must lock into place to ensure proper electrical connectivity of the processor.

6. Slide the HSS top on the supports forward to clip onto the HSS base through the fins of the heat sink.



*Figure 2-12: Sliding the HSS top bar onto the HSS base.*

7. Depending on the type of the Fan/Heat Sink power cable, attach the end of the power cable either to the three-pin connector on the motherboard or to the power cord of the ATX power supply.





# The Celeron™ Processor

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This chapter is organized into the following sections:

- About the Celeron Processor
- Installing the Hardware for the Celeron Processor

## About the Celeron Processor

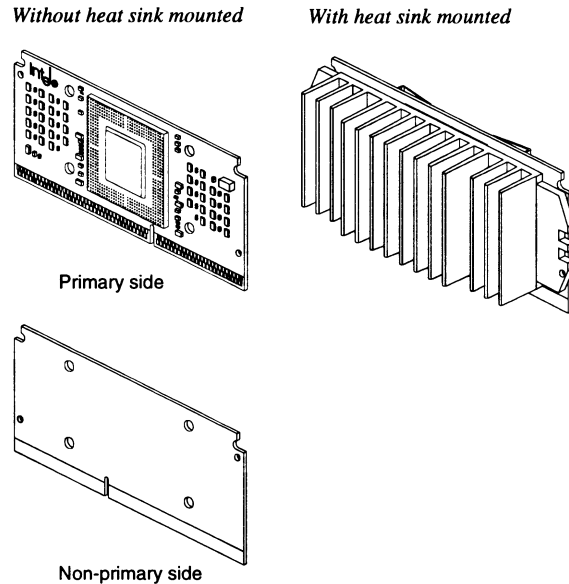
The Pentium® II processor and the Celeron processor are the latest additions to the P6 processor family. They combine the architectural advances in the Pentium Pro processor with the instruction set extensions of MMX technology. They are fully compatible with the huge base of Intel architecture-based PC software.

The Celeron processor has a separate 32 KB, on-chip, non-blocking Level 1 cache which runs at the same speed as the processor.

# Installing the Hardware for the Celeron Processor

The Celeron processor uses Single Edge Processor Package (SEPP) technology.

Figure 3-1 shows the Celeron processor with and without heat sink mounted.



*Figure 3-1: The Celeron processor.*

Before you proceed, do the following:

1. Switch off the computer.
2. Remove the motherboard from the chassis.
3. Place it on a workbench.
4. Remove all DIMM chips, cables, and cards from the motherboard so that it is bare.

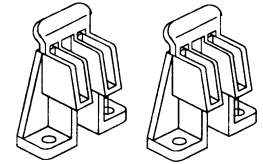
# Components of the Celeron Processor's Retention Mechanism

With Celeron processors, the Retention Mechanism (RM) is used to hold the base processor in the SEPP. The following instructions will show you how to mount the RM first before showing you how to install the processor. If you should need help with the mechanism, please contact your dealer.

The RM package consists of 2 sets of components. Each set consists of one RM, two post pins, and two lock pins.

## ❑ Retention Mechanism (RM)

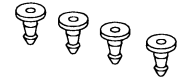
Two plastic guides that hold the SEPP in the Slot 1 connector.



Plastic guides

## ❑ Post pins

Four post pins are pushed into the RM's holes to secure the RM onto the motherboard.



Post pins

## ❑ Lock pins

Four lock pins are pushed into the post pins' holes to lock the RM to the motherboard.



Lock pins

Figure 3-2: The Retention Mechanism.

## Step 1: To assemble the Retention Mechanism

1. Locate the RM mounting holes of Slot 1 on the motherboard. (See Figure 3-3.)
2. Align the two plastic guides with the two ends of Slot 1. Make sure that the two guides face each other.
3. Insert four post pins through the RM to secure it to the motherboard.
4. Insert four lock pins through the post pins to lock the RM to the motherboard.

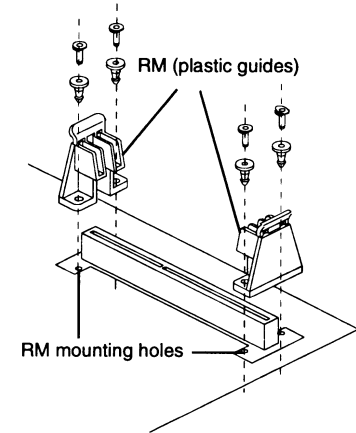
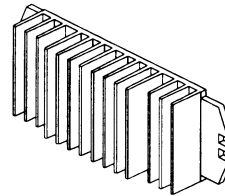


Figure 3-3: Assembling the RM.

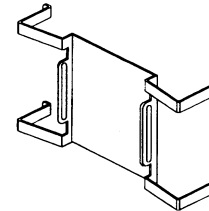
## Components of the Celeron Processor's Heat Sink

Figure 2-4 shows the components of the heat sink for the Celeron processor:

- Heat Sink (HS)
- HS retention clip



Heat Sink



HS retention clip

Figure 3-4: Components of the Heat Sink.

## Step 2: To mount the heat sink onto the Celeron processor



- The side of the clip which touches the substrate surface on the processor is covered with a mylar insulator. This insulator prevents the clip from shorting lines on the substrate.
- The blue film protects the thermal interface from damage during shipping.

1. Assemble all parts on a static-free bench with proper operator grounding and an ESD mat.
2. Carefully insert all four legs of the HS retention clip into the Celeron processor. The base of the HS retention clip must be located on the non-primary side of the processor (see Figure 3-5).

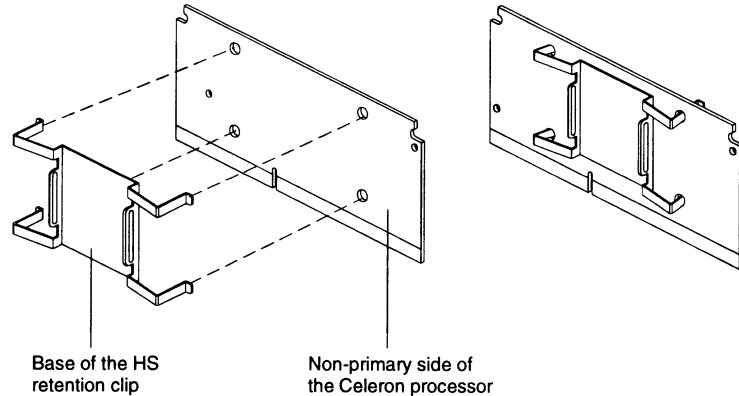


Figure 3-5: Inserting the heat sink retention clip into the non-primary side of the Celeron processor.

3. Remove the blue film covering the thermal interface.
4. Turn the processor around so that the primary side is now facing the heat sink.

5. Insert the two left legs of the HS retention clip fully into the heat sink (see Figure 3-6).

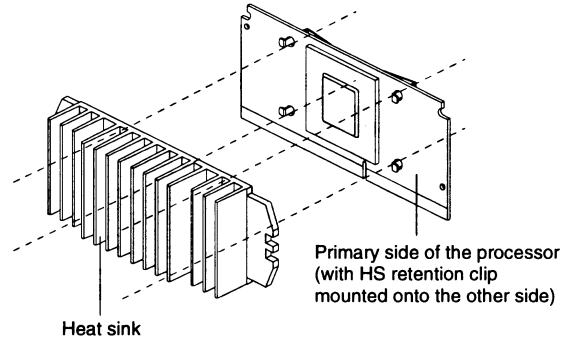


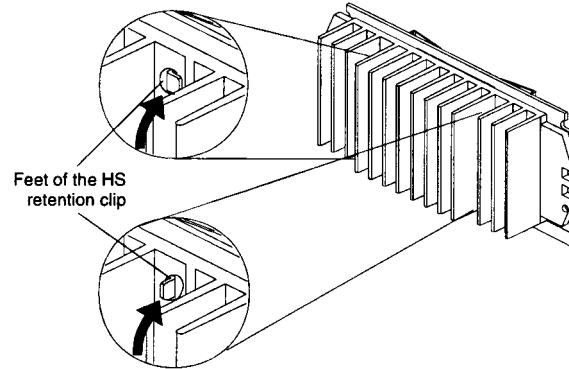
Figure 3-6: Inserting the left legs of the clip into the heat sink.



- Do not bend or apply pressure directly to the SEPP.
- Do not allow the bar stock or screwdriver to come into contact with the processor because the bar stock or screwdriver may scratch the processor's surface.

6. Hold the processor between the HS retention clip and the heat sink.
7. Use a non-metallic bar stock or screwdriver to push the remaining two clip legs into the heat sink.

8. Verify that all the feet of the clip are fully inserted and the clip is firmly attached to the heat sink (see Figure 2-21).



*Figure 3-7: Verifying that the clip is firmly attached to the heat sink.*

9. Proceed to Step 3: To mount the Celeron Processor.



## Step 3: To mount the Celeron Processor

1. Hold the processor so that the heat sink is facing toward the DIMM sockets on the motherboard.
2. Align the processor with the RM and slowly slide the processor into it (see Figure 3-8).

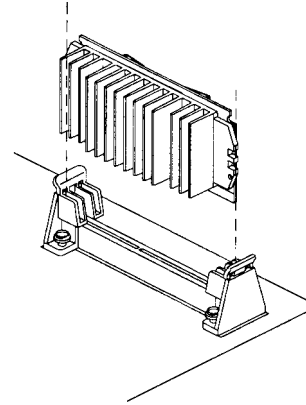


Figure 3-8: Inserting the Celeron processor into its RM.

3. Push the processor down firmly, with even pressure on both sides, until it is seated firmly in the RM (see Figure 3-9).

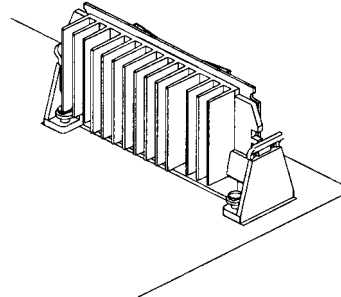


Figure 3-9: The Celeron processor in its RM.

# Connectors

This chapter is organized into the following sections:

- ❑ Front Panel Connectors
- ❑ Back Panel Connectors
- ❑ Other Connectors

## Front Panel Connectors

Figure 4-1 below shows the positions of the front panel connectors on your motherboard.

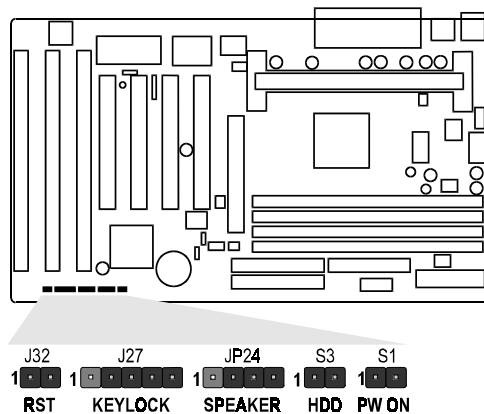


Figure 4-1: The front panel connectors.

### **Hardware Reset Connector (J32)**

A 2-pin hardware reset switch is attached to it. Closing the reset switch restarts the system.

### **KeyLock Connector (J27)**

The KeyLock & Power LED connector is a 5-pin connector for a physical lock that may be installed on the system casing for locking the keyboard. It is also connected to the casing's Power LED. Pins 1 to 3 are for the power LED, pins 4 and 5 are for keylock, and pin 2 is empty.

### **Speaker Connector (JP24)**

You may attach a 4-pin PC speaker cable to the PC speaker connector.

### **HD LED Connector (S3)**

A 2-pin IDE drive LED cable is attached to this connector. The LED lights up when an IDE device is active.

### **ATX Power On/Off Switch Connector (S1)**

A 2-pin momentary type switch is attached to this connector. The switch is used to turn your ATX power supply on and off.

# Back Panel Connectors



Figure 4-2 below shows the back panel connectors of your motherboard.

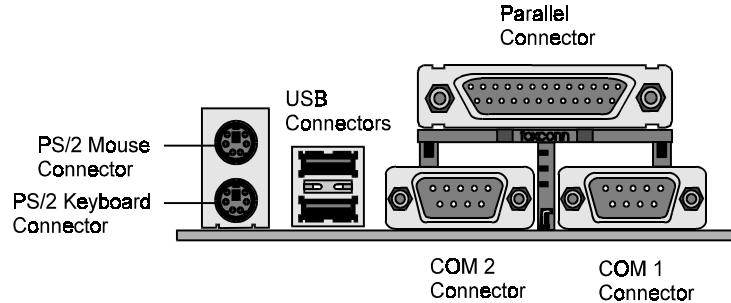


Figure 4-2: The back panel connectors.

## COM1 Connector

Attach the COM1 device cables to this connector.

## PS/2 Keyboard & PS/2 Mouse Connectors

Two 6-pin female PS/2 keyboard & Mouse Connectors are located at the rear of the motherboard. The PS/2 Mouse connector is on top of the PS/2 Keyboard connector. Plug the PS/2 keyboard and mouse into their respective connectors.

## Parallel Port Connector

A 25-pin female connector is located at the rear of the motherboard. Plug the parallel port device cable into this connector.

## USB1/USB2 Port Connectors

Two female USB connectors are located at the rear of the board. Plug USB devices into these connectors.



## Other Connectors

### ATX Power Supply Connector (J31)

It is a twenty-pin male connector. Plug the connector from the power supply directly into the board connector. Make sure that pin 1 is inserted into the correct position. The motherboard requires a power supply of at least 200 watts with good power transmission.

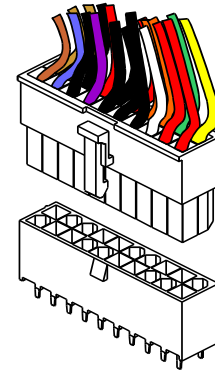


Figure 4-3: The ATX Power Supply connector.

## IR Connector

You can attach a 5-pin infrared device cable to the infrared device connector to use the infrared ASKIR and HPSIR specifications. Figure 4-4 shows JP4's pin assignment and location.

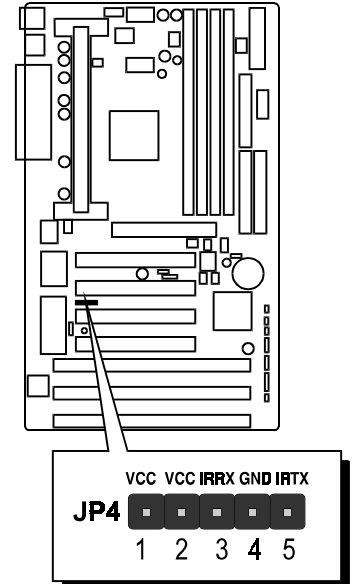


Figure 4-4: JP4's pin assignment and location.

### CPU, Chassis & AGP cooling FAN connectors (JP29, JP28, J43 and J47)

The motherboard provides three onboard 12 V cooling fan power connectors for the CPU (JP28 and JP29), Chassis (J43) and AGP device (J47) cooling fans. Depending on the fan's manufacturer, the wiring and plug type may be different. The red wire should be connected to +12V and the black wire should be connected to ground (GND).

### Wake-On-LAN connectors (J45)

You can attach a 3-pin connector from a LAN card which supports the Wake-On-LAN (WOL) feature to this connector. This feature allows users to wake the connected system through the LAN card.

### Enhanced IDE and Floppy Connectors

The motherboard is shipped with one 40-pin ribbon cable for IDE hard disk drives and one 34-pin ribbon cable for floppy disk drives. Make sure that the colored or dotted stripe of each cable is aligned to Pin 1 of its corresponding connector.

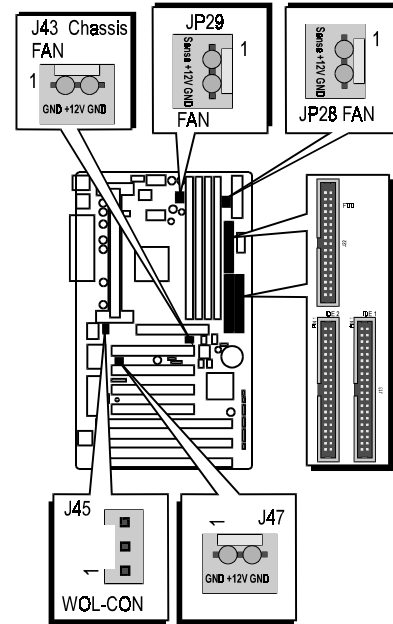


Figure 4-5: Locations of the FAN and Wake-On-LAN connectors.

# + Jumper Settings

This chapter is organized into the following sections:



- ❑ About Jumpers
- ❑ Changing Jumper Settings

## + About Jumpers

Several hardware settings are made through the use of jumper caps to connect jumper pins on the motherboard. Pin 1 of each jumper on the motherboard is either on the top or the left of the jumper when holding the motherboard with the keyboard connector away from yourself.

Table 5-1 below shows the jumper conventions used in this manual:

**Table 5-1: Jumper conventions.**

Jumper Setting	Representation Used
Closed (On)	
Open (Off)	





Instead of removing the jumper cap completely, you can place the cap over one pin so that the cap will not be misplaced.

## Changing Jumper Settings



Do not change the jumper settings unless you have a good understanding of how they work and know the effects of any changes you make. Incorrect jumper settings may cause your system to stop functioning.

### To close a jumper

- ▶ Place a jumper cap over the two jumper pins.

### To open a jumper

- ▶ Remove the jumper cap from the two jumper pins.

This section provides instructions on how to configure some important jumpers on your motherboard. These jumpers have already been set to the factory default. If you do not need to change the jumper settings, you can leave them as the factory default. Figure 5-1 is a diagram showing the relative positions of some of the jumpers on the M000 motherboard.

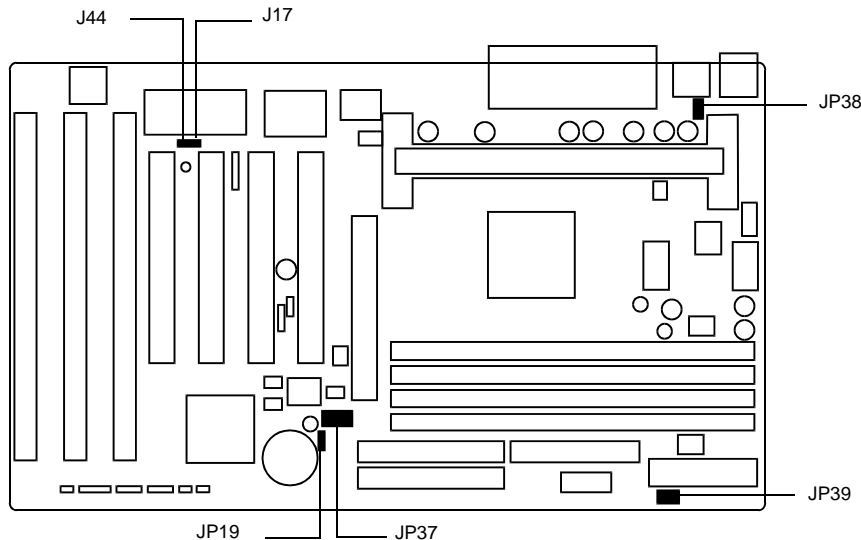


Figure 5-1: Relative positions of jumpers on the M000 motherboard.

## To configure the CPU Bus Clock Multiplier



The JP37 jumper is used to configure the CPU bus clock multiplier. As the motherboard features CPU Plug & Play function, you do not need to adjust the CPU clock speed and CPU multiplier. When the system is switched on for the first time, the BIOS will set the CPU clock speed to 233 MHz automatically. You only need to use the CMOS Setup utility to specify the CPU clock speed if it is higher than 233 MHz.

Table 5-2 shows the multiplier needed for various processor speeds with the system clock speed at 66 MHz.

**Table 5-2: Settings for System Clock and Multiplier.**

Pentium II Processor	System Clock	Multiplier
233 MHz	66 MHz	3.5
266 MHz	66 MHz	4
300 MHz	66 MHz	4.5
333 MHz	66 MHz	5

### To enable the CPU Plug & Play function

- ▶ Leave the jumper pack on the Auto group.

### To configure the Host Bus Clock/CPU Core Clock ratio (multiplier) manually

- ▶ Place the jumper pack on the Manual group, and then set the jumper according to the multiplier that you want (see Table 5-3 on page 5-4).





When the motherboard is oriented such that the keyboard connector is in the top left corner of the motherboard, JP37 appears as three columns of pins. In Auto, the jumper pack is placed over the two columns on the left, leaving only one column of pins exposed. To switch to Manual, place the jumper pack over the first column on the left, leaving the second and third columns exposed.

Table 5-3 shows all the multipliers that the motherboard supports.

**Table 5-3: Jumper Settings for Multiplier.**

Multiplier	JP37 Jumper	Multiplier	JP37 Jumper
Setting from BIOS		3.5x	
2x		4x	
2.5x		4.5x	
3x		5x	

## To configure the PCI Bus Clock



- The diagrams represents JP39 as it appears when the motherboard is oriented such that the keyboard connector is in the top left corner of the motherboard. Pin 1's position has also been clearly labelled in each diagram.
- 75 Mhz and 83 Mhz are for overclocking the CPU bus. Generally, overclocking the CPU bus is not recommended.

The motherboard's clock generator provides an adjustable system clock frequency. The JP39 jumper is used to indicate the system clock frequency which can range from 50 MHz to 83 MHz. The CPU Plug & Play function is supported by a 66 MHz system clock frequency.

Table 5-4 shows various speeds of the system bus clock that the motherboard supports.

**Table 5-4: Jumper Settings for PCI Bus Clock.**

System Clock	PCI Bus Clock	JP39 Jumper	System Clock	PCI Bus Clock	JP39 Jumper
50 MHz	25 MHz		75 MHz	37.5 MHz	
60 MHz	30 MHz		83 MHz	41.5 MHz	
66 MHz	33 MHz				



## To clear the CMOS

Under some unusual circumstances, the configuration record created by the CMOS Setup utility can become corrupted and unusable. This can cause the motherboard to stop functioning properly. In such cases, you need to clear the CMOS record by using jumper JP19.

### To clear the CMOS

1. Switch off the computer.
2. Remove the jumper cap from JP19 pins 1 and 2.
3. Place the jumper cap over JP19 pins 2 and 3 for two seconds.
4. Remove the jumper cap from pins 2 and 3.
5. Place the jumper cap back on pins 1 and 2.



**Table 5-5: Jumper Settings for CMOS.**

Clear CMOS	JP19 Jumper
Clear CMOS	 The diagram shows a three-pin header labeled '1' above it. A black jumper cap is placed over the second and third pins from the left.
Normal Operation	 The diagram shows a three-pin header labeled '1' above it. A black jumper cap is placed over the first and second pins from the left.

## To flash the EEPROM Vpp

The M000 motherboard supports two types of flash EEPROM: 5 V and 12 V. By setting up jumper J17, the motherboard can use either 5V or 12V to flash the EEPROM with new system BIOS files when necessary.

**Table 5-6: Jumper Settings for Flash EEPROM.**

Flash EEPROM Vpp	J17 Jumper
12V Flash (Intel, MXIC)	 A 3-pin jumper with a black cap on the top pin and a hole on the bottom pin.
5V Flash (SST, Atmel)	 A 3-pin jumper with a hole on the top pin and a black cap on the bottom pin.

## To enable or disable the Keyboard & PS/2 Mouse Power-On function



Power-on by serial mouse is not supported.

The M000 motherboard has a power-on by keyboard and PS/2 mouse feature. You can switch on the system with any keystroke (or with an assigned hot-key) or by double-clicking the PS/2 mouse.

J44 and JP38 are jumpers used to enable or disable the keyboard and PS/2 mouse power-on function. When you enable the keyboard & PS/2 Mouse power-on function, you also have to make the appropriate adjustments to the POWER ON Function item in the Integrated Peripherals screen of the CMOS Setup utility. For details, see Table 6-10, “The Integrated Peripherals Screen items.,” on page 6-26.

**Table 5-7: Jumper Settings for Keyboard and PS/2 Mouse.**

Keyboard Power-on	PS/2 Mouse Power-on	J44, JP38 Jumpers
Disabled	Disabled	
Enabled	Enabled	
Disabled	Enabled	
Enabled	Disabled	

# Memory Configuration and BIOS Settings

This chapter is organized into the following sections:

- ❑ Memory Configuration
- ❑ BIOS Settings

## Memory Configuration

The motherboard provides four 168-pin DIMM sockets that make it possible to install from 8 MB up to 512 MB of SDRAM and EDO DRAM. The DIMM sockets support 8 MB, 16 MB, 32 MB, 64 MB, and 128 MB 3.3V single- or double-sided SDRAM and EDO DRAM modules.

The four DIMM sockets are arranged in four banks of one socket each. Each bank provides a 64/72-bit wide data path.

The M000 provides optional data integrity features, including EC (Error Checking) and ECC (Error Checking and Correcting) in the memory array. The EC mode provides single- and multiple-bit error detection. The ECC mode provides error checking and correction of the data during reads from the DRAM. To support ECC, you must use true 72-bit parity-type (as opposed to phantom parity generated by TTL chips) DIMM for all modules.



**Table 6-1: Install memory in any or all of the banks in any combination as follows**

<b>DIMM Socket</b>	<b>Memory Modules</b>	<b>Module Quantity</b>
DIMM 0	8 MB, 16 MB, 32 MB, 64 MB, 128 MB 168-pin 3.3V SDRAM or EDO DRAM	x1
DIMM 1	8 MB, 16 MB, 32 MB, 64 MB, 128 MB 168-pin 3.3V SDRAM or EDO DRAM	x1
DIMM 2	8 MB, 16 MB, 32 MB, 64 MB, 128 MB 168-pin 3.3V SDRAM or EDO DRAM	x1
DIMM 3	8 MB, 16 MB, 32 MB, 64 MB, 128 MB 168-pin 3.3V SDRAM or EDO DRAM	x1

## BIOS Settings

The CMOS Setup Utility is a program that allows you to modify basic system configuration that is stored on the motherboard's BIOS chip. For the motherboard to function properly, this information must be intact and accurate. Normally, you will not need to use this utility once your system is set up.

## To change BIOS settings in CMOS



Do not change the BIOS settings unless you have a good understanding of how they work and know the effects of any changes you make. Incorrect BIOS settings may cause your system to stop functioning.



1. Switch on your computer.
2. During the memory check, press the <Delete> key.  
The CMOS Setup Utility menu similar to Figure 6-1 on page 6-3 appears.  
If you did not respond in time, restart your system by pressing the Reset button on your computer.
3. To select a menu option, use the arrow keys to browse to the desired option and then press <Enter>.
4. After you have changed the BIOS settings, press <F10> to save the settings and exit the CMOS Setup Utility. Your system continues to start up.

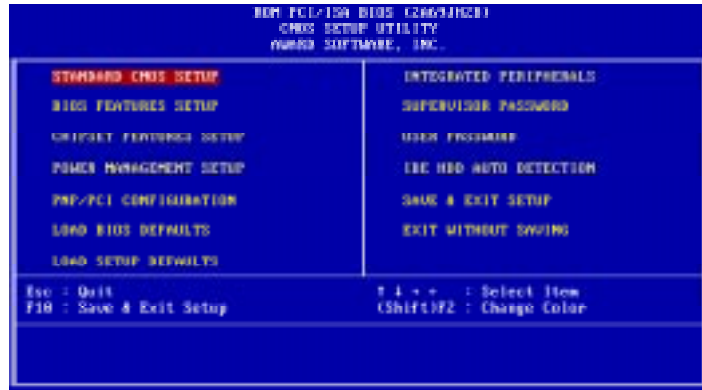


Figure 6-1: The CMOS Setup Utility menu.

## The CMOS Setup Utility Menu

Selecting an option in the CMOS Setup Utility menu will display the corresponding screen or perform a function (for example, Load BIOS Defaults). Table 6-2 lists the descriptions of the menu options.

**Table 6-2: The CMOS Setup Utility menu options.**

<b>This Option</b>	<b>Allows You To Do This</b>
Standard CMOS Setup	Set the date, time, disk drive, video display and error handling.
BIOS Features Setup	Set the system customization features and video display settings.
Chipset Features Setup	Specify chipset settings, memory configuration feature for special add-on cards and VGA memory configuration.
Power Management Setup	Set up the power management features.
PnP/PCI Configuration	Specify the system resource settings and other settings for the PCI slots.
Load BIOS Defaults	Set the system to load the optimized settings from the BIOS ROM.
Load Setup Defaults	Set the system to load the minimum settings from the BIOS ROM.
Integrated Peripherals	Specify the settings for IDE channels and onboard ports.
Supervisor Password	Change, set, or disable supervisor password. This allows you to limit access to the system and setup, or to limit access to the setup only.
User Password	Change, set, or disable user password. This allows you to limit access to the system and setup, or to limit access to the setup only.
IDE HDD Auto Detection	Automatically detect and configure IDE hard disk drives (HDD) in your system.

**Table 6-2: The CMOS Setup Utility menu options.**

This Option	Allows You To Do This
Save & Exit Setup	Exit setup and save any changes you have made.
Exit Without Saving	Exit setup without saving any changes.

**Table 6-3: The CMOS Setup Utility menu commands.**

This Command	Allows You To Do This
Quit	Close the Setup utility when you press the <Esc> key.
Save & Exit Setup	Save the current settings and close the Setup utility when you press the <F10> key.
Select Item	Use the arrow keys on your keyboard to move around the screen and select a menu item. The selected item will be highlighted.
Change Color	Change the Setup utility's color scheme by pressing <Shift+F2>.

This menu also provides four commands, Quit, Save & Exit Setup, Select Item, and Change Color. Their descriptions are listed in Table 6-3 on the right.



PU: the <Page Up> key, PD: the <Page Down> key,  
+: the plus <+> key, -: the minus <-> key.

The following sections provide detailed information on the setup screens and options in the CMOS Setup utility.

## Standard CMOS Setup

Display this screen if you want to set the date and time of the system clock. This screen also allows you to configure your hard disks, floppy disks, video display and error handling procedure.

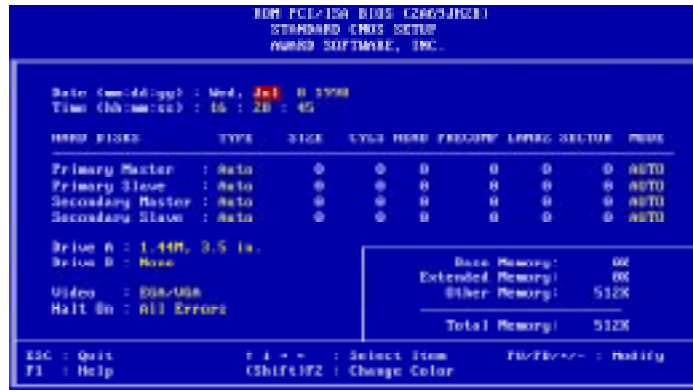


Figure 6-2: The Standard CMOS Setup screen.

Table 6-4: The Standard CMOS Setup Screen items.

Item	Description
Date	The date format of the system clock is <day>, <month> <date> <year>. To display the calendar, press <F3>.
Time	The time format of the system clock, a 24-hour clock, is <hour>:<minute>:<second>. For example, 5:00 P.M. should be entered as 17:00:00.

**Table 6-4: The Standard CMOS Setup Screen items.**

Item	Description
Hard Disks Type and Parameters	<p>Identifies the types of hard disk drives that have been installed in your system. There are 46 predefined types and a user-defined type. <b>Warning:</b> The information entered in this Hard Disk table must match the actual specifications of your hard disk. Otherwise, your hard disk will not work properly.</p> <p>For IDE hard disk drives, set the entries to <i>Auto</i> under TYPE and the system will configure the hard disk drives automatically when it is switched on. You can also use the IDE HDD Auto Detection option in the Setup utility menu to do this.</p> <p>If your hard disk type is listed among the 46 predefined types, select the corresponding type for your hard disk. Otherwise, select <i>User</i> under the TYPE column to define the hard disk type manually. Enter the details of the hard disk in the various columns, for example, SIZE and CYLS, directly from the keyboard and press &lt;Enter&gt;. If you are not sure of these details, refer to your hard disk drive's documentation.</p> <p>If no hard disk drive has not been installed or if your hard disk drive is a SCSI one, select <i>None</i> under TYPE and press &lt;Enter&gt;.</p>

**Table 6-4: The Standard CMOS Setup Screen items.**

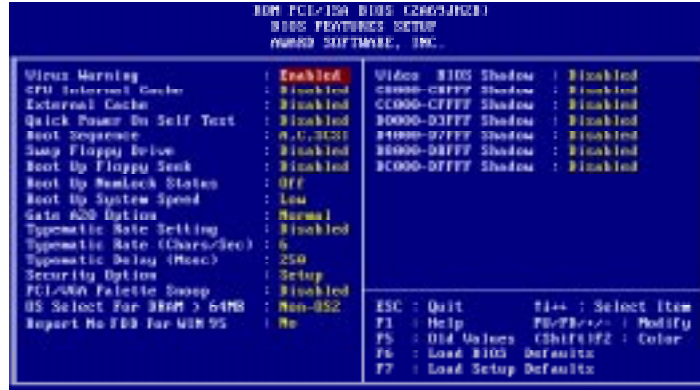
Item	Description
Large Hard Disk Modes	<p>The last drive parameter, MODE, has four available settings: <i>Normal</i>, <i>LBA</i>, <i>Large</i>, and <i>Auto</i>. These settings are for IDE hard disks only.</p> <p><i>Normal</i>: For IDE hard disks of 528 MB or less.</p> <p><i>LBA</i>: Logical Block Addressing, the current standard access mode for large IDE hard disk drives. It allows the use of hard disks larger than 528 MB by causing the IDE controller to translate between the logical address it creates and the hard disk's actual physical address. The maximum drive size supported is 8.4 GB.</p> <p><i>Large</i>: For 1 GB or smaller drives with more than 1024 cylinders and no LBA support. This access mode causes the operating system to treat the drive as if it has fewer than 1024 cylinders by dividing the cylinder total in half and doubling the number of heads.</p>
Drive A, Drive B	Specifies the types of floppy disk drive A or drive B that has been installed in the system.
Video	Selects the type(s) of adapter used for the primary system monitor. This setting must match those of your video display card and monitor. Although secondary monitors are supported, you do not have to configure them in CMOS setup.
Error halt	Specifies when the system stops if an error occurs during system startup.

**Table 6-4: The Standard CMOS Setup Screen items.**

Item	Description
Memory	<p>This item is for display only. The value is automatically determined by POST (Power On Self Test) of the BIOS.</p> <p>Base Memory refers to the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512 K for systems with 512 K memory installed on the motherboard, or 640 K for systems with 640 K or more memory installed on the motherboard.</p> <p>Extended Memory refers to the amount of memory located above 1 MB in the CPU's memory address map.</p>

## BIOS Features Setup

Display this screen if you want to configure system features such as virus warning, boot sequence, and security option.



*Figure 6-3: The BIOS Features Setup screen.*



**Table 6-5: The BIOS Features Setup Screen items.**

Option	Description
Virus Warning	<p>When this is enabled, the BIOS will monitor the boot sector and partition table of the primary hard disk drive and warn of any attempt to write to it. If an attempt is detected, the BIOS will halt the system and the following warning message will appear:</p> <div data-bbox="790 316 1297 412" style="border: 1px solid black; padding: 5px; text-align: center;"> <p>!WARNING!            Disk boot sector is to be modified            Type "Y" to accept write or "N" to abort write            Award Software, Inc.</p> </div> <p>In this situation, restart your system from a virus-free bootable floppy disk and then use an anti-virus utility located on the floppy disk to check the hard disk.            The default setting is <i>Disabled</i>.</p>
CPU Internal Cache	Enables CPU internal cache to speed up memory access.
External Cache	Enables CPU secondary cache to speed up memory access.
Quick Power On Self Test	If this is enabled, BIOS will shorten or skip some check items during Power On Self Test (POST) to speed up the process.
Boot Sequence	Determines which drive the computer searches first for the disk operating system. Default setting is: A, C, SCSI. BIOS also supports system bootup from CD-ROM drive or SCSI hard disk drive.
Swap Floppy Drive	When this is enabled, the BIOS will swap floppy drive assignments so that Drive A: will function as Drive B: and Drive B: as Drive A:.

**Table 6-5: The BIOS Features Setup Screen items.**

Option	Description
Boot Up NumLock Status	When this is enabled, BIOS turns on Num Lock when the system is switched on.
Gate A20 Option	Allows you to specify how the gate A20 is handled. The gate A20 is a device used to address memory above 1 MB. Initially, the gate A20 was handled via a pin on the keyboard. Today, while keyboards still provide this support, it is more common and much faster for the motherboard's chipset to provide support for gate A20. For the chipset to do this, set this item to <i>Fast</i> .
Typematic Rate Setting	Determines if the typematic rate is to be used. When this is disabled, holding down a key on your keyboard will generate only one instance of the corresponding character or movement (for arrow keys). When this is enabled, holding down a key will generate the character or movement repeatedly. For example, you would use such a feature to accelerate cursor movements with the arrow keys.
Typematic Rate (Chars/Sec)	When the Typematic Rate Setting (see description on previous page) is enabled, this item allows you to specify the speed at which the character or movement is to be repeated when you hold down a key.
Typematic Delay (Msec)	When the Typematic Rate Setting (see description on previous page) is enabled, this item allows you to specify the amount of time that elapses before repetition of the character or movement takes place when you hold down a key.

**Table 6-5: The BIOS Features Setup Screen items.**

Option	Description
Security Option	<p>Allows you to limit access to the System and Setup, or just to Setup. If you select <i>System</i>, the System will not boot up and access to Setup will be denied unless the correct password is entered at the prompt. If you select <i>Setup</i>, the System will boot up. However, access to Setup will be denied unless the correct password is entered at the prompt.</p> <p>Note: The password is created in the Supervisor Password and/or User Password screen(s) in the CMOS Setup menu. If no password is set, the system will ignore this Security Option.</p>
PCI/VGA Palette Snoop	<p>Must be enabled if there is a MPEG ISA card installed in the system, and disabled if there is no MPEG ISA card installed in the system.</p>
OS Select For DRAM > 64 MB	<p>If you are using the OS/2 operating system, and your system has more than 64 MB of DRAM installed, selecting <i>OS/2</i> for this item allows you to access the memory that is over 64 MB in OS/2.</p>
Video BIOS Shadow	<p>Determines whether video display card BIOS will be copied into the system DRAM to increase display speed and improve system performance. The default setting is <i>Enabled</i>.</p>
C8000-CBFFF Shadow/ DC000-DFFFF Shadow	<p>C8000-CBFFF Shadow to DC000-DFFFF Shadow are address ranges for shadowing other expansion card ROMs.</p> <p>This item allows you to specify whether other expansion card ROMs will be copied into the system DRAM. If there are any expansion cards with ROMs installed in your system and you want the system to shadow them specifically, you need to know the address range they use.</p> <p>The default setting for all these address ranges is <i>Disabled</i>.</p>

## Chipset Features Setup

✦ The options on this screen are either set to the optimized values or set automatically when auto configuration is active.

Unless you have a good understanding of the effects of changing chipset feature settings, avoid making any manual settings to the chipset features.



Figure 6-4: The Chipset Features Setup screen.

Table 6-6: The Chipset Features Setup Screen items.

Item	Description
Auto Configuration	If this is enabled, the system will set the optimal timings for items 3 through 7 below.
DRAM Speed Selection	Sets the EDO DRAM Read/Write timings that the system uses. When Auto Configuration is disabled, this item will not be displayed.
MA Additional Wait State	If this is enabled, one additional wait state is inserted before the CAS/RAS assertion during DRAM read or write leadoff cycles.

**Table 6-6: The Chipset Features Setup Screen items.**

Item	Description
EDO RAS# to CAS# Delay	When EDO DRAM is refreshed, both rows and columns are addressed separately. This item allows you to determine the timing of the transition from Row Address Strobe (RAS) to Column Address Strobe (CAS). The setting can be 3 or 2.
EDO RAS# Precharge Time	Sets the DRAM RAS Precharge Timing. DRAM must continually be refreshed or it will lose its data. Normally, DRAM is refreshed entirely as the result of a single request. This item allows you to specify the number of CPU clocks allocated for Row Address Strobe to accumulate its charge before the DRAM is refreshed. If amount of time specified is insufficient, DRAM refresh may be incomplete and data may be lost. The setting can be 4 CLKs or 3 CLKs.
EDO DRAM Read Burst	Sets the EDO DRAM Read Burst Timing. The timing used depends on the type of DRAM chip (EDO Burst mode or Standard Fast Page mode) inserted into each DIMM (Dual Inline Memory Module) socket. The setting can be x222 or x333.
EDO DRAM Write Burst	Sets the EDO DRAM Write Burst timing for accessing DRAM. The setting can be x222 or x333.
DRAM Data Integrity Mode	Allows the user to set DRAM Data Integrity mode to ECC (Error Checking and Correcting) or Non-ECC. The ECC setting allows detection of single-bit and multiple-bit errors, and recovery of single-bit errors. The Non-ECC setting enables byte-wide write capability but has no provision for protecting data integrity in the DRAM array.

**Table 6-6: The Chipset Features Setup Screen items.**

Item	Description
CPU-to-PCI IDE Posting	If this is disabled, the CPU-to-PCI IDE posting cycles will be treated as normal I/O write transactions. If this is enabled, the system will have the I/O write cycles posted.
System BIOS Cacheable	Allows the user to specify the system BIOS F000-FFFF areas as cacheable or non-cacheable.
Video BIOS Cacheable	Allows the user to specify the video BIOS C000-C7FF areas as cacheable or non-cacheable.
Video RAM Cacheable	This is a new cache technology for the CPU's video memory. By caching the display data, the display speed can be greatly improved. However, if your display card cannot support this feature, you must disable this item. Otherwise, your system may not boot up.
8 Bit I/O Recovery Time	This is the length of time, measured in CPU clocks, which the system will delay after the completion of an 8 bit input/output (I/O) request. This delay is necessary for the CPU to recover from completing the I/O request. This item allows you to specify the amount of recovery time allowed for 8 bit I/O. The setting can be <i>NA</i> , or <i>1 to 8 CPU clocks</i> .
16-Bit I/O Recovery Time	Allows you to specify the amount of recovery time allowed for 16 bit I/O requests. The setting can be <i>NA</i> , or <i>1 to 4 CPU clocks</i> .
Memory Hole at 15M-16M	Some special add-on cards require a 1 MB address space between 15 MB and 16 MB. Verify with the documentation that comes with the card(s) to see if you need this address space.

**Table 6-6: The Chipset Features Setup Screen items.**

Item	Description
Passive Release	If this is enabled, the chipset will provide a programmable passive release mechanism to meet the required ISA master latencies.
Delayed Transaction	Since PCI specification version 2.1 requires much tighter controls on target and master latency, PCI cycles to or from ISA typically take longer. If this item is enabled, the chipset will provide a programmable delayed completion mechanism to meet the required target latencies.
AGP Aperture Size (MB)	Specifies the maximum amount, in MB, of system memory an AGP display card can use to store 3D texture mapping data. The larger the aperture, the better the performance of the card's 3D function. The settings range from <i>4 MB to 256 MB</i> .
SDRAM RAS-to-CAS Delay	When SDRAM is refreshed, both rows and columns are addressed separately. This item allows you to specify the timing of the transition from Row Address Strobe (RAS) to Column Address Strobe (CAS). The setting can be <i>Slow</i> for 3 CLKs or <i>Fast</i> for 2 CLKs.
SDRAM RAS Precharge Time	SDRAM must continually be refreshed or it will lose its data. Normally, DRAM is refreshed entirely as the result of a single request. This item allows you to specify the number of CPU clocks allocated for Row Address Strobe to accumulate its charge before the DRAM is refreshed. If the amount of time specified is insufficient, DRAM refresh may be incomplete and data may be lost. The setting can be <i>Slow</i> for 3 CLKs or <i>Fast</i> for 2 CLKs.
SDRAM CAS Latency Time	Defines the CAS Latency timing parameter of the SDRAM, expressed in 66 MHz clocks. The setting can be 2 CLKs or 3 CLKs.

**Table 6-6: The Chipset Features Setup Screen items.**

Item	Description
Auto Detect DIMM/PCI Clock	When this item is enabled, the system automatically detects and closes clock signals to empty DIMM/PCI slots to reduce EMI.
Spread Spectrum Modulated	When this item is enabled, EMI is reduced.
CPU Speed (w/ HCLK - 66 MHz): 233 MHz	When the JP37 jumper is set to the Auto mode, you can set the CPU clock speed using this item. For details on how to set the JP37 jumper, see “To configure the CPU Bus Clock Multiplier” on page 5-3.

Table 6-7 below shows the recommended BIOS settings for the items in the Chipset Features Setup screen..

**Table 6-7: Recommended Settings for the Chipset Features Setup Screen items.**

Item	Recommended BIOS Setting		
	For 66 MHz	For 75/83 MHz	For Safe Setting
Auto Configuration	<i>Disabled</i>	<i>Disabled</i>	<i>Disabled</i>
DRAM Speed Selection	—	—	—
MA Additional Wait State	<i>Fast</i>	<i>Fast</i>	<i>Slow</i>
EDO RAS# to CAS# Delay	2	2	3
EDO RAS# Precharge Time	3	3	4
EDO DRAM Read Burst	<i>x222</i>	<i>x333</i>	<i>x333</i>



“—” indicates no recommended BIOS setting for that item. 75 MHz and 83 MHz are used when you want to overclock the CPU bus. However, overclocking the CPU bus is not a recommended general practice.



**Table 6-7: Recommended Settings for the Chipset Features Setup Screen items.**

Item	Recommended BIOS Setting		
	For 66 MHz	For 75/83 MHz	For Safe Setting
EDO DRAM Write Burst	<i>x222</i>	<i>x333</i>	<i>x333</i>
DRAM Data Integrity Mode	<i>Non-ECC</i>	<i>Non-ECC</i>	<i>Non-ECC</i>
CPU-to-PCI IDE Posting	<i>Enabled</i>	<i>Enabled</i>	<i>Enabled</i>
System BIOS Cacheable	<i>Enabled</i>	<i>Enabled</i>	<i>Disabled</i>
Video BIOS Cacheable	<i>Enabled</i>	<i>Enabled</i>	<i>Disabled</i>
Video RAM Cacheable	<i>Enabled</i>	<i>Enabled</i>	<i>Disabled</i>
8 Bit I/O Recovery Time	<i>1</i>	<i>1</i>	<i>2</i>
16-Bit I/O Recovery Time	<i>1</i>	<i>1</i>	<i>2</i>
Memory Hole at 15M-16M	<i>Disabled</i>	<i>Disabled</i>	<i>Disabled</i>
Passive Release	<i>Enabled</i>	<i>Enabled</i>	<i>Disabled</i>
Delayed Transaction	<i>Enabled</i>	<i>Enabled</i>	<i>Disabled</i>
AGP Aperture Size (MB)	<i>64</i>	<i>64</i>	<i>8</i>
SDRAM RAS-to-CAS Delay	<i>Fast</i>	<i>Fast</i>	<i>Slow</i>
SDRAM RAS Precharge Time	<i>Fast</i>	<i>Fast</i>	<i>Slow</i>
SDRAM CAS Latency Time	<i>2</i>	<i>2</i>	<i>3</i>

**Table 6-7: Recommended Settings for the Chipset Features Setup Screen items.**

Item	Recommended BIOS Setting		
	For 66 MHz	For 75/83 MHz	For Safe Setting
Auto Detect DIMM/PCI Clock	—	—	—
Spread Spectrum Modulated	<i>Enabled</i>	<i>Enabled</i>	<i>Enabled</i>
CPU Speed (w/ HCLK - 66 MHz): 233 MHz	—	—	—

## Power Management Setup

Display this screen if you want to set up the power management features.



*Figure 6-5: The Power Management Setup screen.*

**Table 6-8: The Power Management Setup Screen items.**

Item	Description
Power Management	<p>This item defines the current power management function. <i>Max Saving</i> puts the system into power saving mode after a brief period of system idle time. <i>Min Saving</i> is similar to <i>Max Saving</i> except the period of the system idle time is longer. <i>Disabled</i> disables the power saving feature. <i>User Defined</i> allows you to set power saving options according to your preference.</p>
PM Control by APM	<p>If this item is set to <i>Yes</i>, the Advanced Power Management (APM) feature in Microsoft Windows will control power management operation.</p> <p>The available Power Management (PM) modes include <i>Doze</i>, <i>Standby</i> or <i>Suspend</i>.</p>
Video Off After	<p>This item defines when to activate the Video Off feature for monitor power management. The available settings are <i>N/A</i>, <i>Doze</i>, <i>Standby</i> and <i>Suspend</i>.</p> <p><i>Suspend</i>: the video display gets turned off after system enters Suspend mode.</p> <p><i>Standby</i>: the video display gets turned off after system enters Standby mode.</p> <p><i>Doze</i>: the video display gets turned off after system enters Doze mode.</p> <p><i>N/A</i>: there will be no display shut off.</p>
MODEM Use IRQ	<p>This item defines the IRQ line that the modem can use.</p> <p>The available settings are 1, 3, 4, 5, 7, 9, 10, 11, N/A.</p>

**Table 6-8: The Power Management Setup Screen items.**

Item	Description
Doze Mode	When this item is enabled, the CPU clock will run at a slower speed after the preset period of system idle time, while all other devices operate at full speed.
Standby Mode	When this item is enabled, the video display will shut off after the preset period of system idle time.
Suspend Mode	When this item is enabled, all devices, except the CPU, will shut off after the preset period of system idle time.
HDD Power Down	This item defines the continuous HDD (Hard Disk Drive) idle time before the HDD enters power saving mode (motor off). The available settings are between 1 min to 15 min or <i>Disabled</i> .
Throttle Duty Cycle	This item defines the duty cycle for the clock control thermal throttling mode. The duty cycle indicates the percentage of time while in the thermal throttle mode. The available settings are between 12.5% and 87.5%.
ZZ Active in Suspend	When this item is enabled, the ZZ signal will be active during Suspend mode.
VGA Active Monitor	If this item is enabled, the VGA activity event will be monitored to reload the global timer.

**Table 6-8: The Power Management Setup Screen items.**

Item	Description
Soft-Off by PWR-BTTN (This feature is available for ATX power only.)	When this item is set to <i>Instant-Off</i> , the ATX switch functions as a normal system power-off button when pressed for less than 4 seconds. The setting of Delay 4 Sec allows the button to have a dual function, whereby pressing the button for less than 4 seconds will place the system in Suspend mode, and pressing the button for more than 4 seconds will shut the system off.
Resume by Ring	When this item is enabled, the system will resume through the activation of the modem ring.
Resume by Alarm	When this item is enabled, you can set the system to resume at a certain date and time.
IRQ 8 Break Suspend	You can enable or disable the monitoring of IRQ8 (the Real Time Clock) so that it does not wake the system from Suspend mode.  ** Reload Global Timer Events ** If any of these items is enabled, that particular system activity event will be monitored to reload the global timer. These items include IRQ[3-7, 9-15], NMI, Primary IDE0/1, Secondary IDE 0/1, Floppy Disk, Serial Port and Parallel Port.

## PnP/PCI Configuration Setup

Display this screen if you want to specify the system resource settings and other settings for the PCI slots.

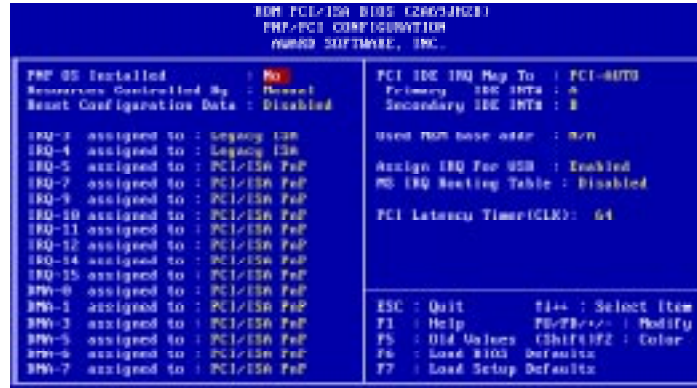


Figure 6-6: The PnP/PCI Configuration screen.

Table 6-9: The PnP/PCI Configuration Screen items.

Item	Description
PnP OS Installed	When this item is set to Yes, it will allow the PnP OS (Windows 95) to control the system resources except PCI and PnP boot devices. Default setting is <i>No</i> .
Resources Controlled By	The Award Plug and Play BIOS has the capability to automatically configure all boot and PnP compatible devices. However, this capability is not available unless you are using a PnP operating system such as Windows 95.
Reset Configuration Data	This item defines whether to reset the configuration data.

**Table 6-9: The PnP/PCI Configuration Screen items.**

Item	Description
IRQ 3/4/5/7/9/10/ 11/12/14/15, assigned to	These items define the IRQ lines assigned to the ISA buses. It is not available for PCI slots. The available settings are Legacy ISA and PCI/ISA PnP.
DMA 0/1/3/5/6/7 assigned to	These items define the DMA assigned to the ISA buses. It is not available for PCI slots. The available settings are Legacy ISA and PCI/ISA PnP.
PCI IDE IRQ Map to	This item defines the type of IDE disk controller in use in your system. By default, Setup assumes that your controller is an ISA device rather than a PCI controller. If you have equipped your system with a PCI controller, changing this setting allows you to specify which slot has the controller and which PCI interrupt (A, B, C or D) is associated with the connected hard drives. Remember that this setting refers to the hard disk drive itself, rather than individual partitions. Since each IDE controller supports two separate hard disk drives, you can select the INT# for each. Note that the Primary has a lower interrupt than the Secondary as described in “Slot x Using INT#” above. Selecting the PCI Auto setting allows the system to automatically determine the configuration of your IDE disk system.
Used MEM base addr	This item is used to select a base address for the memory area used by any peripheral that requires high memory. The available settings are C800, CC00, D000, D400, D800, DC00 and N/A.

**Table 6-9: The PnP/PCI Configuration Screen items.**

Item	Description
Used MEM Length	<p>This item is used to select a length for the memory area specified in the previous item.</p> <p>This item does not appear if no base address is specified.</p> <p>The available settings are 8K, 16K, 32K and 64K.</p>
Assign IRQ for USB	<p>Specifies whether to assign an IRQ line to the on-board USB controller.</p> <p>Since the on-board controller is always enabled , if no IRQ line is assigned to it, an error will be reflected on the system device under windows 95 Device Manager.</p>
MS IRQ Routing Table	<p>Specifies whether the BIOS IRQ Routing Table is enabled or disabled.</p>
PCI Latency Timer	<p>The PCI Latency Timer is used to ensure that the PCI agents are given a minimum amount of the system resource.</p> <p>The number of clocks programmed in the PCI Latency Timer represents the guaranteed time slice allocated to the 440LX, after which it must complete the current data transfer phase and surrender the bus as soon as its bus grant is removed.</p> <p>The default setting is 64 PCI <i>clocks</i>.</p>



## Integrated Peripherals

Display this screen if you want to configure the IDE and floppy controllers, and other onboard ports. You can also configure the USB (USB Keyboard Support) and infrared (UR2 Mode and UR2 Duplex Mode) features.



Figure 6-7: The Integrated Peripherals screen.

Table 6-10: The Integrated Peripherals Screen items.

Item	Description
IDE HDD Block Mode	If your IDE Hard Disk supports block mode, you can enable this item to speed up the hard disk drive (HDD) access time. Otherwise, disable this item to avoid HDD access error.
IDE Primary Master PIO	In this item, there are five settings (0, 1, 2, 3, and 4) defined for the manual mode and one setting (Auto) for the automatic mode. The default setting is Auto.
IDE Primary Slave PIO	In this item, there are five settings (0, 1, 2, 3, and 4) defined for the manual mode and one setting (Auto) for the automatic mode. The default setting is Auto.

**Table 6-10: The Integrated Peripherals Screen items.**

Item	Description
IDE Secondary Master PIO	In this item, there are five settings (0, 1, 2, 3, and 4) defined for the manual mode and one setting ( <i>Auto</i> ) for the automatic mode. The default setting is <i>Auto</i> .
IDE Secondary Slave PIO	In this item, there are five settings (0, 1, 2, 3, and 4) defined for the manual mode and one setting ( <i>Auto</i> ) for the automatic mode. The default setting is <i>Auto</i> .
IDE Primary Master UDMA	UDMA stands for Ultra DMA. On this motherboard, Intel PIIX4 improves IDE transfer rate using Bus Master UltraDMA/33 IDE which can handle data transfer up to 33 MB/sec. The setting can be <i>Disabled</i> , <i>Enabled</i> or <i>Auto</i> . The default setting is <i>Auto</i> . Note: For this feature to work, your hard disk drive must also support UDMA.
IDE Primary Slave UDMA	On this motherboard, Intel PIIX4 improves IDE transfer rate using Bus Master UltraDMA/33 IDE which can handle data transfer up to 33 MB/sec. The setting can be <i>Disabled</i> , <i>Enabled</i> or <i>Auto</i> . The default setting is <i>Auto</i> . Note: For this feature to work, your hard disk drive must also support UDMA.
IDE Secondary Master UDMA	On this motherboard, Intel PIIX4 improves IDE transfer rate using Bus Master UltraDMA/33 IDE which can handle data transfer up to 33 MB/sec. The setting can be <i>Disabled</i> , <i>Enabled</i> or <i>Auto</i> . The default setting is <i>Auto</i> . Note: For this feature to work, your hard disk drive must also support UDMA.

**Table 6-10: The Integrated Peripherals Screen items.**

Item	Description
IDE Secondary Slave UDMA	On this motherboard, Intel PIIX4 improves IDE transfer rate using Bus Master UltraDMA/33 IDE which can handle data transfer up to 33 MB/sec. The setting can be <i>Disabled</i> , <i>Enabled</i> or <i>Auto</i> . The default setting is <i>Auto</i> . Note: For this feature to work, your hard disk drive must also support UDMA.
On-Chip Primary PCI IDE	Your system includes two built-in IDE controllers, the primary and the secondary, both of which operate on the PCI bus. This item allows you to enable or disable the primary controller. If you add a higher-performance or specialized controller, you may choose to disable the primary controller.
On-Chip Secondary PCI IDE	Allows you to enable or disable the secondary controller. If you add a higher-performance or specialized controller, you may choose to disable the secondary controller.
USB Keyboard Support	Enables or disables the USB keyboard support.

**Table 6-10: The Integrated Peripherals Screen items.**

Item	Description
<p>POWER ON Function</p>	<p>Specifies how you want to resume the system's power. The setting can be <i>BUTTON ONLY</i>, <i>HOT-KEY</i> or <i>PS/2 MOUSE</i>.</p> <p><i>BUTTON ONLY</i>: Resume the system's power only through the Power switch.</p> <p><i>HOT-KEY</i>: Resume the system's power through the Power switch and the hot-key that you set. Set the hot-key using &lt;Ctrl&gt; and any key from &lt;F1&gt; to &lt;F12&gt;, for example, &lt;Ctrl&gt;&lt;F1&gt;.</p> <p><i>PS/2 MOUSE</i>: Resume the system's power through the Power switch and the PS/2 Mouse.</p> <p>When <i>PS/2 MOUSE</i> or <i>HOT-KEY</i> is selected, you have to set the JP38 jumper to the corresponding setting (see Table 5-7 on page 8). This function does not support USB keyboard, USB Mouse and Serial Mouse.</p>
<p>KBC Input Clock</p>	<p>Sets the input clock to onboard keyboard controller (KBC). The setting can be <i>8 MHz</i> or <i>12 MHz</i>.</p>
<p>Onboard FDC Controller</p>	<p>Specifies the onboard floppy disk controller (FDC). This setting allows you to connect your floppy disk drives to the onboard floppy connector. If you have a separate control card, select <i>Disabled</i> for this item.</p>
<p>Onboard Serial 1</p>	<p>Sets the onboard serial port 1 to <i>3F8/IRQ4</i>, <i>2F8/IRQ3</i>, <i>3E8/IRQ4</i>, <i>2E8/IRQ3</i>, <i>Auto</i> or <i>Disabled</i>.</p>
<p>Onboard Serial 2</p>	<p>Sets the onboard serial port 2 as <i>3F8/IRQ4</i>, <i>2F8/IRQ3</i>, <i>3E8/IRQ4</i>, <i>2E8/IRQ3</i>, <i>Auto</i> or <i>Disabled</i>.</p>
<p>UR2 Mode</p>	<p>The default setting is <i>SBIrDA</i>.</p>

**Table 6-10: The Integrated Peripherals Screen items.**

Item	Description
UR2 Duplex Mode	Specifies whether the onboard infrared transfer mode is full duplex or half duplex. The default setting is <i>Full</i> for full duplex.
Onboard Parallel Port	Sets the onboard parallel port address to <i>378H</i> , <i>278H</i> , <i>3BCH</i> or <i>Disabled</i> .
Parallel Port Mode	Specifies the onboard parallel port mode. The settings are <i>SPP</i> (Standard Parallel Port), <i>EPP</i> (Enhanced Parallel Port), <i>ECP</i> (Extended Capabilities Port), and <i>EPP+ECP</i> .
ECP Mode Use DMA	Specifies the DMA (Direct Memory Access) channel when ECP device is in use. The settings are <i>DMA 1</i> and <i>DMA 3</i> . This item will not be displayed when SPP or EPP printer mode is selected.

## Password Setting

This section describes the two access modes, Supervisor Password and User Password, that can be configured to restrict access to your CMOS settings.



Retain a record of your password in a safe place. If you forget the password, the only way to access the system is to clear the CMOS memory. For details, see the section, “To clear the CMOS” on page 5-6.

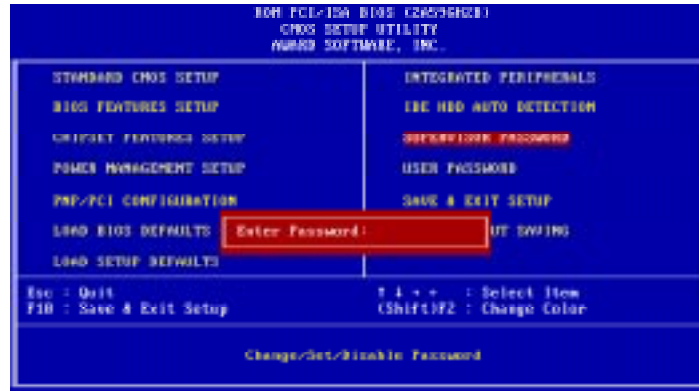


Figure 6-8: Setting password to the CMOS Setup utility.

Table 6-11: The Password Setting options.

Item	Description
Supervisor Password and User Password	<p>The options on the Password screen menu make it possible to restrict access to the Setup program by enabling you to set passwords for two different access modes: Supervisor mode and User mode.</p> <p>Supervisor mode has full access to the Setup options, whereas User mode has restricted access to the Setup options. By setting separate Supervisor and User password, a system supervisor can restrict who can change critical Setup values.</p>

**Table 6-11: The Password Setting options.**

Item	Description
Enter Password	<p>Type a password, up to eight characters long, and press &lt;Enter&gt;. The password typed now will clear any previously entered password from CMOS memory. You will be prompted to confirm the password. Type the password again and press &lt;Enter&gt;. You can press &lt;Esc&gt; to abort the selection and skip entering a password.</p> <p>To disable a password, just press &lt;Enter&gt; when you are prompted to enter the password. A message will confirm that the password is disabled. Once the password is disabled, the system will reboot and you can enter Setup menu freely.</p>
Password Disable	<p>If you selected System at Security Option of BIOS Features Setup Menu, you will be prompted for the password every time the system is rebooted or any time you try to enter the Setup program. If you selected Setup at Security Option of BIOS Features Setup Menu, you will be prompted only when you try to enter Setup.</p>

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Printed in Singapore