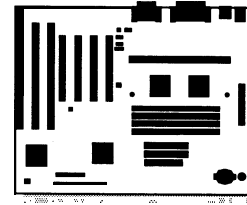


# PD440FX Motherboard Product Guide

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Order Number: **667613-001**

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# Product Description

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This chapter describes the features of the PD440FX motherboard. The remaining chapters explain how to:

- Use the BIOS Setup program to modify the motherboard's configuration
- Install components like processors or memory
- Interpret error messages you might encounter while running the computer

Figure 1 shows the components on the motherboard. Figure 2 shows the back panel connectors on the motherboard.

## Microprocessor

The PD440FX motherboard supports 233 MHz and 266 MHz Intel Pentium® II processors with MMX™ technology and 256 KB or 512 KB secondary (L2) cache.

The Pentium II processor is packaged in a Single Edge Contact (S.E.C.) Cartridge that mounts in the Slot 1 processor connector on the motherboard.

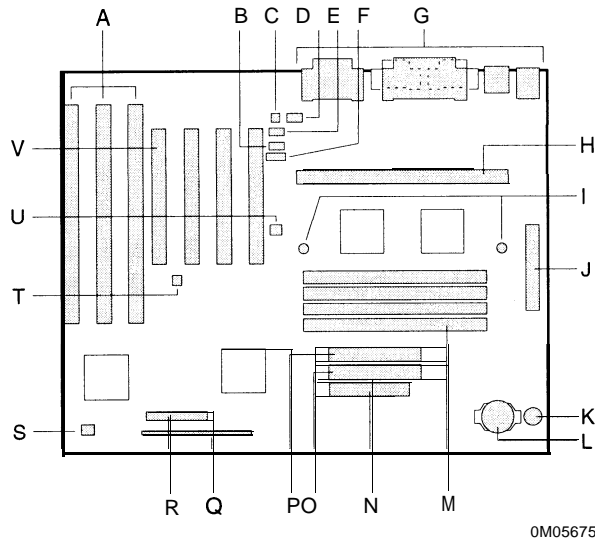
## Main Memory (DRAM)

The motherboard supports up to 256 MB of DRAM. DRAM is implemented through four 72-pin SIMM† sockets. The motherboard contains four SIMM sockets. To add memory to the motherboard, see Chapter 3. For the motherboard's main memory map, see Chapter 5.

Memory error checking and correction is supported with parity or ECC SIMMs. Parity or ECC SIMMs are automatically detected; however, the user must enter Setup to configure SIMMs for either parity or ECC operation. Parity memory will detect single-bit errors. ECC memory will detect multi-bit errors and correct

single-bit errors. Errors may be generated by a defective memory module, mixing different speed memory modules, or by DMA or memory conflicts.

**Figure 1. Motherboard Components**



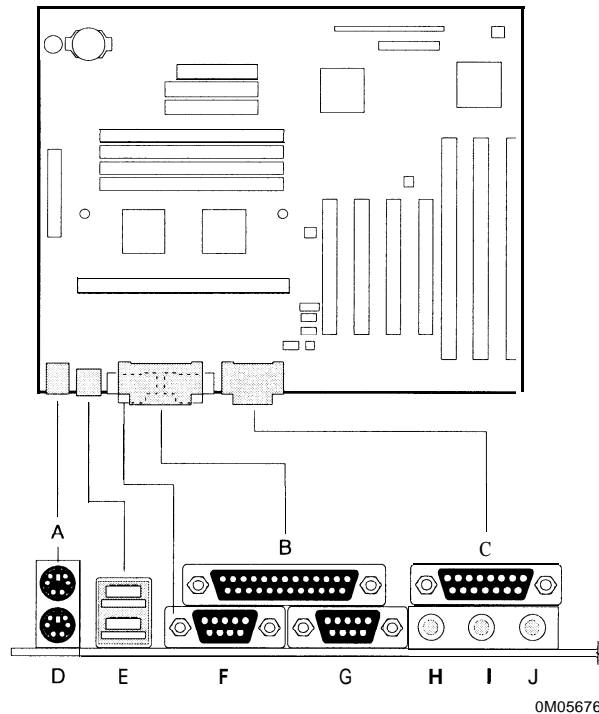
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- A. ISA connectors
- B. CD-ROM audio connector
- C. Telephony connector
- D. Wavetable connector
- E. Telephony connector
- F. Audio line in connector
- G. Back panel I/O connectors
- H. Slot 1 processor connector
- I. Heatsink support mounting holes
- J. Power connector
- K. Speaker (optional)
- L. Battery
- M. SIMM sockets
- N. Floppy drive connector
- O. Primary IDE connector
- P. Secondary IDE connector
- Q. Front panel connectors
- R. Jumper block
- S. Fan 1 connector
- T. Chassis security connector
- U. Fan 3 connector
- V. PCI connectors

**NOTE**

*Components labeled "optional" do not come on all PD440FX motherboards.*



**Figure 2. Back Panel I/O Connectors**

- A. PS/2<sup>†</sup> connector (mouse or keyboard)
- B. Parallel port connector
- C. MIDI/game port connector
- D. PS/2 connector (mouse or keyboard)
- E. USB connectors
- F. Serial port 1 connector
- G. Serial port 2 connector
- H. Audio line out jack
- I. Audio line in jack
- J. Audio mic in jack

## PCI/IDE Peripheral Interface

The motherboard has a high-speed, 32-bit PCI/IDE interface that supports the following:

- Up to four PCI/IDE hard drives on the PCI bus
- PIO Mode 3 and Mode 4 hard drives
- Logical block addressing (LBA) of hard drives larger than 528 MB
- Extended Cylinder Head Sector (ECHS) translation modes
- ATAPI devices (such as CD-ROMs)

## I/O Features

The I/O controller integrates the functions for the serial ports, parallel port, diskette drive, and keyboard. This component provides:

- Multimode bidirectional parallel port:
  - Standard mode: Centronics-compatible operation
  - High-speed mode: support for enhanced capabilities port (ECP) and enhanced parallel port (EPP)
- Two RS-232C NS16C450/550-compatible 9-pin serial ports
- Integrated real-time clock with an accuracy of  $\pm 13$  minutes/year at 25 °C and 5 V
- Integrated 8042-compatible keyboard controller
- Flexible IRQ and DMA mapping to support Windows† 95
- Support for an IrDA† or Consumer IR compatible infrared interface. The infrared interface supports data transfer rates of up to **115** K baud with either half- or full-duplex operation

- Industry standard diskette drive controller that supports 720 KB, 1.44 MB, and 2.88 MB 3.5-inch drives (at 135 tracks per inch); and 360 KB and 1.2 MB 5.25-inch drives

## BIOS Features

The BIOS, from American Megatrends, Inc. (AMI), provides ISA and PCI compatibility. The BIOS is contained in a Flash memory device soldered to the motherboard. The BIOS provides the POST, the Setup program, a PCI and IDE auto-configuration utility, and BIOS recovery code.

## PCI Auto-configuration

The PCI auto-configuration utility works in conjunction with the Setup program to support using PCI add-in cards in the computer. When you turn on the power after installing a PCI card, the BIOS automatically configures interrupts, DMA channels, and I/O space. Since PCI add-in cards use the same interrupt resources as ISA add-in cards, you must specify the interrupts used by ISA cards in the Setup program. The

PCI auto-configuration program complies with version 2.1 of the PCI BIOS specification.

## **IDE Auto-configuration**

The motherboard automatically detects installed IDE devices and configures them for operation.

## **ISA Plug and Play Capability**

The motherboard provides auto-configuration of Plug and Play ISA cards and resource management for legacy (non Plug and Play) ISA cards when used with the ISA Configuration Utility (ICU) or a Plug and Play compatible operating system like Windows 95. To obtain the ICU, contact your computer supplier.

## **Security Features**

The BIOS provides a password option that you can enable through the Setup program (refer to Chapter 2).

## **BIOS Upgrades**

Because the BIOS is stored in a Flash memory device, you can upgrade the BIOS without having to disassemble the computer. The upgrade can be done with a utility stored on a diskette or hard disk or run over a network. To upgrade the BIOS, see Appendix B.

## **Expansion Slots**

The motherboard has two dedicated 16-bit ISA/AT<sup>†</sup>-compatible and three dedicated PCI-compatible expansion slots. Another expansion slot is a combination slot that can be used for either a PCI or an ISA card. This allows you to install a maximum of six add-in cards.

## **Real-time Clock and CMOS RAM**

The I/O controller provides a real-time clock and CMOS RAM. You can set the time for the clock and the CMOS values by using the Setup program described in Chapter 2.

## Battery

A battery on the motherboard keeps the clock and values in CMOS RAM current when your computer is turned off. To replace the battery, see Chapter 3.

## Speaker

An optional speaker is mounted on the motherboard. The speaker provides audible error code information (beep codes) during the POST if the BIOS cannot use the video interface. For beep code descriptions, see Chapter 4.

### NOTE

*The board also has a connector for an optional offboard speaker. To install an offboard speaker, remove the jumper that enables the onboard speaker (refer to Chapter 5).*

## Fan Connectors

The motherboard has connectors for two fans. For the locations and pinouts of the fan connectors, see Chapter 5.

## USB Interface Support

The USB ports permit the direct connection of two USB peripherals without an external hub. If more devices are required, an external hub can be connected to either of the built-in ports. The motherboard supports the standard universal host controller interface (UHCI) and uses standard software drivers that are UHCI-compatible.

Features of the USB include:

- Support for self-identifying, hot-pluggable peripherals
- Automatic device configuration
- Support for isochronous and asynchronous transfers over the same set of wires
- Support for up to 127 physical devices
- Bandwidth and low latencies appropriate for telephony, audio, and other applications
- Error handling and fault recovery built into protocol

 **NOTE**

*Computers that have an unshielded cable attached to the USB port may not meet FCC Class B requirements, even if no device or a low-speed USB device is attached to the cable. Use shielded cable that meets the requirements for full-speed devices.*

## Audio Subsystem

The onboard audio subsystem is based on the Yamaha OPL<sup>†</sup> family of single-chip audio controllers (YM 715). The audio subsystem provides the digital audio and analog mixing functions needed for recording and playing sound on personal computers. The subsystem features:

- Line and microphone level inputs
- MIDI/Game port
- 3-D enhanced stereo
- Full digital control of all mixer and volume control functions
- Full duplex operation

- Sound Blaster<sup>†</sup> Pro, Windows Sound System, Roland MPU-401, AdLib<sup>†</sup>, and Multimedia PC Level 2 (MPCII) compatibility
- Onboard Yamaha YM 704 wavetable synthesizer (optional)
- Wavetable upgrade connector
- CD-ROM audio connector
- Telephony connectors

## Hardware Monitor Option

The hardware monitor option features the following:

- An integrated temperature sensor
- Fanspeedsensors
- Power supply voltage monitor
- POST test result and error code storage
- Support for Intel LANDesk<sup>®</sup> Client Manager
- Connector for external chassis security feature

These features are implemented by an integrated hardware monitor device.

# Using the BIOS Setup Program

This chapter explains how to use the BIOS Setup program. You can use the Setup program to change the computer's configuration information and boot-up sequence.

Setup information is stored in CMOS random access memory (RAM) and is backed up by a battery on the motherboard when power to the computer is off.

## Overview of the BIOS Setup Program

To enter the Setup program, turn the computer on and press <F1> when you see the message:

"Press <F1> Key if you want to run SETUP."

You have about five seconds to press <F1> before the boot process continues.

### NOTE

*For reference purposes, you should write down the current Setup settings. When you make changes to the settings, update this record.*

When you enter the Setup program, you will see the Main screen. Listed along the top of the display are three other screens: Advanced, Security, and Exit.

Select a screen by pressing the left <<-> or right <-> arrow keys. Use the up <↑> or down <↓> arrow keys to select items within a screen. Use the <Enter> key to select an item you want to change. For some items, pressing <Enter> brings up a subscreen. After you have selected an item, use the arrow keys to change the setting.

**Table 1** provides an overview of function keys in the Setup program. Table 2 provides an overview of the menu screens and subscreens in the Setup program.

**Table 1. Overview Of the Setup Function Keys**

Setup Key	Description
<F1>	Brings up a help screen for the current item
<Esc>	Backs up to the previous screen In the Main, Advanced, Security, or Exit screen allows you to exit while discarding changes (see page 40)
<Enter>	Selects the current item or option
<↑>	Selects the previous item or option -- --
<↓>	Selects the next item or option
<←> <→>	In the Main, Advanced, Security, or Exit menu screens, changes the menu screen
<F5>	Loads Setup defaults (see page 40)
<F6>	Discards current changes (see page 40)
<F10>	Exits while saving changes (see page 40)

**Table 2. Overview of the Setup Screens**

Setup Screen	This Screen is Used To
Main	Configure basic features such as time, date, floppy drives, and hard drives
Advanced	Configure advanced features such as peripheral configuration, audio configuration, and advanced chipset configuration
Security	Set passwords
Exit	Save or discard changes
Floppy Options	Configure a floppy drive
Primary/Secondary IDE Master/Slave Configuration	Configure IDE devices
Boot Options	Configure how the computer boots up
Peripheral Configuration	Configure the serial ports, the parallel port, and the hard disk drive interfaces
Advanced Chipset Configuration	Configure the memory and data buses

continued 

**Table 2. Overview of the Setup Screens  
(continued)**

<b>Setup Subscreen</b>	<b>This Subscreen is Used To</b>
Power Management Configuration	Configure the computer's power management options
Plug and Play Configuration	Configure the computer's Plug and Play capabilities
Event Logging Configuration	Configure the computer's event logging functions
Single Bit ECC Events	Report about logged events
Multiple Bit ECC Events	Report about logged events
Parity Error Events	Report about logged events
Pre-Boot Events	Report about logged events

## Main Screen

This section describes the options in the Main screen. If you select some options from the main screen (for example, Primary IDE Master), the Setup program displays a subscreen for the selected option.

### System Date

Specifies the current date. Select the month from a pop-up menu and type the date and year.

### System Time

Specifies the current time.

### Floppy Options

When selected, this displays the Floppy Options subscreen.

### Primary IDE Master

Reports if an IDE device is connected to the Primary IDE Master interface. When selected, this brings up the Primary IDE Master Configuration subscreen.



### **Primary IDE Slave**

Reports if an IDE device is connected to the Primary IDE Slave interface. When selected, this brings up the Primary IDE Slave Configuration subscreen.

### **Secondary IDE Master**

Reports if an IDE device is connected to the Secondary IDE Master interface. When selected, this brings up the Secondary IDE Master Configuration subscreen.

### **Secondary IDE Slave**

Reports if an IDE device is connected to the Secondary IDE Slave interface. When selected, this brings up the Secondary IDE Slave Configuration subscreen.

### **Language**

Specifies the language of the text strings used in the Setup program and the BIOS. The options are any installed languages.

### **Boot Options**

When selected, this brings up the Boot Options subscreen.

### **Video Mode**

Reports the video mode. There are no options.

### **Mouse**

Reports if a PS/2 mouse is installed. There are no options.

### **Base Memory**

Reports the amount of base memory. There are no options.

### **Extended Memory**

Reports the amount of extended memory. There are no options.

### **BIOS Version**

Reports the BIOS version. There are no options.

## Floppy Options Subscreen

### Floppy A:

Reports if a floppy drive is connected to the system. There are no options.

### Floppy B:

Reports if a second floppy drive is connected to the system. There are no options.

### Floppy A: Type

Specifies the physical size and capacity of the floppy drive. The options are:

- Disabled
- 360 KB, 5.25inch
- **1.2 MB, 5.25inch**
- 720 KB, 3.5-inch
- **1.44/1.25 MB, 3.5-inch (default)**
- **2.88 MB, 3.5-inch**

### Floppy B: Type

Specifies the physical size and capacity of the floppy drive. The options are:

- **Disabled (default)**
- **360 KB, 5.25-inch**
- 1.2 MB, 5.25-inch
- 720 KB, 3.5-inch
- 1.44/1.25 MB, 3.5-inch
- 2.88 MB, 3.5-inch

## Floppy Access

The BIOS displays this item only if the motherboard supports changing the read/write or read-only access for floppy drives. The following options change the access for all attached floppy drives:

- **Read/Write (default)**
- Read Only

## **Primary/Secondary IDE Master/Slave Configuration Subscreens**

There are four subscreens used to enable IDE devices (e.g., hard disks):

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

Each of these subscreens contains the following eight fields.

### **IDE Device Configuration**

Used to manually configure or autoconfigure the attached IDE device. The options are:

- **Auto Configured (default)**
- User Definable
- Disabled

If you select User Definable, the Cylinders, Heads, Sectors items can be specified. If you select Disabled, the BIOS will not scan for a drive on that interface.

### **Cylinders**

If IDE Device Configuration is set to User Definable, type the correct number of cylinders for the installed hard disk. If IDE Device Configuration is set to Auto Configured, this field reports the number of cylinders for the hard disk.

### **Heads**

If IDE Device Configuration is set to User Definable, type the correct number of heads for the installed hard disk. If IDE Device Configuration is set to Auto Configured, this field reports the number of heads for the hard disk.

### **Sectors**

If IDE Device Configuration is set to User Definable, type the correct number of sectors for the installed hard disk. If IDE Device Configuration is set to Auto Configured, this field reports the number of sectors for the hard disk.

### **Maximum Capacity**

Reports the maximum capacity of the hard disk. Capacity is calculated from the number of cylinders, heads, and sectors. There are no options.

## IDE Translation Mode

### **A!** CAUTION

*Do not change the IDE translation mode after the IDE device has been formatted. Changing the option could corrupt data.*

Specifies the IDE translation mode. The options are.

- Standard CHS (standard cylinder head sector: fewer than 1024 cylinders)
- Logical Block
- Extended CHS (extended cylinder head sector: more than 1024 cylinders)
- **Auto Detected (default)** (BIOS detects IDE translation mode)

### Multiple Sector Setting

Sets the number of sectors transferred by an IDE drive per interrupt generated. The options are:

- Disabled
- 4 Sectors/Block
- 8 Sectors/Block
- **Auto Detected (default)**

Check the specifications for the hard disk to determine which setting provides optimum performance.

### Fast Programmed I/O Modes

Sets how fast transfers on the IDE interface occur. The options are:

- Disabled
- **Auto Detected (default)**

If this option is set to Disabled, transfers occur at a less than optimized speed. If it is set to Auto Detected, transfers occur at maximum speed.

## Boot Options Subscreen

This section describes the options in the Boot Options subscreen.

### First Boot Device

Sets which drive the computer checks first to find an operating system to boot from. The options are:

- Disabled
- **Floppy (default)**
- Hard Disk
- CD-ROM
- Network

### Second Boot Device

Sets which drive the computer checks second to find an operating system to boot from. The options are:

- Disabled
  - Floppy
- **Hard Disk (default)**
- Network

### Third Boot Device

Sets which drive the computer checks third to find an operating system to boot from. The options are:

- **Disabled (default)**
  - Floppy
- Hard Disk
- Network

### Fourth Boot Device

Sets which drive the computer checks fourth to find an operating system to boot from. The options are:

- **Disabled (default)**
  - Floppy
- Hard Disk
- Network

### System Cache

Enables or disables both primary and secondary cache memory. The options are:

- Disabled
- **Enabled (default)**

### Boot Speed

Sets the speed at which the motherboard operates at boot-up. The options are:

- Deturbo
- **Turbo (default)**

If turbo boot speed is enabled, the motherboard operates at full speed. If deturbo boot speed is enabled, the motherboard operates at a slower speed needed to support some legacy add-in cards.

## Num Lock

Sets the Num Lock feature on your keyboard at boot-up. The options are:

- Off (**default**)
- On

## Setup Prompt

### NOTE

*This option does not affect your ability to access the Setup program. It only toggles the prompt.*

Turns on (or off) the “Press <F1> Key if you want to run Setup” prompt during the power-up sequence. The options are:

- **Enabled (default)**
- Disabled

## Hard Disk Pre-Delay

Sets the hard disk drive pre-delay. The options are:

- **Disabled (default)**
- 3 Seconds
- **6 Seconds**

- 9 Seconds
- **12** Seconds
- **15** Seconds
- **21** Seconds
- 30 Seconds

When this option is enabled, the BIOS waits the specified time before accessing the first hard drive. If your computer contains a hard drive, and you don't see the drive type displayed during boot-up, the hard drive might need more time before it can communicate with the controller. Setting a pre-delay provides the additional time for the hard drive to initialize.

## Typematic Rate Programming

Sets the typematic rates. The options are:

- **Default (default)**
- Override

Selecting Override enables the Typematic Rate Delay and Typematic Rate fields.

### Typematic Rate Delay

Sets the delay time (in milliseconds) for the key-repeat function to start when you hold down a key on the keyboard. The options are:

- 250 msec (default)
- 500 msec
- 750 msec
- 1000 msec

If the Typematic Rate Programming field is set to Default, this option will not appear.

### Typematic Rate

Sets the speed (in characters per second) at which characters repeat when you hold down a key on the keyboard. The higher the number, the faster the characters repeat. The options are:

- 6 char/sec (default)
- 8 char/sec
- 10 char/sec
- 12 char/sec
- 15 char/sec

- 20 char/sec
- 24 char/sec
- 30 char/sec

If the Typematic Rate Programming field is set to Default, this option will not appear.

### Scan User Flash Area

#### NOTE

*If an OEM logo is programmed into the user Flash area, the logo will be displayed at bootup regardless of how this option is set.*

Enables or disables scanning of user Flash area for ROMs. The options are:

- Disabled (default)
- Enabled (scan occurs during POST)

### Power-On COM1 Ring

Enables the computer to power on when a telephony device operating on COM1 receives a call. The options are:

- Disabled (default)
- Enabled

## Advanced Screen

This section describes the Setup options in the Advanced menu screen. If you select some options from the Advanced screen (for example, Peripheral Configuration), Setup displays a subscreen for the selected option. Subscreens are described in the sections following the description of the Advanced screen options.

### Processor Type

Reports the processor type. There are no options.

### Processor Speed

Reports the processor clock speed. There are no options.

### Cache Size

Reports the size of second-level cache memory. There are no options.

### Peripheral Configuration

When selected, this displays the Peripheral Configuration subscreen.

### Advanced Chipset Configuration

When selected, this displays the Advanced Chipset Configuration subscreen.

### Power Management Configuration

When selected, this displays the Power Management Configuration subscreen.

### Plug and Play Configuration

When selected, this displays the Plug and Play Configuration subscreen.

### Event Logging Configuration

When selected, this displays the Event Logging Configuration subscreen.



## Peripheral Configuration Subscreen

This section describes the Setup options in the Peripheral Configuration subscreen.

When Auto Configured is selected for Primary PCI IDE interface, Secondary PCI IDE Interface, Floppy Interface, Serial Port 1 Interface, Serial Port 2 Interface, Serial Port 2 IR Mode, or Parallel Port Interface, the computer automatically configures that peripheral during power up. Reported settings for these options reflect the current state of the computer.

### Primary PCI IDE Interface

Use to disable or automatically configure the primary PCI IDE interface. The options are:

- Disabled
- **Auto Configured (default)**

When Auto Configured is selected, the Primary PCI IDE Interface is automatically configured during power up.

### Secondary PCI IDE Interface

Use to disable or automatically configure the secondary PCI IDE interface. The options are:

- Disabled
- **Auto Configured (default)**

When Auto Configured is selected, the Secondary PCI IDE Interface is automatically configured during power up.

### Floppy Interface

Enables or disables the floppy drive interface. The options are:

- Disabled
- Enabled
- **Auto Configured (default)**

When Auto Configured is selected, the floppy interface is automatically configured during power up.

## Serial Port 1 Interface

Selects the COM port, I/O address, and IRQ of serial port 1. The options are:

- Disabled
  - . COM1    3F8    IRQ4
  - . COM2    2F8    IRQ3
  - . COM3    3E8    IRQ4
  - . COM4    2E8    IRQ3
- COM1    3F8    IRQ3
  - . COM2    2F8    IRQ4
- COM3    3E8    IRQ3
  - . COM4    2E8    IRQ4
- **Auto Configured (default)**

When Auto Configured is selected, the Setup program assigns the first free COM port (normally COM1, 3F8, IRQ4) as the serial port 1 address and IRQ.

## Serial Port 2 Interface

### NOTE

*If either serial port address is set, the address it is set to will not appear in the options dialog box of the other serial port. If an ATI<sup>†</sup> mach32<sup>†</sup> or an ATI mach64<sup>†</sup> video controller is active, the COM4, 2E8, IRQ3 address will not appear in the options dialog box of either serial port.*

Selects the COM port, I/O address, and IRQ of serial port 2. The options are:

- Disabled
  - . COM1    3F8    IRQ4
- COM2    2F8    IRQ3
  - . COM3    3E8    IRQ4
  - . COM4    2E8    IRQ3
- COM3    3E8    IRQ4
  - . COM1    3F8    IRQ3
  - . COM2    2F8    IRQ4
- COM3    3E8    IRQ3
  - . COM4    2E8    IRQ4
- **Auto Configured (default)**

When Auto Configured is selected, the Setup program assigns the first free COM port (normally COM2, 2F8, IRQ3) as the serial port 2 address and IRQ.

### **Serial Port 2 IR Mode**

Makes Serial Port 2 available to infrared applications. The options are:

- **Disabled (default)**
- Enabled

### **Parallel Port Interface**

Selects the printer port, I/O address, and IRQ of the parallel port. The DMA assignment for the port will be displayed if the Parallel Port Type is set to ECP. The options are:

- Disabled
  - . LPT3      3BC    IRQ7
  - . LPT1      378    IRQ7
  - . LPT2      278    IRQ7
  - . LPT3      3BC    IRQ5
  - . LPT1      378    IRQ5
  - . LPT2      278    IRQ5
- **Auto Configured (default)**

When Auto Configured is selected, the Setup program assigns LPT1, 378, IRQ7 as the parallel port address and IRQ.

### **Parallel Port Type**

Selects the mode for the parallel port. The options are:

- **Compatible (default)**
- Bi-directional
  - . ECP
- EPP

Compatible means the parallel port operates in AT-compatible mode. Bi-directional means the parallel port operates in bidirectional PS/2-compatible mode. EPP and ECP mean the parallel port operates high-speed, bidirectionally.

### **USB Interface**

Enables or disables the USB interface. The options are:

- Disabled
- **Enabled (default)**

### **Audio interface**

Enables or disables the onboard audio subsystem. The options are:

- Disabled
- **Enabled (default)**

### **Hardware Monitor Interface**

Enables or disables the hardware monitor. The options are:

- Disabled
- **Enabled (default)**

This option is displayed only if the hardware monitor component is installed on the motherboard.

### **Primary PCI IDE Status**

Reports if the Primary IDE Interface is enabled or disabled. There are no options.

### **Secondary PCI IDE Status**

Reports if the Secondary IDE Interface is enabled or disabled. There are no options.

### **Floppy Status**

Reports if the Floppy Interface is enabled or disabled. There are no options.

### **Serial Port 1 Status**

Reports the COM port, I/O address, and IRQ for serial port 1 (COM1). There are no options.

### **Serial Port 2 Status**

Reports the COM port, I/O address, and IRQ for serial port 2 (COM2). There are no options.

### **Parallel Port Status**

Reports the printer port, I/O address, and IRQ for the parallel port. There are no options.

## Advanced Chipset Configuration Subscreen

This section describes the options in the Advanced Chipset Configuration subscreen.

### Base Memory Size

Sets the size of the base memory. The options are:

- . 512KB
- **640 KB (default)**

### ISA LFB Size

Sets the size of the linear frame buffer. The options are:

- **Disabled (default)**
- . 1 MB
- 2 MB
- 4 MB

If this option is set to 1 MB, 2MB, or 4MB, the ISA LFB Base Address field appears.

### ISA LFB Base Address

Reports the base address of the LFB. There are no options.

### Video Palette Snoop

Controls the ability of a primary PCI graphics controller to share a common palette with an ISA add-in video card. The options are:

- **Disabled (default)**
- Enabled

### ISA VGA<sup>†</sup> Write Combining

Sets the VGA<sup>†</sup> frame buffer address (B000h-BFFFh) to the processor's Write Combined memory type. The options are:

- **Disabled (default)**
- Enabled

### Latency Timer (PCI Clocks)

Sets the length of time (in PCI clocks) an agent on the PCI bus can hold the bus when another agent has requested the bus. The options are:

- **Auto Configured (default)**
- Valid numbers between 16 and 128 (in multiples of 8).

## Memory Error Detection

Sets the type of memory error detection or correction. The options are:

- **Disabled (default)**
- . ECC
- Parity

This option only appears if the memory installed on the motherboard supports error detection.

## Bank 0

Reports the size and type of memory installed in bank 0. There are no options.

## Bank 1

Reports the size and type of memory installed in bank 1. There are no options.

## Power Management Configuration Subscreen

This section describes the options in the Power Management Configuration subscreen.

## Advanced Power Management

Enables or disables the advanced power management (APM) support in the computer's BIOS. The options are:

- Disabled
- **Enabled (default)**

APM features require an APM-capable operating system. If this option is set to Disabled, only the Auto Start On AC Loss option will appear. If this option is set to Enabled, all the following options will appear.

## IDE Drive Power Down

Sets any IDE drives to spin down when the computer goes into power-managed mode. The options are:

- Disabled
- **Enabled (default)**

### **VESA<sup>†</sup> Video Power Down**

Sets the command issued to your VESA<sup>†</sup>-compliant graphics add-in card when the computer enters power-managed mode. The options are:

- Disabled (the monitor is not under power management)
- Standby (minimal power reduction)
- Suspend (significant power reduction)
- **Sleep (default)** (maximum power reduction)

### **Inactivity Timer**

Sets how long (in minutes) the computer must be inactive before it enters power-managed mode. The range is 0-255 minutes. The default is **10** minutes.

### **Hot Key**

Sets the hot key for power-managed mode. Press the hot key while holding down the <Ctrl> and <Alt> keys to enter power-managed mode. All alphabetic keys are valid entries for this field.

### **Auto Start On AC Loss**

Specifies whether the power supply should resume after AC power interruption. The options are:

- Disabled
- **Enabled (default)**

## **Plug and Play Configuration Subscreen**

This section describes the options in the Plug and Play Configuration subscreen.

### **Configuration Mode**

Sets how the BIOS gets information about non-Plug and Play ISA add-in cards. The options are:

- **Use PnP OS (default)**
- Use BIOS Setup

If Use BIOS Setup is selected, specify the IRQ for each non-Plug and Play ISA add-in card you install on the motherboard (see page 34, IRQ 3, 4, 5, 7, 9, **10**, **11**, **14**, **15**).

If Use PnP OS is selected, the BIOS uses run-time software to prevent conflicts between Plug and Play and non-Plug and Play add-in cards. If Use PnP OS is selected, PnP OS is the only option visible in the subscreen.

### **PnP OS**

Enables the computer to boot with an operating system capable of managing Plug and Play add-in cards. The options are:

- Disabled
- Other PnP OS
- **Windows 95 (default)**

This field will only be visible if the Configuration Mode field is set to Use PnP OS.

### **ISA Shared Memory Size**

Enables you to specify a range of memory addresses that will be directed to the ISA bus rather than to onboard memory. The options are:

- **Disabled (default)**
- 16 KB
- 32 KB
- 48 KB

- 64 KB
- 80 KB
- 96 KB

If this field is set to Disabled, the ISA Shared Memory Base Address field (described below) will not appear.

This field should be enabled only when you are using a non-Plug and Play ISA add-in card (legacy card) that requires non-ROM memory space. For example, video capture cards that have video buffer memory.

By default, allocation of upper memory is as follows: memory from C0000h-C7FFFh is automatically shadowed. (This memory range is typically reserved for video BIOS.) Memory from C8000h-DFFFFh is initially unshadowed. The BIOS scans this range for any ISA add-in cards that may be present and notes their location and size. The BIOS will then automatically configure the PCI and Plug and Play devices, shadowing the ROM requirements (other than video) into the area above E0000h until that area is full. It will then assign additional PCI and Plug and Play add-in cards to the area between C8000h and DFFFFh. If an ISA legacy card has non-ROM memory requirements, the autoconfigure



routine may write into an area that is needed by the ISA add-in card. The ISA Shared Memory Size parameter signifies to the autoconfigure routine that this block of memory is reserved and should not be shadowed.

Shadowing copies a block of memory from an add-in card's ROM to the same address in computer DRAM memory. This improves computer performance.

### ISA Shared Memory Base Address

Sets the base address for the ISA shared memory. The options are:

- **C8000h (default)**
- CC000h
- D0000h
- D4000h
- D8000h
- DC000h

This setting could affect the ISA Shared Memory Size field. The value entered in the ISA Shared Memory Size field cannot extend to the E0000h address. For example, if a size of 64 KB were selected, options D4000h, D8000h, and DC000h would not appear.

If the ISA Shared Memory Size field is disabled, this field will not appear.

### IRQ 3, 4, 5, 7, 9, 10, 11, 14, 15

Sets the status of the IRQ. The options are:

- **Available (default)**
- Used By ISA Card

The PCI auto-configuration code looks here to see if these IRQs are available for PCI add-in cards. If an IRQ is available, the PCI auto-configuration code can assign the IRQ to be used by the computer. If your computer has an ISA add-in card, select Used By ISA Card for one of these IRQs.

### NOTE

*IRQs 5, 9, 10, and 11 are the default user available IRQs. Depending on the configuration of your computer, other IRQs could be listed. If you have disabled the parallel port or either of the serial ports, more IRQs will be available. Refer to Chapter 5 for information on reserved and available IRQs.*

## Event Logging Configuration Subscreen

This section describes the options in the Event Logging Configuration subscreen.

### Event Log Capacity

Reports whether or not the log is full. There are no options.

### Event Log Count Granularity

Reports the number of log events that must occur before the event log is updated. There are no options.

### Event Time Granularity

Reports the amount of time (in minutes) that must pass before the event log is updated. There are no options.

### Event Log Control

Enables or disables event logging. The options are:

- **All Events Enabled (default)**
- ECC Events Disabled
- All Events Disabled

### Clear Event Log

Clears the event log on the next pass through POST. The options are:

- **Keep (default)**
- On Next Boot

### NOTE

*If set to On Next Boot, this option reverts to the default on the next pass through POST.*

### Mark Existing Events as Read

Marks all events already in the log as having been not read (Do Not Mark) or read (Mark). The options are:

- **Do Not Mark (default)**
- Mark

### Single Bit ECC Events

When selected, this displays the Single Bit ECC Events subscreen.

### Multiple Bit ECC Events

When selected, this displays the Multiple Bit ECC Events subscreen.

### **Parity Error Events**

When selected, this displays the Parity Error Events subscreen.

### **Pre-Boot Events**

When selected, this displays the Pre-Boot Events subscreen.

### **Single Bit ECC Events Subscreen**

If Clear Event Log is set to On Next Boot (see page 35), the following fields report information for the last single-bit ECC error to occur since the last pass through POST.

Date of Last Occurrence

Reports the date when the last single-bit ECC error occurred. There are no options.

Time of Last Occurrence

Reports the time when the last single-bit ECC error occurred. There are no options.

Total Count of Events/Errors

Reports the total number of single-bit ECC errors in the log. There are no options.

Memory Bank with Errors

Reports the memory bank that contained the last single-bit ECC error. There are no options.

### **Multiple Bit ECC Events Subscreen**

If Clear Event Log is set to On Next Boot (see page 35), the following fields report information for the last multiple-bit ECC error to occur since the last pass through POST.

Date of Last Occurrence

Reports the date when the last multiple-bit ECC error occurred. There are no options.

Time of Last Occurrence

Reports the time when the last multiple-bit ECC error occurred. There are no options.

Total Count of Events/Errors

Reports the total number of multiple-bit ECC errors in the log. There are no options.

Memory Bank with Errors

Reports the memory bank that contained the last multiple-bit ECC error. There are no options.

### **Parity Error Events Subscreen**

If Clear Event Log is set to On Next Boot (see page 35), the following fields report information for the last parity error to occur since the last pass through POST.

#### **Date of Last Occurrence**

Reports the date when the last parity error occurred. There are no options.

#### **Time of Last Occurrence**

Reports the time when the last parity error occurred. There are no options.

#### **Total Count of Events/Errors**

Reports the total number of parity errors in the log. There are no options.

#### **Memory Bank with Errors**

Reports the memory bank that contained the last parity error. There are no options.

### **Pre-Boot Events Subscreen**

If Clear Event Log is set to On Next Boot (see page 35), the following fields report information for the last pre-boot event to occur since the last pass through POST.

#### **Date of Last Occurrence**

Reports the date when the last pre-boot event occurred. There are no options.

#### **Time of Last Occurrence**

Reports the time when the last pre-boot event occurred. There are no options.

#### **Total Count of Events/Errors**

Reports the total number of pre-boot events in the log. There are no options.

## Security Screen

The Security screen enables you to set passwords for two access modes: administrative and user.

Administrative mode allows the administrative user to view and change all Setup program options while user mode limits access to Setup program options. User mode access to the Setup program is set in administrative mode by the Enter Password and User Privilege Level options. Setting a user privilege level enables system administrators to restrict who can view or change options in the Setup program. If you set the administrative password only, you can gain user mode access to the Setup program by pressing the <Enter> key at the password prompt.

To restrict who can boot the computer, set the user password. The computer will prompt the user for this password before booting. If you set the administrative password only, the computer will boot without prompting the user for a password. If both passwords are set, a user can enter either the administrative or user password to boot the computer.

The following table shows how the passwords work together.

Password Set	Administrative Mode	User Mode	Password Needed to Boot
Neither	Can change all options	Can change all options	None
Administrative only	Can change all options	Access controlled by user privilege level setting	None
User only	N/A	Can change all options	User
Both	Can change all options	Access controlled by user privilege level setting	Administrative or user

Descriptions of the options in the Security screen follow.

### User Password

Reports if there is a user password set. There are no options.

### Administrative Password

Reports if there is an administrative password set. There are no options.

### Enter Password

Sets the user password. The password can be up to seven alphanumeric characters.

### Set Administrative Password

Sets the administrative password. The password can be up to seven alphanumeric characters.

### User Privilege Level

This option appears when an administrative password is set. User Privilege Level sets the level of user mode access to the Setup program. This option can only be set in administrative mode. The options are:

- **Limited Access (default)**
- No Access
- View Only
- Full Access

---

### Privilege

Level	User Mode Access to Setup Program
Limited Access	Can access the Setup program and change: System Date, System Time, User Password, Unattended Start, and Security Hot-Key
No Access	Cannot access the Setup program
View Only	Can access the Setup program and view options, but not change them
Full Access	Can access the Setup program and change all options except User Privilege Level and Set Administrative Password

---

### Clear User Password

This option appears when both an administrative and user password are set. Press the <Enter> key to clear the user password.

### Unattended Start

Controls when the user password is requested. The options are:

- Enabled
- **Disabled (default)**

The user password must be set before you can enable this option. If Enabled is selected, the computer boots, but the keyboard will be locked until the user password is entered.

### **Security Hot Key (CTRL-ALT-)**

Sets a hot key that, when pressed, locks the keyboard until the user password is entered. The keyboard LEDs flash to indicate that the keyboard is locked. When you enter the user password, you do not have to press the <Enter> key.

## **Exit Screen**

This section describes how to exit and save changes to the Setup program or exit and discard changes to the Setup program.

### **Exit Saving Changes**

Exits and saves changes made to the Setup program. You can also press the <F10> key anywhere in the Setup program to exit and save changes.

### **Exit Discarding Changes**

Exits without saving changes made to the Setup program. This means that any changes you made to the Setup program are discarded and **not saved**. You can also press the <Esc> key in the four main screens to exit the Setup program without saving changes.

### **Load Setup Defaults**

Returns all Setup program options to their defaults. You can also press the <F5> key anywhere in the Setup program to load the Setup defaults.

This option loads the default Setup values from the ROM table.

### **Discard Changes**

Discards any changes you made during the current Setup session without exiting the program. You can also press the <F6> key anywhere in the Setup program to discard any changes to Setup without exiting the program.

This option loads the CMOS RAM values that were present when the computer was turned on.

# Installing and Configuring Motherboard Options

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## 3

This chapter describes the following:

- Jumper locations and functions
- How to set jumpers for Setup program functions
- How to install the processor and set jumpers for processor speed
- How to install memory
- How to replace the battery
- How to remove the motherboard
- Always follow the steps in each procedure in the correct order.
- Set up a log to record information about your computer such as model, serial numbers, and installed options. If you need this information, it will be easier to consult the log than to open up the computer.
- You will need a medium flat-bladed screwdriver. You also might want a tool for removing jumpers such as fine needle-nosed pliers. We recommend that you use an antistatic wrist strap and a conductive foam pad when working on the motherboard.

## Before You Begin



### CAUTION

*If you are installing this motherboard in a computer, see Appendix A for regulatory requirements and installation instructions and precautions.*



## **A** WARNINGS

***The procedures in this chapter assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.***

***Disconnect the computer from its power source and from any telecommunications links, networks, or modems before doing any of the procedures described in this chapter. Failure to disconnect power, telecommunications links, networks, or modems before you open the computer or do any procedures can result in personal injury or equipment damage. Some circuitry on the motherboard may continue to operate even though the front panel power button is off.***



## CAUTION

*Electrostatic discharge (ESD) can damage components. Do the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.*

## Jumpers

Figure 3 shows the location of the jumper block on the motherboard. The jumpers have been set correctly at the factory. Normally, the only time you will have to change a jumper is if you need to do one of the following:

- Clear the user or administrator password
- Reset CMOS RAM to the default values
- Disable or enable access to the Setup program
- Configure the motherboard for a different processor speed

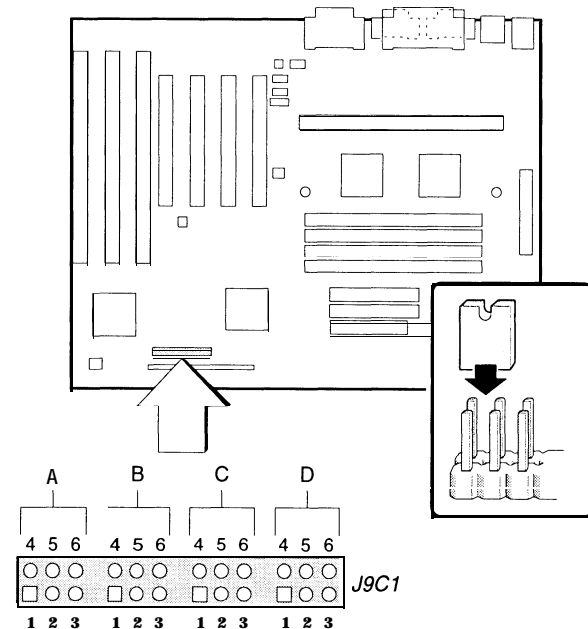
### NOTE

As shown in Figure 3, a jumper is a small plastic-encased conductor that slips over jumper pins. To change a jumper setting, remove the jumper from the pins and slide it onto the new pins to obtain the desired setting.

### A CAUTION

*To avoid bending or breaking pins, use caution when removing or installing a jumper.*

**Figure 3. Configuration Jumper Block**



## Jumpers for Setup Program Functions

Table 3 shows jumper settings for Setup program functions. Figure 3 shows the location of the jumper block. For each function, see the step-by-step instructions that follow. For more information about the Setup program, refer to Chapter 2.

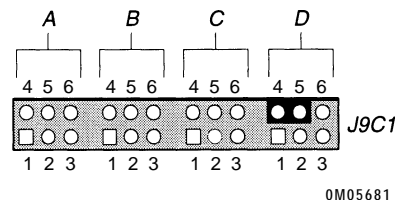
**Table 3. Jumpers for Setup Program Functions**

Function	Block	Pins	Description
Setup Program Access	J9C1-D	5-6	Enabled (default)
		4-5	Disabled
BIOS Recovery*	J9C1-A	5-6	Normal (default)
		4-5	Recover
CMOS Clear	J9C1-C	5-6	Keep (default)
		4-5	Clear
Password Clear	J9C1-D	2-3	Keep (default)
		1-2	Clear

\* Refer to Appendix B for information on upgrading the BIOS.

## How to Disable Access to the Setup Program

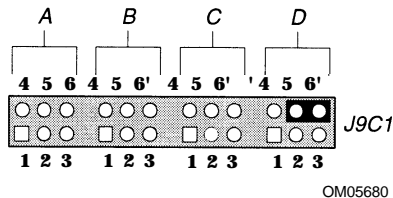
1. Observe the precautions in “Before You Begin” (see page 41).
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the computer cover.
4. On jumper block J9C1-D, move the jumper from pins 5-6 to pins 4-5 as shown below.



5. Replace the cover and turn on the computer.

## How to Enable Access to the Setup Program

1. Observe the precautions in “Before You Begin” (see page 41).
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the computer cover.
4. On jumper block J9C1-D, move the jumper from pins 4-5 to pins 5-6 as shown below.

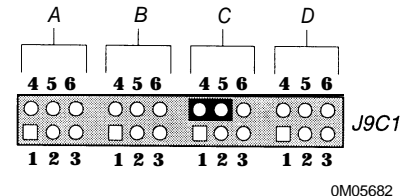


5. Replace the cover and turn on the computer.

## How to Clear CMOS RAM

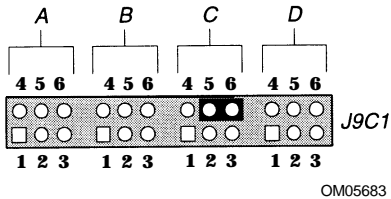
Normally, you should only have to do this procedure after you upgrade the BIOS.

1. Observe the precautions in “Before You Begin” (see page 41).
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the computer cover.
4. On jumper block J9C1-C, move the jumper from pins 5-6 to pins 4-5 as shown below.



5. Turn on the computer and allow it to boot.
6. Turn off the computer.

7. Move the jumper back to pins 5-6 to restore normal operation as shown below.

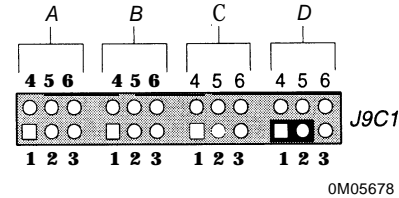


8. Replace the cover and turn on the computer.

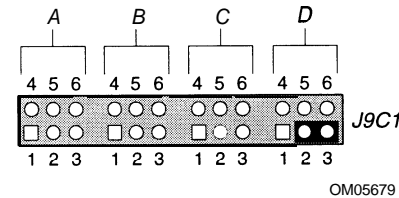
## How to Clear the User or Administrator Password

1. Observe the precautions in "Before You Begin" (see page 41).
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the computer cover.

4. On jumper block J9C1-D, move the jumper from pins 2-3 to pins 1-2 as shown below.



5. Turn on the computer and allow it to boot.
6. Turn off the computer.
7. Move the jumper back to pins 2-3 as shown below.



8. Replace the cover and turn on the power.

## How to Install the Processor

The processor installs in the Slot 1 connector on the motherboard.

### -NOTE

*Before you install the processor, you must install the retention mechanism that secures the processor to the motherboard.*

## How to Install the Retention Mechanism

To install the retention mechanism supplied with the motherboard:

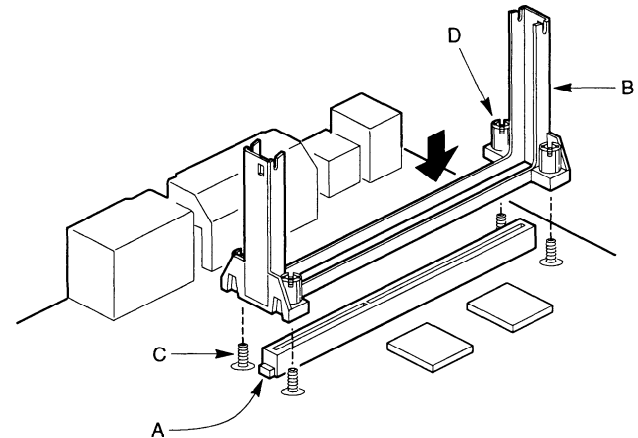
1. Locate **Slot 1** and the four attachment studs (C in Figure 4) on the motherboard.
2. To position the retention mechanism (B), orient it as shown in Figure 4. Note that tab (A) on Slot 1 fits into a notch in the retention mechanism.

### CAUTION

*Overtightening the captive nuts on the retention mechanism can damage the motherboard. Use caution when tightening these nuts.*

3. To secure the mechanism, tighten the four captive nuts (D) with a Phillips screwdriver.

**Figure 4. Installing the Processor Retention Mechanism**



OM05980D

You can now install the processor on the motherboard. Refer to the instructions that came with your processor.

After you have installed the processor, use the following information to set the motherboard jumpers for the processor's speed.

## How to Set the Processor Speed Jumpers

Table 4 lists jumper settings for 233 MHz and 266 MHz processors. Figure 3 shows the location of the jumper block. To set the jumpers follow the instructions after Table 4.

**Table 4. Jumpers for Processor Speed (MHz)**

Processor Speed*	Host Bus Speed	Block J9C1		
		A	B	C
233 MHz	66	2-3	2-3, 5-6	2-3
266 MHz	66	1-2	1-2, 4-5	2-3

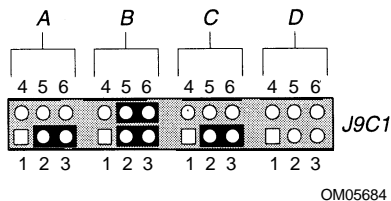
• See the processor's documentation for the correct speed (MHz).

To set jumpers for processor speed:

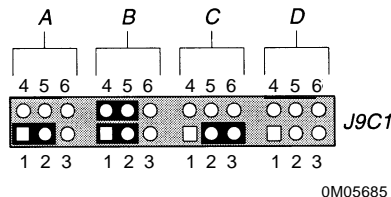
1. Observe the precautions in "Before You Begin" (see page 41).
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the computer cover.

4. On jumper block J9C1, place the jumpers on the pins as shown below.
5. Replace the cover and turn on the computer.

For a 233 MHz processor:



For a 266 MHz processor:



## How to Install Memory

The motherboard has four 72-pin, tin-lead SIMM sockets that support from 8 MB to 256 MB of memory. The sockets are arranged as banks 0 and 1 (Figure 5). Two sockets make up one bank.

When adding memory, follow these guidelines:

- When adding SIMMs, use only tin-lead, 72-pin, 50 or 60 ns EDO DRAM. Faster devices will not improve system performance.
- When you install SIMMs, you must completely fill at least one bank; that is, you must install SIMMs in both sockets of the bank.
- The computer automatically detects the installed memory, so it doesn't matter which bank is used, as long as both sockets in the bank are filled. Because of limited space on the motherboard, it might be easier to install SIMMs in bank 0 first.

- Both SIMMs in one bank must be the same size. For example, don't install a 4 MB SIMM in one socket of bank 0 and an 8 MB SIMM in the second socket of bank 0. You may, however, use different size SIMMs in different banks.

### NOTE

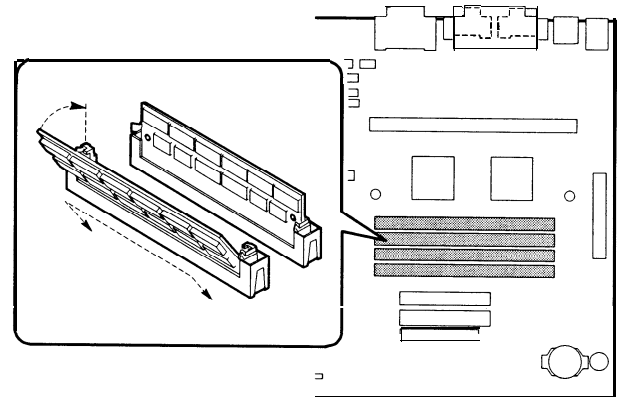
*The motherboard supports parity (x36) or non-parity (x32) SIMMs. Error checking and correction is supported with parity and ECC SIMMs. There is no error checking and correction with non-parity SIMMs.*



To install SIMMs, do the following:

1. Observe the precautions in “Before You Begin” (see page 41).
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the computer cover.
4. Holding the SIMM only by the edges, remove it from its antistatic package.
5. Position the SIMM at about a 45° angle relative to the motherboard. Make sure the small notch in the middle of the bottom edge of the SIMM aligns with the notch in the SIMM socket.
6. Insert the bottom edge of the SIMM into the SIMM socket and make sure it is seated firmly.
7. When the SIMM seats correctly, hold it at each end and gently push the top edge towards the retaining clips of the connector until the SIMM snaps into place (Figure 6). If the SIMM does not install correctly, gently spread the retaining clips just enough so that you can pull away the top edge of the SIMM and try again.
8. Reinstall and reconnect any parts you removed or disconnected to gain access to the SIMM sockets.
9. Replace the computer cover.

**Figure 6. Installing a SIMM**



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## How to Remove Memory

To remove a SIMM, do the following:

1. Observe the precautions in “Before You Begin” (see page 41).
2. Turn off all peripheral devices connected to the computer.
3. Turn off the computer.
4. Remove the computer cover.
5. Gently spread the retaining clip at each end of the SIMM socket, just enough to allow you to rotate the top edge of the SIMM downward to an angle of about 45°.
6. Holding the SIMM only by the edges, lift it away from the socket, and store it in an antistatic package.
7. Reinstall and reconnect any parts you removed or disconnected to gain access to the SIMM sockets.
8. Replace the computer cover.

## How to Replace the Battery

When your computer is turned off, a lithium battery keeps the time-of-day clock and the values in CMOS RAM current. Figure 6 shows the location of the battery.

The battery should last about seven years. When the battery begins to die, it loses voltage; when the voltage drops below a certain level, the Setup program settings stored in CMOS RAM (for example, the date and time) might not be accurate. If the battery dies, replace it with an equivalent battery.

If your local ordinances permit, you may dispose of individual batteries as normal trash. Do not expose batteries to excessive heat or fire. Keep all batteries away from children.

 **CAUTION**

*Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.*

 **ATTENTION**

*Il y a danger d'explosion s'il y a remplace ment incorrect de la ba tterie. Remplacer uniquement avec une batterie du même type ou d'un type recommande par le constructeur. Mettre au rebut les batteries usagees conformement aux instructions du fa brican t.*

 **ADVARSEL!**

*Lithiumba tteri - Eksplosjonsfare ved fejlagtig handtering. Udskiftning ma kun ske med batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leverandøren.*

 **ADVARSEL**

*Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av appara tfabrikanten. Brukt ba tteri returneres appara tleverandoren.*

 **VARNING**

*Explosionsfara vid felaktigt ba tteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av appara ttillverkaren. Kassera använ t ba tteri enligt fabrikan tens ins truktion.*

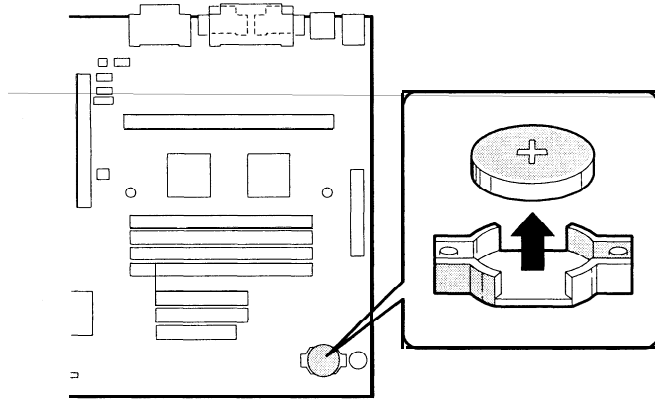
 **VAROITUS**

*Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä kajtetty paristo valmistajan ohjeiden mukaises ti.*

To replace the battery (see Figure 7):

1. Observe the precautions in "Before You Begin" (see page 41).
2. Turn off all peripheral devices connected to the computer. Turn off the computer.
3. Remove the computer cover.
4. With your fingers, gently pry the battery free from its socket, taking care to note the "+" and "-" orientation of the battery.
5. Install the new battery in the socket.
6. Replace the computer cover.

**Figure 7. Replacing the Battery**



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## How to Remove the Motherboard

See your chassis manual for instructions on removing and installing the motherboard.

### NOTES

*You will need a Phillips (#2 bit) screw driver.*

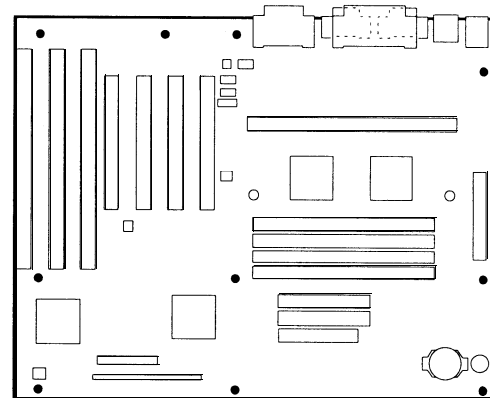
*See Appendix A for regulatory requirements and installation instructions and precautions.*

### **A** WARNING

***This procedure should be done only by qualified technical personnel. Disconnect the computer from its power source before doing the procedures described here. Failure to disconnect the power before you open the computer can result in personal injury or equipment damage.***

The motherboard is secured to the chassis by ten screws. The locations of the mounting screw holes are shown in Figure 8.

**Figure 8. Mounting Screw Holes (shown in black)**



OM05689

# Error and Information Messages

## BIOS Beep Codes

One long beep followed by several short beeps indicates a video problem.

**Table 6. Beep Codes**

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	A parity error occurred in system memory.
3	First Bank Memory Failure	Memory failure in the first bank of memory.
4	Timer Not Operational	Memory failure in the first bank of memory or Timer 1 on the motherboard is not functioning.
5	Processor Error	The processor generated an error.

**Table 6. Beep Codes (continued)**

Beeps	Error Message	Description
6	Keyboard Controller Failure	The keyboard controller may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The processor generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	ROM checksum value does not match the value encoded in the BIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.

## PCI Configuration Error Messages

The following PCI messages are displayed as a group with bus, device and function information.

**Table 7. PCI Configuration Error Messages**

Message	Explanation
Bad PnP Serial ID Checksum	The Serial ID checksum of a Plug and Play card was invalid.
Floppy Disk Controller Resource Conflict	The floppy disk controller has requested a resource that is already in use.
NVRAM Checksum Error, NVRAM Cleared	The ESCD data was reinitialized because of an NVRAM checksum error. Try rerunning the ICU.
NVRAM Cleared By Jumper	The "CMOS Clear" jumper has been moved to the "Clear" position and CMOS RAM has been cleared.
NVRAM Data Invalid, NVRAM Cleared	Invalid entry in the ESCD.
Parallel Port Resource Conflict	The parallel port has requested a resource that is already in use.

continued 

**Table 7. PCI Configuration Error Messages (continued)**

Message	Explanation
PCI Error Log is Full	This message is displayed when more than 15 PCI conflict errors are detected. No additional PCI errors can be logged.
PCI I/O Port Conflict	Two devices requested the same resource, resulting in a conflict.
PCI IRQ Conflict	Two devices requested the same resource, resulting in a conflict.
PCI Memory Conflict	Two devices requested the same resource, resulting in a conflict.
Primary Boot Device Not Found	The designated primary boot device (hard disk drive, diskette drive, CD-ROM drive, or network) could not be found.
Primary IDE Controller Resource Conflict	The primary IDE controller has requested a resource that is already in use.
Primary Input Device Not Found	The designated primary input device (keyboard, mouse, or other, if input is redirected) could not be found.

continued 


**Table 7. PCI Configuration Error Messages (continued)**

Message	Explanation
Secondary IDE Controller Resource Conflict	The secondary IDE controller has requested a resource that is already in use.
Serial Port 1 Resource Conflict	Serial port 1 has requested a resource that is already in use.
Serial Port 2 Resource Conflict	Serial port 2 has requested a resource that is already in use.
Static Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.
System Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.

## BIOS Error Messages

**Table 8. BIOS Error Messages**

Error Message	Explanation
A20 Error	Gate A20 on the keyboard controller is not working.
Address Line Short!	Error in the address decoding circuitry on the baseboard.
CH-2 Timer Error	Most systems include two timers. There is an error in timer 2.
CMOS Battery State Low	The battery power is low. Replace the battery.
CMOS Checksum Failure	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by the BIOS. Run Setup.

continued 



**Table 8. BIOS Error Messages (continued)**

<b>Error Message</b>	<b>Explanation</b>
CMOS Memory Size Mismatch	The amount of memory on the motherboard is different than the amount indicated in CMOS RAM. Run Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run Setup.
CMOS Time and Date Not Set	Run Setup to set the 'date, and time' in CMOS RAM.
Diskette Boot Failure	The boot disk in floppy drive A is corrupt. It cannot be used to boot the system. Use another boot disk and follow the screen instructions.
DMA Error	Error in the DMA controller.
DMA #1 Error	Error in the first DMA channel.
DMA #2 Error	Error in the second DMA channel.
FDD Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.

continued 

**Table 8. BIOS Error Messages (continued)**

<b>Error Message</b>	<b>Explanation</b>
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS can read the disk in floppy drive A, but cannot boot the system. Use another boot disk.
Keyboard Is Locked...Unlock It	The keyboard lock on the computer is engaged. Unlock the computer to continue.
Keyboard Error	There is a timing problem with the keyboard.
KB/Interface Error	There is an error in the keyboard controller

continued 

**Table 8. BIOS Error Messages (continued)**

<b>Error Message</b>	<b>Explanation</b>
Off Board Parity Error	Parity error in memory installed in an expansion slot. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (xxxx) where xxxx is the address where the error occurred.
On Board Parity Error	Parity error detected in system memory.
Parity Error	Parity error in system memory at an unknown address.

## ISA NMI Messages

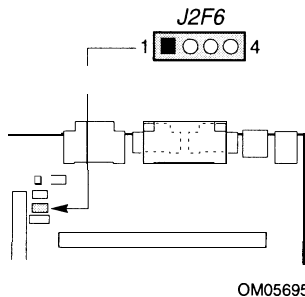
**Table 9. ISA NMI Messages**

<b>ISA NMI Message</b>	<b>Explanation</b>
Memory Parity Error at xxxxx	Memory failed. If the memory location can be determined, it is displayed as xxxxx. If the memory location cannot be determined, the message is: Memory Parity Error ????.
I/O Card Parity Error at xxxxx	An expansion card failed. If the address can be determined, it is displayed as xxxxx. If the address cannot be determined the message is: I/O Card Parity Error ????.
DMA Bus Time-out	A device has driven the bus signal for more than 7.8 microseconds.

# Technical Reference

## Motherboard Connectors

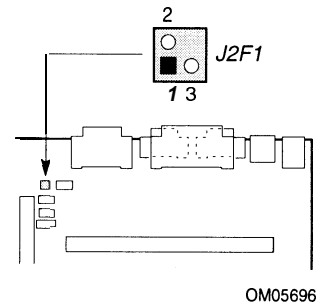
### CD-ROM Audio Connector



**Table 10. CD-ROM Audio Connector Pinout**

Pin	Signal Name
1	Ground
2	CD-Left
3	Ground
4	CD-Right

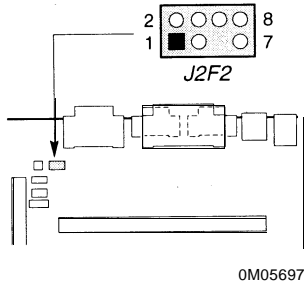
### Telephony Connector



**Table 11. Telephony Connector Pinout**

Pin	Signal Name
1	Ground
2	Mono In
3	Mono Out
4	Key

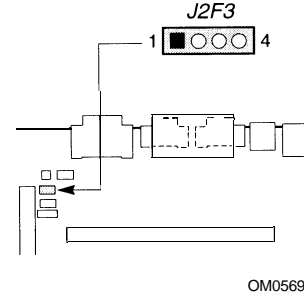
## Wavetable Connector



**Table 12. Wavetable Connector Pinout**

Pin	Signal Name
1	Waveright
2	Ground
3	Waveleft
4	Ground
5	Key
6	Ground
7	No connection
8	MIDI_OUT

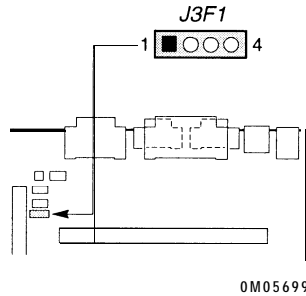
## Telephony Connector



**Table 13. Telephony Connector Pinout**

Pin	Signal Name
1	Mono In
2	Ground
3	Ground
4	Mono Out

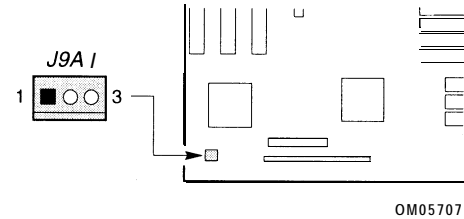
## Audio Line In Connector



**Table 14. Audio Line In Connector Pinout**

Pin	Signal Name
1	Left Line In
2	Ground
3	Ground
4	Right Line In (monaural)

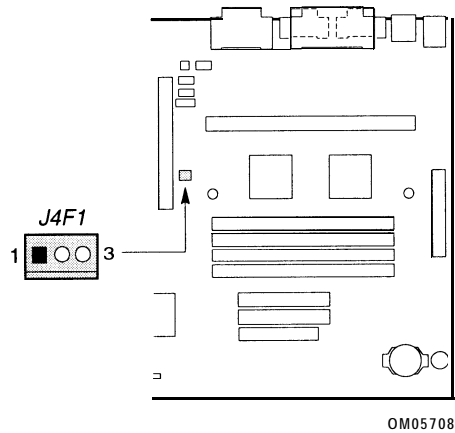
## Fan 1 Connector



**Table 15. Fan 1 Connector Pinout**

Pin	Signal Name
1	Ground
2	+12 V
3	FAN_SEN

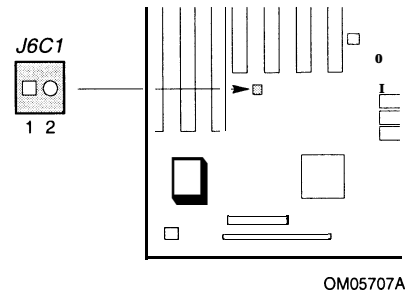
## Fan 3 Connector



**Table 16. Fan 3 Connector Pinout**

Pin	Signal Name
1	Ground
2	+12 V
3	FAN_SEN

## Chassis Security Connector



**Table 17. Chassis Security Connector Pinout**

Pin	Signal Name
1	Ground
2	CHS_SEC

# Front Panel Connectors

The motherboard has connectors for controls and indicators typically located on the front panel of the computer.

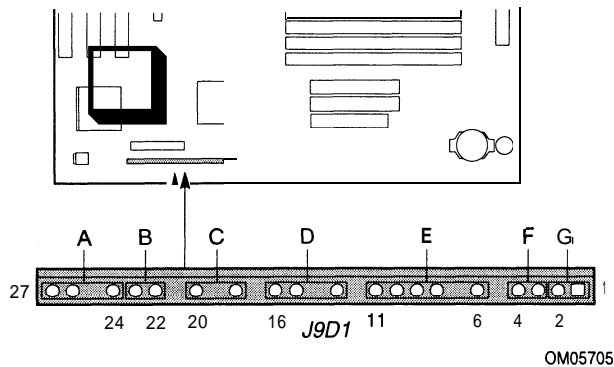


Table 18. Front Panel Connectors

Connector	Pin	Signal Name
A. Speaker*	27	SPKR_HDR
	26	PIEZO_IN
	25	Key
	24	Ground

continued

Table 18. Front Panel Connectors (continued)

Connector	Pin	Signal Name
B. Reset switch	23	SW_RST
	22	Ground
		Key
C. Power LED	20	+5 V
	19	Key
	18	Ground
		Key
D. Hard drive LED	16	+5 V
	15	HD Active#
	14	Key
	13	+5 V
		Key
E. Infrared	11	CONIR (consumer IR)
	10	IrTX (transmit)
	9	Ground
	8	IrRX (receive)
	7	Key
	6	+5 V
		Key
F. Sleep switch	4	+5 V
	3	SI_EEP
G. Power switch	2	Ground
	1	SW_ON#


\* A jumper on pins 26-27 enables the onboard speaker.

## Motherboard Resources

### Memory Map

**Table 19. Memory Map**

Address Range (Decimal)	Address Range (hex)	Size	Description
1024K-262144K	1 00000-10000000	255M	Extended memory
960K-1024K	F0000-FFFFF	64K	System BIOS
944K-960K	EC000-EFFFF	16K	Boot Block
936K-944K	EA000-EBFFF	8K	ESCD (Plug and Play configuration area)
932K-936K	E9000-E9FFF	4K	Reserved for BIOS
928K-932K	E8000-E8FFF	4K	OEM logo area
896K-928K	E0000-E7FFF	32K	BIOS reserved
800K-896K	C8000-DFFFF	96K	Available high DOS memory (open to ISA and PCI bus)

continued 

**Table 19. Memory Map (continued)**

Address Range (Decimal)	Address Range (hex)	Size	Description
640K-800K	A0000-C7FFF	160K	Video memory and BIOS
639K-640K	9FC00-9FFFF	1K	Extended BIOS Data (moveable by memory management software)
512K-639K	80000-9FBFF	127K	Extended conventional memory
OK-51 2K	00000-7FFFF	512K	Conventional memory



## I/O Map

Table 20. I/O Map

Address (hex)	Size	Description
0000 - 000F	16 bytes	PIIX3 - DMA 1
0020 - 0021	2 bytes	PIIX3 - Interrupt Controller 1
002E - 002F	2 bytes	I/O Controller Config. Reg.
0040 - 0043	4 bytes	PIIX3 - Timer 1
0048 - 004B	4 bytes	PIIX3 - Timer 2
0060	1 byte	Keyboard Controller Byte - Reset IRQ
0061	1 byte	PIIX3 - NMI, speaker control
0064	1 byte	Keyboard Controller, CMD/STAT Byte
0070, bit 7	1 bit	PIIX3 - Enable NMI
0070, bits 6:0	7 bits	PIIX3 - Real Time Clock, Address
0071	1 byte	PIIX3 - Real Time Clock, Data
0078	1 byte	Reserved - Brd. Config.
0079	1 byte	Reserved - Brd. Config.
0080 - 008F	16 bytes	PIIX3 - DMA Page Registers
00A0 - 00A1	2 bytes	PIIX3 - Interrupt Controller 2

continued 

Table 20. I/O Map (continued)

Address (hex)	Size	Description
00B2 - 00B3	2 bytes	APM Control
00C0 - 00DE	31 bytes	PIIX3 - DMA 2
00F0	1 byte	Reset Numeric Error
0170 - 0177	8 bytes	Secondary IDE Channel
01F0 - 01F7	8 bytes	Primary IDE Channel
0200 - 0207	8 bytes	Game Port
0220 - 022F	16 bytes	Audio
0240 - 024F	16 bytes	Audio
0278 - 027F	8 bytes	Parallel Port 2
0295	1 byte	Hardware 'monitor'
<b>0296</b>	1 byte	Hardware monitor'
02E8 - 02EF	8 bytes	Serial Port 4/Video (8514A)
02F8 - 02FF	8 bytes	Serial Port 2
0300 - 0301	2 bytes	MPU-401 (MIDI)
0330 - 0331	2 bytes	MPU-401 (MIDI)
0332 - 0333	2 bytes	MPU-401 (MIDI)
0334 - 0335	2 bytes	MPU-401 (MIDI)
0376	1 byte	Sec. IDE Chan. Cmd. Port


continued 

Table 20. I/O Map (continued)

Address (hex)	Size	Description
0377	1 byte	Floppy Chan. 2 Cmd.
0377, bit 7	1 bit	Floppy Disk Chg. Chan. 2
0377, bits 6:0	7 bits	Sec. IDE Chan. Status Port
0378 - 037F	8 bytes	Parallel Port 1
0388 - 038D	6 bytes	FM Synthesizer
03B4 - 03B5	2 bytes	VGA
03BA	1 byte	VGA
03BC - 03BF	4 bytes	Parallel Port 3
03C0 - 03CA	2 bytes	VGA
03CC	1 byte	VGA
03CE - 03CF	2 bytes	VGA
03D4 - 03D5	2 bytes	VGA
03DA	1 byte	VGA
03E8 - 03EF	8 bytes	Serial Port 3
03F0 - 03F5	6 bytes	Floppy Channel 1
03F6	1 byte	Pri. IDE Chan. Cmd. Port
03F7 (Write)	1 byte	FloppyChan.1Cmd.

continued 

Table 20. I/O Map (continued)

Address (hex)	Size	Description
03F7, bit 7	1 bit	Floppy Disk Chg. Chan. 1
03F7, bits 6:0	7 bits	Pri. IDE Chan. Status Port
03F8 - 03FF	8 bytes	Serial Port 1
04D0 - 04D1	2 bytes	Edge/level triggered PIC
0530 - 0537	8 bytes	Windows Sound System
0604 - 060B	8 bytes	Windows Sound System
LPT + 400h	8 bytes	ECP port, LPT + 400h
0CF8 - 0CFB*	4 bytes	PCI Config. Address Reg.
0CF9**	1 byte	Turbo & Reset Control Reg.
OCFC - OCFE	4 bytes	PCI Config. Data Reg.
OE80 - OE87	8 bytes	Windows Sound System
OF40 - OF47	8 bytes	Windows Sound System
OF86 - OF87	2 bytes	Yamaha OPL3-SA Config.
FF00 - FF07	8 bytes	IDE Bus Master Reg.
FFA0 - FFA7	8 bytes	Pri. Bus Master IDE Reg.
FFA8 - FFAF	8 bytes	Sec. Bus Master IDE Reg.

\* Only by DWORD accesses.

\*\* Only by Byte accesses.

## PCI Configuration Space Map

Table 21. PCI Configuration Space Map

Bus Number (hex)	Device Number (hex)	Function Number (hex)	Description
00	00	00	Intel 82441 FX (PMC)
00	07	00	Intel 82371SB (PIIX3) PCI/ISA Bridge
00	07	01	Intel 82371SB (PIIX3) IDE Bus Master
00	07	02	Intel 82371SB (PIIX3) USB
00	0B	00	PCI Expansion Slot 1 (J4E2)
00	0F	00	PCI Expansion Slot 2 (J4E1)
00	01	00	PCI Expansion Slot 3 (J4D1)
00	13	00	PCI Expansion Slot 4 (J4C1)

## DMA Channels

Table 22. DMA Channels

DMA	Data Width	System Resource
0	8- or 16-bits	Audio if present, else parallel port
1	8- or 16-bits	Audio if present, else available
2	8- or 16-bits	Floppy drive
3	8- or 16-bits	Audio if present, else parallel port (for ECP/EPP configuration)
4	16-bits	Reserved - Cascade Channel
5	16-bits	Available
6	16-bits	Available
7	16-bits	Available

## Interrupts

**Table 23. interrupts**

---

<b>IRQ</b>	<b>System Resource</b>
NMI	I/O channel check
0	Reserved, interval timer
1	Reserved, keyboard buffer full
2	Reserved, cascade interrupt from slave PIC
3	Serial Port 2
4	Serial Port 1
5	Parallel Port 2
6	Floppy drive
7	Parallel Port 1
8	Real-time clock
9	User available
10	User available
11	Audio if present, else user available
12	Onboard mouse port if present, else user available
13	Reserved, math coprocessor
14	Primary IDE if present, else user available
15	Secondary IDE if present, else user available

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# Regulatory and Integration Information

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This appendix contains:

- Safety standards, electromagnetic compatibility regulations, and product certification markings for this motherboard
- Instructions and precautions for integrators who are installing this motherboard in a chassis

## Regulatory Requirements

This printed circuit assembly meets the following safety and electromagnetic interference (EMI) regulations when correctly installed in a compatible host computer.

## Safety Standards

**UL 1950 - CSA 950-95, 3rd edition, 28 July 1995**

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (USA and Canada)

**CSA C22.2 No. 950-95, 3rd Edition**

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (Canada)

**EN 60 950, 2nd Edition, 1992 (with Amendments 1, 2, and 3)**

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (European Union)

**IEC 950, 2nd edition, 1991  
(with Amendments 1, 2, and 3)**

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (International)

**EMKO-TSE (74-SEC) 207/94**

Summary of Nordic deviations to EN **60 950**. (Norway, Sweden, Denmark, and Finland)

**Electromagnetic Interference  
(EMI) Regulations**

**FCC Class B**

Title 47 of the Code of Federal Regulations, Parts 2 and 15, Subpart B, pertaining to unintentional radiators. (USA)

**CISPR 22, 2nd Edition, 1993**

Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (International)

**EN 55 022, 1995**

Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (Europe)

**EN 50 082-1, 1992**

Generic Immunity Standard. Currently compliance is determined via testing to IEC 801-2, -3 and -4. (Europe)

**VCCI Class 2 (ITE)**

Implementation Regulations for Voluntary Control of Radio Interference by Data Processing Equipment and Electronic Office Machines. (Japan)

**ICES-003, Issue 2**

Interference-Causing Equipment Standard, Digital Apparatus. (Canada)

## Product Certification Markings

This printed circuit assembly has the following product certification markings:

- European CE Mark
  - Marking on the board or shipping container.
- UL Recognition Mark
  - Marking is the UL File No. EI39761 on the component side of the board and the PB No. on the solder side of the board. Board material flammability is 94V-1 or -0.
- Canadian Compliance Mark
  - Marking is a small c followed by a stylized backward UR on the component side of the board.

## Installation Precautions

When you install and test the motherboard, observe all warnings and cautions in the installation instructions.

To avoid injury, be careful of:

- Sharp pins on connectors
- Sharp pins on printed circuit assemblies
- Rough edges and sharp corners on the chassis
- Hot components (like processors, voltage regulators, and heat sinks)
- Damage to wires that could cause a short circuit

Observe all warnings and cautions that instruct you to refer computer servicing to qualified technical personnel.

### **A** WARNING

***Do not open the power supply. Risk of electric shock and burns from high voltage and rapid overheating. Refer servicing of the power supply to qualified technical personnel.***

## Installation Instructions



### CAUTION

*Follow these guidelines to meet safety and regulatory requirements when installing this board assembly.*

Read and adhere to all of these instructions and the instructions supplied with the host computer and associated modules. If the instructions for the host computer are inconsistent with these instructions or the instructions for associated modules, contact the supplier's technical support to find out how you can ensure that your computer meets safety and regulatory requirements. If you do not follow these instructions and the instructions provided by host computer and module suppliers, you increase safety risk and the possibility of non-compliance with regional laws and regulations.

### Ensure Electromagnetic Compatibility (EMC)

Before computer integration, make sure that the host chassis, power supply, and other modules have passed EMC testing using a motherboard

with a microprocessor from the same family (or higher) and operating at the same (or higher) speed as the microprocessor on this motherboard.

In the installation instructions for the host chassis, power supply, and other modules pay close attention to the following:

- Certifications (see page 75)
- External I/O cable shielding and filtering
- Mounting, grounding, and bonding requirements
- Keying connectors when mismatching of connectors could be hazardous

If the host chassis, power supply, and other modules have not passed applicable EMC testing before integration, EMC testing must be conducted on a representative sample of the newly completed computer.



## Ensure Host Computer and Accessory Module Certifications

Make sure that the host computer, any added subassembly, such as a board or drive assembly, and internal or external wiring, are certified for the region(s) where the end-product will be used. Marks on the product are proof of certification. Certification marks are as follows:

### In Europe

The CE marking signifies compliance with all relevant European requirements. If the host computer does not bear the CE marking, obtain a supplier's Declaration of Conformity to the appropriate standards required by the European EMC Directive and Low Voltage Directive. Other directives, such as the Machinery and Telecommunications Directives, may also apply depending on the type of product. No regulatory assessment is necessary for low voltage DC wiring used internally or wiring used externally when provided with appropriate overcurrent protection. Appropriate protection is provided by a maximum 8-Amp current limiting circuit or a maximum 5-Amp fuse or positive temperature coefficient (PTC) resistor. All Intel motherboards now have PTCs on all external ports that provide DC power externally.

### In the United States

A certification mark by a Nationally Recognized Testing Laboratory (NRTL) such as UL, CSA, or ETL signifies compliance with safety requirements. External wiring must be UL Listed and suitable for the intended use. Internal wiring must be UL Listed or Recognized and rated for applicable voltages and temperatures. The FCC mark (Class A for commercial or industrial only or Class B for residential) signifies compliance with electromagnetic interference requirements.

### In Canada

A nationally recognized certification mark such as CSA or cUL signifies compliance with safety requirements. No regulatory assessment is necessary for low voltage DC wiring used internally or wiring used externally when provided with appropriate overcurrent protection. Appropriate protection is provided by a maximum 8-Amp current limiting circuit or a maximum 5-Amp fuse or positive temperature coefficient (PTC) resistor. All Intel motherboards now have PTCs on all external ports that provide DC power externally.

## Prevent Power Supply Overload

Unless the power supply has inherent overcurrent protection, do not overload the power supply output. To avoid overloading the power supply, make sure that the calculated total current load of all the modules within the computer is less than the output current rating of the power supply. If you do not do this, the power supply could overheat, catch fire, or damage the insulation that separates hazardous AC line circuitry from low-voltage user accessible circuitry. If the load drawn by a module cannot be determined by the markings and instructions supplied with the module, contact the module supplier's technical support.

## Place Battery Marking on the Computer

There is insufficient space on this motherboard to provide instructions for replacing and disposing of the battery. The following warning must be placed permanently and legibly on the host computer as near as possible to the battery.

## **A** WARNING

***Danger of explosion if battery is incorrectly replaced.***

***Replace with only the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.***

## Use Only for Intended Applications

This product was evaluated for use in computers that will be installed in offices, homes, schools, computer rooms and similar locations. The suitability of this product for other applications, (such as medical, industrial, alarm systems, and test equipment) may require further evaluation.

# Upgrading the BIOS

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This appendix explains how to use the BIOS upgrade utility and how to recover the BIOS if an upgrade fails.

## Record the Current BIOS Settings

1. Boot the computer and press <F1> when you see the message:

`Press <F1> Key if you want to run SETUP`

### NOTE

*Do not skip step 2. You will need these settings to configure your computer at the end of the procedure.*

2. Write down the current settings in the BIOS Setup program (see Chapter 2).

## How to Upgrade the BIOS

To upgrade the BIOS, you will need Intel's Flash upgrade utility, the files containing the new BIOS, and the files for BIOS recovery.

To obtain these files, contact your computer supplier or go to the Intel World Wide Web site: [www.intel.com](http://www.intel.com).

The following steps explain how to upgrade the BIOS.

## Create a Bootable Floppy Disk

1. Use a DOS, Windows 95, or Windows NT<sup>†</sup> system to create the floppy disk.
2. Insert a floppy disk in floppy drive A.

3. At the C:\ prompt,  
for an unformatted floppy disk, type:

```
format a:/s
```

or, for a formatted floppy disk, type:

```
sys a:
```

4. Press <Enter>

### Create the BIOS Upgrade Floppy Disk

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade the BIOS.

1. Copy the BIOS upgrade file to a temporary directory on your hard disk.
2. From the C:\ prompt, change to the temporary directory.
3. To extract the file, type the name of the BIOS upgrade file, for example:  
  
10006CS1.EXE

4. Press <Enter>.

The extracted file contains the following files:

```
LICENSE.TXT
```

```
README.TXT
```

```
BIOS.EXE
```

5. Read the `LICENSE.TXT` file, which contains the software license agreement and the `README.TXT` file, which contains the instructions for the BIOS upgrade.
6. Insert the bootable floppy disk into drive A.
7. To extract the `BIOS.EXE` file to the floppy disk, change to the temporary directory that holds the `BIOS.EXE` file and type:  
  
BIOS A:
8. Press <Enter>.
9. The bootable floppy disk now holds the BIOS upgrade and recovery files.

## Make a Copy of the Current BIOS

1. Insert the bootable floppy disk with the upgrade files into drive A of the computer you want to upgrade.
2. Boot the computer. The BIOS Upgrade Utility appears.
3. To go to the Main menu, press `<Enter>`.
4. Select `Save Flash Memory to a File`.
5. Select `Save System BIOS`.
6. Type the path and file name (with the `.bio` extension) for the saved BIOS. For example:  
`A:\oldbios.bio`
7. Press `<Enter>`.

### NOTE

*If there is not enough space on the disk, use another pre-formatted floppy disk to save the old BIOS.*

8. Type a description of this BIOS in the Image Title area. For example:  
`Old BIOS as of 10 Oct 96`
9. Press `<Enter>`.

10. To copy the current BIOS to the floppy disk, press `<Enter>`.
11. When the copy is complete, the Main menu displays.
12. If you used a different floppy disk to save the old BIOS, remove it. Insert the BIOS upgrade floppy disk in drive A.

## Upgrade the BIOS

1. Boot the computer. The BIOS Upgrade Utility appears.
2. Select `Update Flash Memory From a File`.
3. Select `Update System BIOS`. Press `<Enter>`.
4. Use the arrow keys to select the correct `.bio` file. Press `<Enter>`.
5. When the utility asks for confirmation that you want to load the new Flash into memory, select `Continue with Programming`. Press `<Enter>`.
6. When the utility displays the message `upgrade is complete, removethefloppy disk`. Press `<Enter>`.

7. As the computer boots, check the BIOS identifier (version number) to make sure the upgrade was successful.
8. To enter the Setup program, press <F1> when you see the message:  
`Press <F1> Key if you want to run SETUP`
9. For proper operation you must load the Setup program defaults. To load the defaults, press <F5>.
10. To accept the defaults, press <Enter>.
11. Set the options in the Setup program to the settings that you wrote down before the BIOS upgrade.
12. To save the settings, press <F10>.
13. To accept the settings, press <Enter>.
14. Turn off the computer and reboot.

## How to Recover the BIOS if an Upgrade Fails

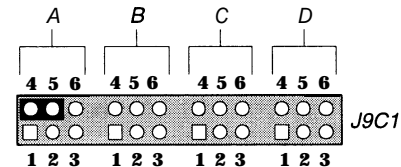
It is unlikely that anything will interrupt the BIOS upgrade; however, if an interruption occurs, the BIOS could be damaged. The following steps

explain how to recover the BIOS if an upgrade fails.

### NOTE

*Because of the small amount of code available in the non-erasable boot block area, there is no video support. You will not see anything on the screen during the procedure. Monitor the procedure by listening to the speaker and looking at the floppy drive LED.*

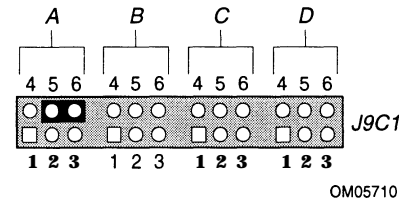
1. Turn off the computer and disconnect the AC power cord from the computer. Remove the computer cover.
2. See Chapter 3 (Figure 3) for the location of the BIOS recovery jumper.
3. On jumper block J9C1-A, move the jumper from pins 5-6 to pins 4-5 as shown below.



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4. Replace the computer cover.

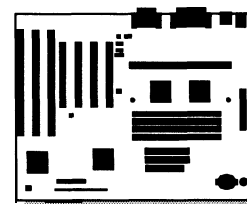
5. Insert the bootable BIOS upgrade floppy disk into floppy drive A.
6. Reconnect the AC power cord and turn on the computer. The recovery process will take a few minutes.
7. Listen to the speaker.
  - a. Two beeps and the end of activity in drive A indicate successful BIOS recovery.
  - b. A series of continuous beeps indicates failed BIOS recovery.
8. If recovery fails, return to step 1 and repeat the recovery process.
9. If recovery is successful, turn off the computer and disconnect the AC power cord from the computer. Remove the computer cover and continue with the following steps.
- 10.** On jumper block J9C1-A, move the jumper back to pins 5-6 as shown below.



11. Replace the computer cover and reconnect the AC power cable; leave the upgrade disk in drive A and turn on the computer.
12. Continue with the BIOS upgrade (see page 79).

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