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Radio Frequency Interference Testing

(USA) This equipment has been tested for radio frequency emissions and has been certified to the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. For more information about compliance with FCC regulations about RFI, see Chapter 7 in this manual.

(Europe) This equipment complies with the relevant clauses of following European directives: 89/336/EEC and 73/23/EEC, and is able to bear the CE mark.

Safety

This equipment meets or exceeds requirements for safety in the US (UL 1950), Canada (CSA 950), Europe (EN 60950) and international (IEC 950).

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Contents

1	Product Description
	Feature Summary1-2
	Central Processing Unit (CPU)1-3
	System Memory1-3
	Cache Memory1-3
	Enhanced PCI/IDE Peripheral Interface1-4
	System I/O1-4
	System BIOS1-5
	BIOS Upgrades1-5
	Plug and Play1-5
	Expansion Slots1-6
	Power Management1-6
	Integrated 16-bit Audio1-6
	Video Graphics Subsystem1-7
	Power Supply1-7
	System Security1-7
	Battery 1-8
	Speaker1-8
	•
2	Installing Your System
_	Selecting a Site2-2
	Checking the Input Voltage Setting2-3
	Checking the Power Cord2-4
	Connecting Devices When Configuring the System2-4
	Before Installing Optional Items2-4
	System Front Panel Controls and Indicators2-5
	Back Panel Connectors and Features2-6
	Turning on the System at First Start-up2-7
	Resetting the System2-9
	Using Keyboard Shortcuts2-9
	Setting Fast and Slow CPU Modes2-10
	Setting Up Add-in Boards and Drives2-10
	betting op rade in bourds and brives

5	Using the Setup Program
	Make a Record of the Setup Configuration3-1
	Overview of the Setup Menu Screens3-2
	Overview of the Setup Keys3-3
	Main BIOS Setup Screen3-4
	System Date3-4
	System Time3-4
	Floppy Options3-4
	Primary IDE Master3-4
	Primary IDE Slave3-4
	Secondary IDE Master3-4
	Secondary IDE Slave3-4
	Language3-4
	Boot Options3-5
	Video Mode3-5
	Mouse3-5
	Base Memory3-5
	Extended Memory3-5
	Floppy Options Subscreen3-6
	Floppy A:
	Floppy B:
	Floppy A: Type3-6
	Floppy B: Type
	IDE Configuration Subscreen
	IDE Device Configuration
	Number of Cylinders
	Number of Heads
	Number of Sectors
	Maximum Capacity
	IDE Translation Mode
	Multiple Sector Setting
	Fast Programmed I/O Modes
	Boot Options Subscreen3-9
	First Boot Device
	Second Boot Device
	Third Boot Device
	Fourth Boot Device
	System Cache
	Boot Speed
	Num Lock 3-10
	Setup Prompt
	Typematic Rate Programming3-10

iv Contents

Typematic Rate Delay3-10
Typematic Rate3-10
Advanced Screen3-11
Processor Type3-11
Processor Speed3-11
Cache Size3-11
Peripheral Configuration3-11
Advanced Chipset Configuration3-11
Power Management Configuration3-11
Plug and Play Configuration3-11
Peripheral Configuration Subscreen3-12
Configuration Mode3-12
PCI IDE Interface3-12
Floppy Interface3-12
Serial Port 1 Address3-12
Serial Port 2 Address3-13
Serial Port 2 IR Mode3-13
Parallel Port Address3-13
Parallel Port Mode3-13
Advanced Chipset Configuration Subscreen3-14
Base Memory Size3-14
ISA LFB Size3-14
ISA LFB Base Address3-14
Video Palette Snoop3-14
Latency Timer (PCI Clocks)3-14
PCI Burst3-14
Bank O SIMM Detected3-15
Bank 1 SIMM Detected3-15
Power Management Configuration Subscreen3-16
Advanced Power Management3-16
IDE Drive Power Down3-16
VESA Video Power Down3-16
Inactivity Timer3-16
Hot Key3-16
Plug and Play Configuration Subscreen3-17
Configuration Mode3-17
Boot with PnP OS3-17
ISA Shared Memory Size3-17
ISA Shared Memory Base Address3-17
IRQ 3, 4, 5, 7, 9, 10, 11, 123-18
Security Screen3-19
Administrative and User Access Modes3-19

20 20 20 20 20 20 20 21
20 20 20 20 20 21
20 20 20 21
20 20 21
20 21
21
0.1
21
21
21
21
1-1
1-3
1-5
1-5
1-6
1-7
1-9
1-9
-10
-11
-11
12
-13
-14
-14
-15
-16
17
18
22
22
23
ıs
5-1
5-3

vi Contents

	Jumper Block Overview	5-4
	How to Disable Access to the Setup Program	5-7
	How to Clear CMOS RAM	5-7
	How to Clear the Password	5-7
	How to Set the ISA Bus Clock Speed Jumper	5-8
	Installing an OverDrive® Processor	5-9
	Clearance Requirements	5-9
	Installing the Upgrade	5-10
	Installing Single In-line Memory Modules (SIMMs)	5-13
	Removing SIMMs	5-16
	Installing Video DRAM	5-17
	Replacing the Battery	5-19
6	Solving Problems	
	Resetting the System	6-1
	Troubleshooting Procedure	
	Problems at Initial System Start-up	
	Problems After the System Has Been Running Correctly	
	Problems Running New Application Software	
	Problems Operating Add-in Boards	
	Problems and Suggestions	
	Error and Information Messages	
	Beep Codes	
	Error and Information Messages	
	PCI Configuration Status and Error Messages	
7	Technical Reference	
•	Safety Compliance	7-1
	Dimensions	
	System Environment	
	Power Supply Specifications	
	AC Input	
	Power Supply Output	
	Board Connectors	
	Primary Power Connector	
	Diskette Drive Connector	
	IDE Connectors	
	Hard Drive LED Connector	7-6
	Remote On/Off	
	Reset Connector	

	Sleep/Resume Connector7-9	
	Infra-red Connector7-10	
	Speaker Connector7-11	
	Wave Table Connector7-12	
	CD-ROM Audio Interface Connector7-12	
	Voice Modem Audio Interface7-12	
	VGA Connector7-13	
	VESA Feature Connector7-14	
	ISA Connectors7-15	
	PCI Connectors	
	System I/O Addresses7-20	
	Memory Map7-22	
	Board Interrupts7-23	
	DMA7-24	
	Electromagnetic Compatibility (EMC)7-25	
	Electromagnetic Compatibility Notice (USA)7-25	
	Electromagnetic Compatibility Notices (International) 7-26	
A	BIOS Update	_
, ,	BIOS UpdateA-1	
	Using the Upgrade Utility	
	Oshig the Opgrade Others	
В	Installing Software Drivers	
	Installing Plug and Play SoftwareB-1	
	Installing Power Management SoftwareB-2	
	Turning the System Off with APM InstalledB-2	
	Using the Suspend/Resume FeatureB-3	
	•	
_	Ontional Interreted Audia Custom	_
С	Optional Integrated Audio System	
	Audio System Features	
	System Board Audio Connectors	
	CD-ROM-to-Audio Interface Connector	
	Voice Modem Audio Interface Connector	
	Audio Software	
	Windows Software	
	Audio Input	

viii Contents

	CS32MIX.EXE:	C-3
	CS4232C.EXE	C-3
	CSACGUCD.EXE	C-3
	CS32DIAG.EXE	C-3
	CS32INTR.EXE	C-3
	Basic Audio System Controls	
	How to Play a MIDI File	
	How to Play a WAV File	C-4
	How to Control the Volume	
	How to Mix Sounds	
D	Optional Graphics Controller	
D	Optional Graphics Controller Installing Video Drivers	D-1
D	Installing Video Drivers	
D		D-2
D	Installing Video Drivers Using the Galileo Control Panel Resolution	D-2 D-3
D	Installing Video Drivers Using the Galileo Control Panel	D-2 D-3 D-3
D	Installing Video Drivers	D-2 D-3 D-3 D-3
D	Installing Video Drivers Using the Galileo Control Panel Resolution Color Depth Refresh Rate Switches	D-2 D-3 D-3 D-3 D-3 D-3
D	Installing Video Drivers Using the Galileo Control Panel	D-2 D-3 D-3 D-3 D-3 D-3 D-3 D-3
D	Installing Video Drivers Using the Galileo Control Panel Resolution Color Depth Refresh Rate Switches	D-2 D-3 D-3 D-3 D-3 D-3 D-3 D-3 D-3
D	Installing Video Drivers Using the Galileo Control Panel	D-2 D-3 D-3 D-3 D-3 D-3 D-3 D-3 D-3 D-3

Tables		
5-1.	System Board Jumper Block Settings5-5	
5-2.	ISA Bus Clock Speeds5-8	
5-3.	Clearances for OverDrive Processor Upgrades5-9	
5-4.	Required SIMM Speeds5-13	
5-5.	Memory Options5-14	
D-1.	Supported Resolutions	
Figure		
Figur		
2-1.	Check the Input Voltage Setting2-3	
2-2.	Mini-Tower Front Panel Controls and Indicators2-5	
2-3.	Mini-Tower Back Panel Connectors and Features2-6	
4-1.	Removing the Side cover4-4	
4-2.	Removing the Bezel4-6	
4-3.	System Slot Numbering Convention4-7	
4-4.	Removing a Breakout Expansion Slot Cover4-9	
4-5.	Removing an Expansion Slot Cover4-10	
4-6.	Installing an Add-in Board4-12	
4-7.	Removing the 3.5-inch Drive Carrier4-13	
4-8.	Removing the Floppy Disk Drive4-15	
4-9.	Installing an Internal Drive4-17	
4-10.	Removing EMI Shields and Filler Panels4-19	
4-11.	Installing the Snap-In Slide Rails4-20	
4-12.	Installing a 5.25-inch Device4-21	
4-13.	Removing the System Board4-23	
5-1.	System Board Components5-3	
5-2.	System Board Jumper Blocks5-6	
5-3.	Removing the CPU Clamp5-11	
5-4.	Installing a Microprocessor Upgrade5-12	
5-5.	Installing SIMMs5-15	
5-6.	Installing Video DRAM on the System Board5-18	
5-7.	Replacing the Battery 5-20	
D-1.	Galileo Graphics Control Panel	

x Contents

Product Description

This manual describes the Mini-Tower system. This system is based on the Intel Pentium $^{\tiny (B)}$ microprocessor. This chapter describes the principal features of the system.

After unpacking the system, make sure the following items are present and in good condition:

- System unit
- Keyboard
- Mouse
- Power cord

If any item is damaged or missing, contact your system supplier. Save all boxes and packing material to repack the system in the future.

Feature Summary

- Intel Pentium microprocessor
- Support for up to 128 MB of DRAM installed in single in-line memory modules (SIMMs) (8 MB already installed)
- Onboard Crystal[†] audio system (optional)
- Onboard S3[†] Trio64V+[†] Graphics controller
- 82439 PCI chip set
- One 1.44 MB, 3.5-inch high-density diskette drive
- Optional CD-ROM drive
- Windows[†] 95-compatible Plug and Play capability
- Support for Advanced Power Management (APM)
- 200 watt power supply switchable between 115 and 230 V ac
- Three dedicated PCI slots
- Two dedicated ISA slots
- · One combination slot for one PCI or ISA board
- AMIBIOS in a flash memory device; supports system setup and PCI auto-configuration
- Two PCI/IDE peripheral connectors on the system board
- Two RS-232C-compatible 9-pin serial connectors
- One multimode, 25-pin Centronics[†]-compatible parallel port
- PS/2[†]-style keyboard and mouse connectors
- Speaker on the system board
- Backup battery for the CMOS RAM and real-time clock
- Optional processor cache SIMM

Central Processing Unit (CPU)

The system is designed to operate with the Intel Pentium microprocessor. The Pentium processor, in addition to its expanded data and addressing capabilities, includes the following features:

- Ready for next generation OverDrive® processor
- · Backward compatibility with Intel microprocessor architecture
- Onchip numeric coprocessor (compatible with the Intel486™ DX processor and compliant with ANSI/IEEE standard 754-1985)
- Onchip 16 KB cache (8 KB for data, 8 KB for code)
- Burst-mode bus cycles

Chapter 5 tells how to upgrade the CPU.

System Memory

The system supports base (conventional) and extended memory. Operating systems such as MS-DOS † , OS/ 2^{\dagger} , UNIX † , and all application programs use base memory. For better performance, Windows 95, OS/2 and UNIX as well as many MS-DOS applications use extended memory. For the system memory map, see Chapter 7.

The system supports up to 128 MB of DRAM. DRAM is implemented through four 72-pin single in-line memory modules (SIMMs). Chapter 5 tells how to install memory modules.

Cache Memory

The Pentium microprocessor includes 16 KB of cache on the chip. The core chip set includes a cache controller that supports secondary write-back cache memory. The system can support 256 KB of secondary cache memory.

Enhanced PCI/IDE Peripheral Interface

The system provides two high speed, 32-bit PCI/IDE interfaces. Each PCI/IDE interface supports:

- Up to two IDE hard drives on the PCI bus
- PIO Mode 3 and 4 and AT API devices
- In conjunction with the system BIOS provides an option that supports logical block addressing (LBA) of hard drives larger than 528 MB

If you are using third-party controllers or non-IDE hard disk drives, the system Setup program provides options that allow you to manually configure the controller functions.

System I/O

A single onboard I/O controller integrates the functions for the serial ports, parallel port, and diskette drive. This component provides

- Multimode bi-directional parallel port
 - Standard mode: Centronics-compatible operation
 - Support for Enhanced Parallel Port
 - High-speed mode: support for Enhanced Capabilities Port
- Two RS-232C-compatible 9-pin serial ports.
- Industry standard diskette drive controller
- Real-time clock for the system
- · Keyboard and mouse controller

System BIOS

The system BIOS, from American Megatrends Incorporated (AMI), provides ISA and PCI compatibility. The BIOS is contained in a flash memory device on the system board. The BIOS provides the power-on self test (POST), the system Setup program, and a PCI and IDE auto-configuration utility.

The system BIOS is always shadowed. Shadowing allows any BIOS routines to be executed from fast 32-bit onboard DRAM instead of from the slower 8-bit flash device.

BIOS Upgrades

Because the BIOS is stored in a flash memory device, you can easily upgrade the BIOS without having to disassemble the system. The flash upgrade process can be done by running a utility from a diskette or hard disk, or over a network.

The DOS-based upgrade utility (Flash Memory Update Program, FMUP) has three main options:

- Update the flash BIOS from a file on disk.
- Copy the current BIOS code from the flash device to a disk file to provide a backup if the upgrade cannot be finished.
- Compare the flash BIOS to a disk file to verify that the versions are the same and make sure that the system has the correct BIOS version.

Appendix A tells how to run the BIOS upgrade utility. For information about the latest BIOS update, contact your service representative.

Plug and Play

Your system is fully Plug and Play compatible. Plug and Play makes it easier to add components to your system. This feature provides these important benefits:

- PCI cards and Plug and Play ISA cards are configured automatically
- IDE hard disks and main memory are configured automatically
- Windows 95 Plug and Play ready

Expansion Slots

The system has two dedicated 16-bit ISA/AT-compatible, three dedicated PCI-compatible expansion slots, and one combination slot that can be used by **either** a PCI or an ISA board. See Chapter 4 for more information about expansion slots and installing add-in boards.

Power Management

Your system supports the Intel/Microsoft Advanced Power Management (APM) specification. Advanced Power Management consists of one or more layers of software that support power management in computer with power manageable hardware. Power Management works with APM-capable operating systems to reduce power consumption in your system. IDE hard drives and monitor/graphics card combinations that support the VESA DPMS standards can be put to sleep along with the processor after a user-defined period of inactivity. The system Setup program provides options for defining a time and a hotkey to enable the power saving mode.

Integrated 16-bit Audio

There is an optional integrated audio solution from Crystal that provides built in support for the following standards:

- Sound Blaster[†] Pro
- Multimedia PC Level 2
- MPU-401

The system includes software for getting the most out of your audio system. Appendix C tells more about the audio system and software.

Video Graphics Subsystem

The graphics subsystem features the S3 Trio64V+ integrated PCI graphics controller. The Trio64V+ controller is a high performance graphics engine that provides the following features:

- Standard 1 MB of graphics memory, expandable to 2 MB
- Multiple screen resolutions/color densities available
- Support for 8-bit bi-directional VESA advanced feature connector
- Support for VESA Display Power Management Signaling (DPMS) monitor power savings modes
- Support for VESA Display Data Channel (DDC2B) that permits transfer of monitor identification and resolution support data for ease of use

A VESA-compliant 8514/A feature connector is provided on the system board in addition to a standard 15-pin analog VGA connector on the back panel. The VESA pass-through connector is useful when an auxiliary video subsystem is installed in one of the expansion slots such as an 8514/A compatible video card or DVI board.

Appendix D tells more about the Trio64V+ graphics controller.

Power Supply

The system has a 200 watt power supply to provide power for onboard resources, add-in boards, and drives. A switch on the system back panel sets the power supply to operate at either

- 115 V ac (in the range of 90-135 V ac; 4 A)
- 230 V ac (in the range of 180-265 V ac; 2 A)

For power supply output ratings, see Chapter 7.

System Security

System security is provided by password options enabled through the Setup program (see Chapter 3).

Battery

A battery on the system board provides power backup for the real-time clock and CMOS RAM. Chapter 5 provides information about replacing the battery.

You can set the time for the clock and the CMOS values by using the system BIOS Setup program, described in Chapter 3.

Speaker

A speaker is mounted on the system board. The speaker provides audible error code information (beep codes) during the power-on self test (POST) if the system cannot use the video interface. See Chapter 6 for beep code information.

Installing Your System 2

This chapter explains how to set up your system, including

- Selecting a site
- Checking the input voltage setting and power cord
- Location of front and back panel connectors and controls
- Turning on the system at first start-up
- Turning the system off
- Resetting the system
- Using keyboard shortcuts
- Setting up drives

Selecting a Site

The system is designed to operate in a typical commercial environment. Choose a site that is:

- Located near a grounded, three-pronged power outlet. For the United States and Canada, this means a NEMA 5-15R outlet for 115 V ac or a NEMA 6-15R outlet for 230 V ac. For other regions, this means a grounded, three-pronged power outlet approved by the electrical code of the region.
- Clean and dust-free.
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices (such as air conditioners, large fans, large electric motors, radio and TV transmitters, and high-frequency security devices).

■ Note

In geographic regions that are susceptible to electrical storms, we highly recommend you plug your system into a surge suppressor.

Checking the Input Voltage Setting

A 200 watt power supply is integrated into the system to provide power for onboard resources, add-in boards, and drives. A switch on the system back panel (Figure 2-1) can be used to set the power supply to operate at:

- 115 V ac (in the range of 100 120 V ac), or
- 230 V ac (in the range of 220 240 V ac)

To verify that your system has the correct setting for your environment, check the input power selection switch. The voltage visible on the switch is the voltage the system is set to operate at. For power supply output ratings, see Chapter 7.

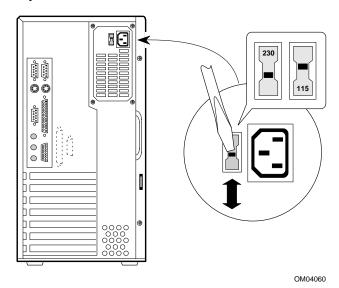


Figure 2-1. Check the Input Voltage Setting

Checking the Power Cord

A WARNING

Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

In some cases, the power cord supplied with this system may not be compatible with the AC wall outlet in your region. If this is true, you must obtain a suitable power cord that meets the following criteria:

- The cord must be rated for use with the available AC voltage, with a current rating that is at least 125% of the current rating of the product.
- The AC plug must be terminated in a grounding-type male plug designed for use in your region. The plug ends must be labeled or marked to indicate that they have been certified by an agency acceptable in your region.
- The connector at the product end must be an IEC 320, sheet C13, female connector (or the equivalent EN 60 320 connector).
- The cord must be less than 14.8 feet (4.5 meters) long and be created with <HAR> (harmonized) or VDE certified cordage.

Connecting Devices When Configuring the System

To configure the system, you must add a monitor, a graphics controller, and a keyboard to the system. If the system normally operates without a monitor or keyboard (for example, as a network server), you may remove these devices after configuring the system.

Before Installing Optional Items

Before installing other items, such as drives, add-in boards, software, and a mouse, connect a keyboard and a monitor, and let the power-on self test (POST) run. Then, add your drives, boards, system board components, and software. Be sure to follow the warnings and cautions in Chapter 4.

- If you need to run Setup, refer to Chapter 3.
- Chapter 4 tells how to remove and replace system components.
- Chapter 5 tells how to install and configure system board components.

If the POST is not successful, see "Turning on the System at First Startup" in this chapter and "Problems at Initial System Start-up" in Chapter 6.

System Front Panel Controls and Indicators

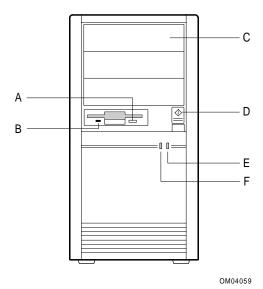


Figure 2-2. Mini-Tower Front Panel Controls and Indicators

- A. Diskette eject button. Press to eject a diskette from the drive.
- B. Diskette drive light. Turns on when the system reads or writes data to a diskette.
- C. Bay for 5.25-inch devices, shown with three plastic filler panels in place.
- D. Power control button. Press to turn on the system.
- E. Power on/off light. Turns on when the system power is on; blinks when in power saving/sleep mode.
- F. Hard disk light. Turns on when the system reads or writes data to an IDE hard disk.

Back Panel Connectors and Features

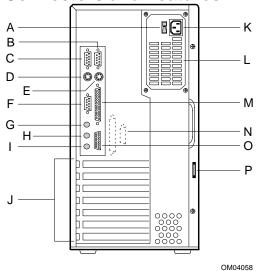


Figure 2-3. Mini-Tower Back Panel Connectors and Features

- A. Input voltage select switch
- B. 9-pin serial port connector COM1
- C. 9-pin serial port connector COM2
- D. PS/2-style mouse/keyboard connector
- E. PS/2-style mouse/keyboard connector
- F. Video graphics connector
- G. Line-out/speaker jack (may not be fitted)
- H. Line-in jack (may not be fitted)
- I. Microphone jack (may not be fitted)
- J. Add-in board expansion slots
- K. Socket for AC power input
- L. Power supply fan
- M. Parallel port connector
- N. Knock outs for additional I/O ports
- O. MIDI and dual game port connector (may not be fitted)
- P. Padlock slot (padlock not included)

Turning on the System at First Start-up

To power up the system for the first time, follow these steps:

- All system components such as a video monitor and keyboard should be connected before turning on the system. All connections should be made while the system is off.
- 2. Connect the female end of the AC power cord into the AC power input socket at the rear of the system, and plug the male end of the power cord into a grounded electrical outlet.
- 3. Turn on power to the monitor.
- Press the power button at the front of the system (the green power LED on the front panel will go on). The system will power up and immediately begin the power-on self test (POST).

When you boot the system, the POST checks the settings stored in CMOS RAM against the actual hardware configuration. During the memory test, the POST displays the amount of memory that it has tested. The POST takes approximately 15 seconds to complete. If you want to go into the Setup program, press the <F1> key after the POST starts the memory test, but before the system boots up (see Setup, Chapter 3). Your next step after booting depends on what POST finds. See the following possibilities:

What happens	What to do
If the settings in CMOS RAM <i>match</i> the hardware configuration, and if the POST does not find any errors, the power-on testing continues.	No action needed.
If the POST finds a fatal error (an error that prevents the system from continuing the boot process), it generates a series of beeps. A specific number of beeps indicates a certain error message.	Record the number of beeps. See Chapter 7 for a description of the system beep codes and troubleshooting procedures.
If the POST finds a non-fatal error (an error that doesn't stop the boot process from continuing), the system displays a message in the following format: Error message line 1 Error message line 2	Locate the error message in Chapter 7, and take action as indicated under the explanation for the error message. If needed, run the Setup program.
Press <f1> for Setup, <esc> to Boot</esc></f1>	
If you need to reconfigure the system setup, start the Setup program.	Press <f1> after the POST starts the memory test, but before the system boots up. You have about five seconds to press <f1> to enter Setup before the boot process continues.</f1></f1>
If you need to begin again, reboot the system.	Press <ctrl +="" alt="" del="">.</ctrl>

Resetting the System

To reset the system, press the key sequence:

```
<Ctrl + Alt + Del>
```

You can also reset the system by shutting system power off and then powering back up. To do this:

- 1. Press the front panel power control button.
- 2. Wait at least 20 seconds.
- 3. Press the power button. The system will power up and immediately begin the power-on self test (POST).

Resetting the system will:

- · Clear the system memory
- Restart the power-on self test (POST)
- Reinitialize all peripherals
- · Load the operating system

Using Keyboard Shortcuts

The keyboard controller supports using shortcuts to reset the system (soft boot) and toggle between fast (turbo) and slow CPU speed.

Normally the CPU runs in fast (turbo) mode at its full rated speed. Some application software requires running the system in slow mode. Changing to fast mode by using shortcuts may not be supported by some systems or by some applications, in which case you can specify fast or slow mode by using the Setup program. For instance the set slow or fast mode keyboard shortcut will not work if the CPU is being operated in protected mode. (When you operate Windows in enhanced mode, the CPU is operating in protected mode.)

The numbers and symbols in the following tables refer to the keys on the numeric keypad.

Setting Fast and Slow CPU Modes

To do the following	Press at the same time
Set slow (deturbo) mode: (You'll hear a low-tone beep.)	<ctrl +="" -="" alt=""></ctrl>
Set fast (turbo) mode: System runs at the full rated speed of the CPU. (You'll hear a hightone beep.)	<ctrl +="" alt=""></ctrl>

Setting Up Add-in Boards and Drives

Chapter 4 explains how to physically install add-in boards and drives. The system is fully Plug and Play compatible. With Plug and Play capability, the system automatically configures IDE hard disk drives, diskette drives, PCI cards, and Plug and Play ISA add-in boards.



This chapter tells how to use the Setup program that is built into the system BIOS. The Setup program makes it possible to change and store system configuration information such as the types of peripherals that are installed, the boot-up sequence for the system, and enabling or disabling the power management support. The Setup information is stored in CMOS random access memory (RAM) and is backed up by a battery when power to the system is off.

If the system does not operate as described here, see the chapter titled "Solving Problems" for problem descriptions and error messages.

If you want to go into the Setup program, press the <F1> key after the POST starts the memory test, but before the system boots up. You have about five seconds to press <F1> to enter Setup before the boot process continues.

Make a Record of the Setup Configuration

To make sure you have a reference to the Setup values for your system, we recommend you write down the current settings and keep this record up-to-date.

Overview of the Setup Menu Screens

The Setup program initially displays the Main menu screen. In each screen there are options for modifying the system configuration. Select a menu screen by pressing the left $<\leftarrow>$ or right $<\rightarrow>$ arrow keys. Use the up $<\uparrow>$ or down $<\downarrow>$ arrow keys to select items in a screen. Use the <Enter> key to select an item for modification. For certain items, pressing <Enter> will bring up a subscreen. After you have selected an item, use the arrow keys to modify the setting.

Setup Menu Screen	Description
Main	For setting up and modifying some of the basic options of a PC, such as time, date, diskette drives, hard drives.
Advanced	For modifying the more advanced features of a PC, such as peripheral configuration and advanced chipset configuration.
Security	For specifying passwords that can be used to limit access to the system.
Exit	For saving or discarding changes.

Setup Subscreen	Description
Floppy Options	For configuring your diskette drives.
IDE Configuration	For configuring your hard drives.
Boot Options	For modifying options that affect the system boot up, such as the boot sequence.
Peripheral Configuration	For modifying options that affect the serial ports, the parallel port, and the disk drive interfaces.
Advanced Chipset Configuration	For modifying options that affect memory and system busses.
Power Management Configuration	For accessing and modifying Advanced Power Management (APM) options.
Plug and Play Configuration	For modifying options that affect the system's Plug and Play capabilities.

Overview of the Setup Keys

The following keys have special functions in the BIOS Setup program.

Setup Key	Description
<f1></f1>	Pressing the <f1> key brings up a help screen for the current item.</f1>
<esc></esc>	Pressing the <esc> key takes you back to the previous screen. Pressing <esc> in the Main, Advanced, Security, or Exit screen allows you to Exit Discarding Changes (see later in this chapter).</esc></esc>
<enter></enter>	Pressing the <enter> key selects the current item or option.</enter>
<^>>	Pressing the up arrow <1> key changes the selection to the previous item or option.
<↓>	Pressing the down arrow $<\downarrow>$ key changes the selection to the next item or option.
<> <>	Pressing the left <←> or right arrow <→> keys in the Main, Advanced, Security, or Exit menu screens changes the menu screen. Pressing either key in a subscreen does nothing.
<f5></f5>	Pressing the <f5> key allows you to Load Setup Defaults (see later in this chapter).</f5>
<f6></f6>	Pressing the <f6> key allows you to Discard Changes (see later in this chapter).</f6>
<f10></f10>	Pressing the <f10> key allows you to Exit Saving Changes (see later in this chapter).</f10>

Main BIOS Setup Screen

This section describes the Setup options found on the main menu screen. If you select certain options from the main screen (e.g., Boot Options), the Setup program switches to a subscreen for the selected option.

System Date

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

System Time

Specifies the current time.

Floppy Options

When selected, this pops up the Floppy Options menu.

Primary IDE Master

Reports if a IDE device is connected to the system. When selected, this brings up the IDE Configuration subscreen.

Primary IDE Slave

Reports if a IDE device is connected to the system. When selected, this brings up the IDE Configuration subscreen.

Secondary IDE Master

Reports if a IDE device is connected to the system. When selected, this brings up the IDE Configuration subscreen.

Secondary IDE Slave

Reports if a IDE device is connected to the system. When selected, this brings up the IDE 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 mouse is installed or not. 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.

Floppy Options Subscreen

Floppy A:

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

Floppy B:

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

Floppy A: Type

Specifies the physical size and capacity of the diskette drive. The options are Disabled, 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. The default is 1.44/1.25 MB, 3.5-inch.

Floppy B: Type

Specifies the physical size and capacity of the diskette drive. The options are Disabled, 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. The default is Disabled.

IDE Configuration Subscreen

IDE Device Configuration

Used to manually configure the device or have the system auto configure it. The options are Auto Configured, User Definable, and Disabled. The default is Auto Configured. If you select User Definable then the Number of Cylinders, Number of Heads, and Number of Sectors items can be modified.

Number of Cylinders

If IDE Device Configuration is set to User Definable, you must type the correct number of cylinders for your hard disk. If IDE Device Configuration is set to Auto Configured, this reports the number of cylinders for your hard disk and cannot be modified.

Number of Heads

If IDE Device Configuration is set to User Definable, you must type the correct number of heads for your hard disk. If IDE Device Configuration is set to Auto Configured, this reports the number of heads for your hard disk and cannot be modified.

Number of Sectors

If IDE Device Configuration is set to User Definable, you must type the correct number of sectors for your hard disk. If IDE Device Configuration is set to Auto Configured, this reports the number of sectors for your hard disk and cannot be modified.

Maximum Capacity

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

IDE Translation Mode

Specifies the IDE translation mode. The options are Standard CHS (standard cylinder head sector — less than 1024 cylinders), Logical Block, Extended CHS (extended cylinder head sector — greater than 1024 cylinders), and Auto Detected (BIOS detects IDE drive support for LBA). The default is Auto Detected.

ACAUTION

Do not change this from the option selected when the hard drive was formatted. Changing the option can result in corrupted data.

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, or Auto Detected. The default is Auto Detected. Check the specifications for your hard disk drive to determine which setting provides optimum performance for your drive.

Fast Programmed I/O Modes

Sets how fast transfers on the IDE interface occur. The options are Disabled or Auto Detected. The default is Auto Detected. If set to Disabled, transfers occur at a less than optimized speed. If set to Auto Detected, transfers occur at the drive's maximum speed.

Boot Options Subscreen

This section describes the options available on the Boot Options subscreen.

First Boot Device

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

Floppy The system checks the Floppy drive first.

Hard Disk The system checks the Hard Disk first.

CD ROM The system checks the CD ROM first.

Network The system checks the Network first.

Disabled

For First Boot Device, the default is Floppy. If the system is unable to boot from the selected boot device, the system will check the device selected for Second Boot Device.

Second Boot Device

The options are Floppy, Hard Disk, CD ROM, Network, and Disabled. Default is Hard Disk. If the system is unable to boot from the selected boot device, the system will check the device selected for Third Boot Device.

Third Boot Device

The options are Floppy, Hard Disk, CD ROM, Network, and Disabled. The default is disabled. If the system is unable to boot from the selected boot device, the system will check the device selected for Fourth Boot Device.

Fourth Boot Device

The options are Floppy, Hard Disk, CD ROM, Network, and Disabled. The default is Disabled.

System Cache

Enables or disables both the primary and the secondary cache memory. The options are Enabled or Disabled. The default is Enabled.

Boot Speed

Sets the system's boot speed. The options are Deturbo and Turbo. The default is Turbo. If Turbo is selected, boot-up occurs at full speed. If Deturbo is selected, the board operates at a slower speed.

Num Lock

Sets the beginning state of the Num Lock feature on your keyboard. The options are On and Off. The default is Off.

Setup 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 and Disabled. The default is Enabled.

■ Note

This option has no effect on your ability to access the Setup program. It only toggles the prompt.

Typematic Rate Programming

Sets the typematic rates. The options are Default and Override. The default is Default. Choosing Override enables Typematic Rate Delay and Typematic Rate.

Typematic Rate Delay

Sets how long it takes for the key-repeat function to start when you hold down a key on the keyboard. The options are 250, 500, 750, and 1000 millisecond delays. The default is 250. If Typematic Rate Programming is set to Default, this option will not be visible.

Typematic Rate

Sets the speed 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, 8, 10, 12, 15, 20, 24, and 30 characters per second. The default is 6. If Typematic Rate Programming is set to Default, this option will not be visible.

Advanced Screen

This section describes the Setup options found on the Advanced menu screen. If you select certain options from the Advanced screen (e.g., Peripheral Configuration), the Setup program switches to a subscreen for the selected option. Subscreens are described in the sections following the description of the Advanced screen options.

Processor Type

Reports the CPU type. There are no options.

Processor Speed

Reports the CPU clock speed. There are no options.

Cache Size

Reports the size of the secondary cache. There are no options. If your system contains no L2 cache, this item will not appear.

Peripheral Configuration

When selected, this brings up the Peripheral Configuration subscreen.

Advanced Chipset Configuration

When selected, this brings up the Advanced Chipset Configuration subscreen.

Power Management Configuration

When selected and enabled, this brings up the Advanced Power Management subscreen.

Plug and Play Configuration

When selected, this brings up the Plug and Play Configuration subscreen.

Peripheral Configuration Subscreen

This section describes the screens for the peripheral configuration subscreen.

Configuration Mode

Enables you to choose between setting the peripheral configuration yourself, or having the system do it. The options are Auto and Manual. The default is Auto.

When Auto is selected, the system peripherals are automatically configured during power up. The options below for PCI IDE Interface, Floppy Interface, Serial Port 1 and Serial Port 2 Addresses, Serial Port 2 IR Mode, and the Parallel Port Address cannot be modified. The settings displayed for those options reflect the current state of the hardware.

PCI IDE Interface

Enables or disables the PCI IDE hard disk interface. The options are Enabled and Disabled. The default is Enabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

Floppy Interface

Enables or disables the diskette drive interface. The options are Enabled and Disabled. The default is Enabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

Serial Port 1 Address

Selects the address of the serial port. The options are Disabled; COM1, 3F8h, IRQ4; COM2, 2F8h, IRQ3; COM3, 3E8h, IRQ4; and COM4, 2E8h, IRQ3. If the Configuration Mode is set to Auto, the Setup program assigns the first free COM port (normally COM1, 3F8h) as the serial port 1 address, regardless of what is selected under the Serial Port 1 Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

Serial Port 2 Address

Selects the address of the serial port. The options are Disabled; COM1, 3F8h, IRQ4; COM2, 2F8h, IRQ3; COM3, 3E8h, IRQ4; and COM4, 2E8h, IRQ3. If the Configuration Mode is set to Auto, the Setup program assigns the first free COM port (normally COM2, 2F8h) as the serial port 2 address, regardless of what is selected under the Serial Port 2 Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

■ 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 *mach32*[†] or an ATI *mach64*[†] video controller is active, the COM4, 2E8h, IRQ3 address will not appear in the options dialog box of either serial port.

Serial Port 2 IR Mode

Makes Serial Port 2 available to infrared applications. The options are Enabled and Disabled. The default is Disabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

Parallel Port Address

Selects the address and IRQ of the parallel port. The options are Disabled; LPT3, 3BCh, IRQ7; LPT1, 378h, IRQ7; LPT2, 278h, IRQ7; LPT3, 3BCh, IRQ5 LPT1, 378h, IRQ5; and LPT2, 278h, IRQ5. If the Configuration Mode is set to Auto, the setup program assigns LPT1, 378h, IRQ7 as the parallel port address, regardless of what is selected under the Parallel Port Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

Parallel Port Mode

Selects the mode for the parallel port. The options are Compatible, Bi-directional, ECP, and EPP. The default is Compatible. Compatible means the parallel port operates in AT-compatible mode. Bi-directional means the parallel port operates in bi-directional PS/2-compatible mode. EPP and ECP mean the parallel port operates high-speed, bi-directionally. This option is not affected by the Configuration Mode field above.

Advanced Chipset Configuration Subscreen

This section describes the options available on the Advanced Chipset Configuration Subscreen.

Base Memory Size

Sets the size of the base memory. The options are $512~\mathrm{KB}$ and $640~\mathrm{KB}$. The default is $640~\mathrm{KB}$.

ISA LFB Size

Sets the size of the linear frame buffer. The options are Disabled and 1 MB. The default is Disabled. If this is set to 1 MB, then the ISA LFB Base Address field will appear.

ISA LFB Base Address

Reports the base address of the LFB. There are no options. This field will not appear if the ISA LFB Size is set to Disabled.

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 Enabled and Disabled. The default is Disabled.

Latency Timer (PCI Clocks)

Sets the length of time an agent on the PCI bus can hold the bus when another agent has requested the bus. Valid numbers are between 0 and 256. The default is 66.

PCI Burst

Enables or disables bursting on the PCI bus. When disabled, forces normal PCI cycles. When enabled, allows PCI cycles to burst. Must be disabled with some graphics cards that don't support burst cycles. If the display appears to be corrupted, disable this field.

Bank O SIMM Detected

Reports the type of memory found in the bank 0 SIMM slots. There are no options.

Bank 1 SIMM Detected

Reports the type of memory found in the bank 1 SIMM slots. There are no options.

Power Management Configuration Subscreen

This section describes the options available on the Power Management Subscreen.

Advanced Power Management

Enables or disables the Advanced Power Management (APM) support in your system's BIOS. The options are Enabled and Disabled. The default is Enabled. Power Management will only work with APM-capable operating systems to manage power consumption in your system. If Advanced Power Management is set to Disabled, none of the fields in the Advanced Power Management subscreen will be visible.

IDE Drive Power Down

Sets any IDE drives to spin down when the system goes into power managed mode. The options are Enabled and Disabled. The default is Enabled.

VESA Video Power Down

Sets the command issued to your graphics controller when the system goes into power managed mode. The command options are Disabled, Standby, Suspend, and Sleep. The default is Sleep.

Inactivity Timer

Sets how long the system must be inactive before it enters power managed mode. Enter the number of minutes. The range is 0 to 255 minutes. The default is 10 minutes.

Hot Key

Sets the hot key that, when pressed while holding down the <Ctrl> and <Alt> keys, causes the system to enter power managed mode. All alphabetic keys are valid.

Plug and Play Configuration Subscreen

This section describes the options found on the Plug and Play configuration subscreen.

Configuration Mode

Sets how the BIOS gets information about ISA cards that do not have Plug and Play capabilities. The options are Use Setup Utility and Use ICU (ISA Configuration Utility). The default is Use Setup Utility.

If Use ICU is selected, the BIOS will depend on run-time software to ensure that there are no conflicts between ISA boards with Plug and Play capabilities and those without. Choosing Use ICU enables Boot with PnP OS and disables all other options.

Boot with PnP OS

Enables the PC to boot with an operating system capable of managing Plug and Play add-in cards. The options are None, Other, and Windows 95. The default is Windows 95. If Configuration Mode (above) is set to Use Setup Utility, this option will not be visible.

ISA Shared Memory Size

Enables you to "unshadow" a block of the upper memory area. The options are Disabled, 16 KB, 32 KB, 48 KB, 64 KB, 80 KB, and 96 KB. The default is Disabled. If this is set to Disabled, the ISA Shared Memory Base Address (described below) will not be visible.

Shadowing is a technique that copies a block of memory from an add-in card's ROM to the same address in system memory. This provides faster access and achieves higher performance. By default, all upper memory is shadowed.

ISA Shared Memory Base Address

Sets the base address for the ISA Shared Memory. The options are C8000h, CC000h, D0000h, D4000h, D8000h, and DC000h. The default is C8000h. This setting could affect the ISA Shared Memory Size item. The value entered in the ISA Shared Memory Size item cannot extend to the E0000h address. For example, if a size of 64K was selected, options D4000h, D8000h, and DC000h will not be available.

IRQ 3, 4, 5, 7, 9, 10, 11, 12

Sets the status of the IRQ. The options are Available and Used By ISA Card. The default is Available. The PCI auto-configuration code looks here to see if these interrupts are available for use by a PCI add-in board. If an interrupt is available, the PCI auto-configuration code can assign the interrupt to be used by the system. If your system contains an ISA agent that uses one of these interrupts, select Used By ISA Card for that interrupt.

Security Screen

This section describes the two access modes that can be set using the options found on the Security screen, and then describes the Security screen options themselves.

Administrative and User Access Modes

The options on the Security screen menu make it possible to restrict access to the Setup program by enabling you to set passwords for two different access modes: Administrative mode and User mode.

In general, Administrative mode has full access to the Setup options, whereas User mode has restricted access to the options. Thus, by setting separate Administrative and User passwords, a system administrator can limit who can change critical Setup values. The actual limitations depend on whether either the Administrative or User passwords or both are set. (See the table below for a description of how the passwords actually work together.)

To limit access to who can boot the system, set the User password. This is the password that the system asks for before booting. If only the Administrative password is set, the system boots up without asking for a password. If both passwords are set, you can enter either password to boot the system.

The following table shows the effects of setting the Administrative and User passwords. (The table is for reference only, and is not shown on the Security screen.) In the table, the statement "Can change a limited number of options" means you can change the system date and time, the power management hot key, the User password, the security hot key, and unattended start.

Administrative and User Password Functions

Password Set	Administrative mode can	User mode can	Password Required During Boot Process
Neither	Can change all options*	Can change all options*	None
Administrative only	Can change all options	Can change a limited number of options	None
User only	N/A	Can change all options	User
Both	Can change all options	Can change a limited number of options	Administrative or User

^{*} If no password is set, any user can change all Setup options.

Security Screen Options

User Password is

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

Administrative Password is

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

Set User 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.

Unattended Start

Controls when the security password is requested. The options are Enabled and Disabled. The default is Disabled. The User password must be enabled before you can enable this option. If Enabled is selected, the system 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 LED's 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 the different ways to exit and save or not save changes made in the Setup program.

Exit Saving Changes

Saves the changes to CMOS RAM and exits the Setup program. You can also press the <F10> key anywhere in the Setup program to do this.

Exit Discarding Changes

Exits the Setup program without saving any changes. This means that any changes made while in the Setup program are discarded and **NOT SAVED**. Pressing the <Esc> key in any of the four main screens will do this.

Load Setup Defaults

Resets all of the setup options to their defaults. You can also press the <F5> key anywhere in the Setup program to do this.

This selection 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 do this.

This selection loads the CMOS RAM values that were present when the system was turned on.

Taking Your System Apart 4

This chapter tells how to take apart and reassemble the major parts of the system. Chapter 5 describes how to remove and install system board components.

Before You Begin

- Be sure to do each procedure in the correct order.
- The procedures (and warnings) for removing and reinstalling the side covers are assumed to precede all other procedures described in this chapter.
- Set up an equipment log to record the system model and serial numbers, all installed options, and other information about the system. If you need this information, it will be easier to consult the log than to open up and examine the system.
- You will need a Phillips screwdriver (#2 bit). We recommend that you
 use an antistatic wrist strap and a conductive foam pad when working
 on the system.

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.

The power supply in this system contains no userserviceable parts. To avoid personal injury or damage to your equipment, refer repair or replacement of the power supply to qualified personnel only. All other areas and components of this system are considered user-accessible. Disconnect the system 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 internal modems before you open the system or do any procedures can result in personal injury or equipment damage.

Do not operate the system with the cover removed. Always replace the cover before turning on the system.

ACAUTIONS

The total power draw on the system must not exceed the specifications for the power supply. See Chapter 7 for the power supply specifications.

Electrostatic discharge (ESD) can damage disk drives, add-in boards, and other components. Conduct 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 system chassis.

Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the system, place the board flat on a grounded, static-free surface, component-side up. Use a conductive foam pad if available, but not the board wrapper. Do not slide the board over any surface.

Removing the Side cover

ACAUTION

For proper cooling and airflow, do not operate the system with the cover removed. Always replace the cover before turning on the system.

- 1. Observe the precautions in "Before You Begin."
- 2. Turn the system power off with the power enable switch at the rear panel and unplug the AC power cord from the back of the chassis.
- 3. Put identification tags on all cables attached to the system.
- 4. Disconnect the cables from the system.
- 5. If you installed a padlock on the back of the system, unlock the padlock and remove it (Figure 4-1, A).
- 6. The side cover is on the left side of the system (as viewed from the front). The cover is secured with two screws at the rear of the system. Remove the screws (Figure 4-1, B).
- 7. Pull the cover so it slides backwards. Make sure that cover clears the padlock slot.
- 8. Pull the bottom of the cover out (like it was hinged at the top) until the bottom metal tabs clear their slots.
- 9. Slide the cover up until it comes free of the chassis.

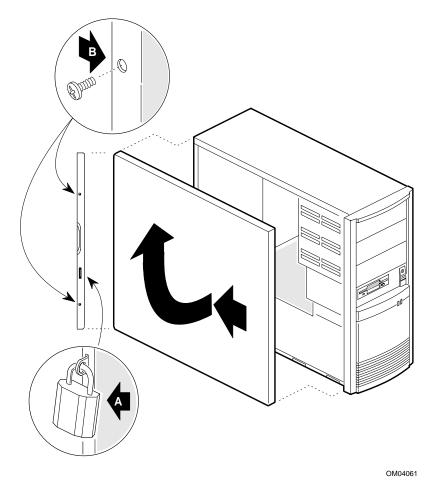


Figure 4-1. Removing the Side cover

Installing the Side cover

- 1. Observe the precautions in "Before You Begin."
- 2. Check that you have not left any tools or loose parts inside the system. Check that everything is properly installed and tightened.
- 3. Insert the metal tabs on the top of the side cover into their slots on the chassis.
- 4. Insert the metal tabs on the bottom of the side cover into their slots on the chassis.
- 5. Slide the cover forward as far as it will go.
- 6. Replace and tighten the screws securing the side cover to the chassis.
- 7. For security, you may want to install a padlock on the system to prevent unauthorized removal of the cover from the chassis.
- 8. Reconnect all cables to the system.

Removing the Bezel

- 1. Observe the precautions in "Before You Begin."
- 2. Remove the side cover.
- 3. Remove the screw securing the bezel to the chassis (Figure 4-2, A).
- 4. Squeeze the two tabs so they clear their slots (Figure 4-2, B).
- 5. Pull the left side of the bezel out (like it was hinged on the right side) until the retaining screw tab, and the power button clear the chassis (Figure 4-2, C).
- 6. Slide the bezel to the right until it comes free (Figure 4-2, D).

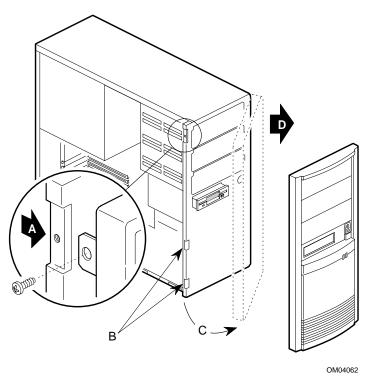


Figure 4-2. Removing the Bezel

Installing the Bezel

- 1. Observe the precautions in "Before You Begin."
- 2. Insert the metal tabs on the right side into their slots.
- 3. Squeeze the bezel and the chassis together along the left side so the tabs snap into their slots.
- 4. Replace and tighten the bezel retaining screw.
- 5. Replace the side cover.

Add-in Board Considerations

The next few procedures tell how to remove and install slot covers and addin boards. As an aid to installing boards in your system, this section describes the arrangement and numbering conventions for the slot connectors on the system board.

ISA-compatible add-in boards can be installed in any of the system board ISA slots. PCI-compatible add-in boards can be installed in any of the PCI slots.

∴ CAUTIONS

Do not overload the system board by installing add-in boards that draw excessive current. The system is designed to provide 2 A (average) of +5 V power for each board in the system. The total +5 V current draw in a fully-loaded system (all add-in board slots filled) must not exceed 14 A.

Add-in boards can be extremely sensitive to ESD and always require careful handling. Hold the board by the edges only; do not touch the electronic components or gold connectors. After removing a board from its protective wrapper or from the system, place it flat on a grounded, static-free surface, component-side up. Do not slide the board over any surface.

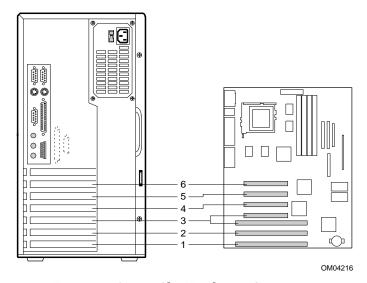


Figure 4-3. System Slot Numbering Convention

Figure 4-3 shows the numbering convention for the connectors on the system board and for the slot openings on the back panel. The numbers are for reference only and are not actually printed on the system board or the back panel. Notice that slot opening 3 in the back panel can hold either a PCI or an ISA board (but not both at the same time).

Removing Expansion Slot Covers

There are two kinds of slot covers, breakout slot covers and standard slot covers. The procedure covers both kinds.

Removing Breakout Slot Covers

1. Observe the precautions in "Before You Begin."

! CAUTIONS

Be careful to not damage components on the system board or add-in boards when doing this procedure. You may need to remove add-in boards that are next to the slot cover you want to remove.

2. Insert a #2 bit Phillips screwdriver into the top of the slot cover. Move the screwdriver and slot cover toward the inside of the chassis until the slot cover breaks away from the chassis (Figure 4-4). Lift the slot cover up and out.

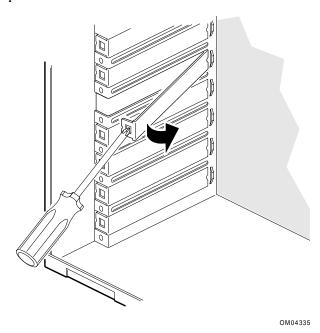


Figure 4-4. Removing a Breakout Expansion Slot Cover

Removing Standard Slot Covers

1. Observe the precautions in "Before You Begin."

ACAUTION

Be careful to not damage components on the system board or add-in boards when doing this procedure. You may need to remove add-in boards that are next to the slot cover you want to remove.

2. Remove the expansion slot screw from the top of the slot cover (Figure 4-5). Lift the cover up and out. Save the slot cover in case you remove the board later.

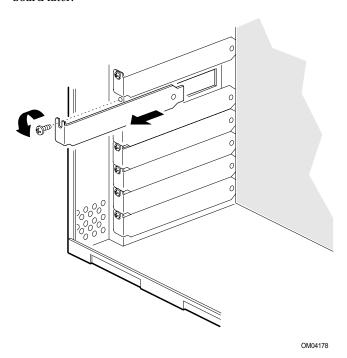


Figure 4-5. Removing an Expansion Slot Cover

Installing an Expansion Slot Cover

- 1. Observe the precautions in "Before You Begin."
- 2. Using one of the original slot covers, insert the cover into the slot at the base of the chassis and secure it with a screw.

Note

If you no longer have the original slot cover, use a standard metal slot cover. The bottom end of the cover fits *inside* the chassis, flush with the chassis wall, and the top end secures to the board guide with a screw.

Installing an Add-in Board

- 1. Observe the precautions in "Before You Begin."
- Remove the expansion slot cover from the slot you plan to use. Save the cover and screw to reinstall if you decide not to install a board in that slot.
- Remove the board from its wrapper and place it on a grounded, staticfree surface.
- Set any board jumpers or switches according to the manufacturer's instructions.
- 5. Hold the board by its top edge or upper corners and firmly press the board into the connector on the system board (Figure 4-6).
- 6. Align the rounded notch in the retaining bracket with the threaded hole in the expansion slot frame (Figure 4-6). The retaining bracket fits into the space that was occupied by the expansion slot cover.
- 7. Insert a screw, but push the notch against the screw before tightening. Otherwise the bracket may interfere with the bracket of an adjacent slot cover or with another add-in board.
- 8. Connect cables (if any are needed) to the installed board.

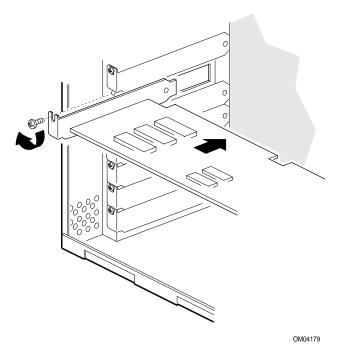


Figure 4-6. Installing an Add-in Board

Removing an Add-in Board

Note

Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emissions characteristics of the system and to ensure proper cooling of the system components.

- 1. Observe the precautions in "Before You Begin."
- 2. Disconnect any cables attached to the add-in board you are removing.
- 3. Remove the screw that holds the board retaining bracket to the chassis.
- 4. Hold the board at each end, and carefully rock it back and forth until the edge connectors pull free. Make sure that you do not scrape the board against other components.

- 5. Store the board in an antistatic wrapper.
- 6. If you disconnected cables from the board and you are not reinstalling this board or one like it, remove the cables from the system.
- 7. Install an expansion slot cover over the vacant slot.

Removing the 3.5-inch Drive Carrier

- 1. Observe the precautions in "Before You Begin."
- 2. Disconnect the power cable and the ribbon data cable from any drives in the carrier.
- 3. Remove the two screws that secure the carrier to the 5.25-inch drive bay (Figure 4-7, A and B).
- 4. Slide the carrier back until the tabs hit their stops (Figure 4-7).
- 5. Pull the carrier away from the 5.25-inch drive bay and remove it from the chassis.

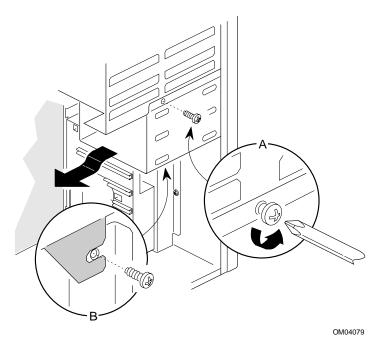


Figure 4-7. Removing the 3.5-inch Drive Carrier

Installing the 3.5-inch Drive Carrier

- 1. Observe the precautions in "Before You Begin."
- 2. Insert the tabs on carrier into their slots on the bottom and side of the 5.25-inch drive bay.
- 3. Slide the carrier forward until the screw hole in the front drive bay and the hole in the carrier line up.
- 4. Insert the two screws that secure the carrier to the front drive bay into their holes and tighten them. (If you removed the front bezel, replace it before tightening the screw.)
- 5. If there is a drive in the carrier, attach the power cable and the ribbon data cable to the drive.

Removing the Floppy Disk Drive

- 1. Observe the precautions in "Before You Begin."
- 2. Remove the 3.5-inch drive carrier from the system.
- 3. Remove the four screws holding the drive to the drive carrier (Figure 4-8, B).
- 4. Slide the drive out of the drive carrier.
- If you do not plan to replace the drive you just removed, and there are no other diskette drives on the same data cable, disconnect the cable from the system board.
- 6. Replace the carrier in the system.

ACAUTION

If you are not reinstalling a 3.5-inch diskette drive, cover the empty bay with a filler panel and a shield to maintain the electromagnetic-interference characteristics of the system and to ensure proper cooling inside.

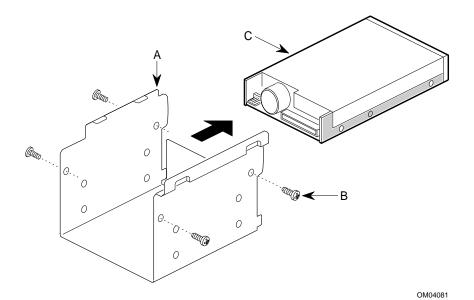


Figure 4-8. Removing the Floppy Disk Drive

Installing a Floppy Disk Drive

- 1. Observe the precautions in "Before You Begin."
- 2. Remove the 3.5-inch drive carrier from the system.
- 3. Remove the floppy disk drive from its protective wrapper and place it on an antistatic surface.
- 4. Set any drive jumpers or switches according to the manufacturer's instructions.
- 5. Slide the floppy drive into the 3.5-inch drive carrier. Line the holes on the carrier up with the screw holes on the drive.
- 6. Insert and tighten four screws of the appropriate size and length (not supplied).
- 7. Install the 3.5-inch drive carrier.
- 8. Attach the power cable and the data cable to the drive.

System Product Guide

Installing a Drive in the 3.5-inch Drive Carrier

- 1. Observe the precautions in "Before You Begin."
- 2. Remove the 3.5-inch drive carrier.
- 3. Remove the drive from its protective wrapper and place it on an antistatic surface.
- 4. Set any jumpers, switches, or terminating resistors according to the manufacturer's instructions.
- 5. Slide the drive into the carrier until the screw holes line up.
- 6. Secure the drive to the carrier with four screws (Figure 4-9, C) of the appropriate size and length (not supplied).
- 7. Connect a power connector from the power supply to the drive. If the drive is an IDE drive, connect the data cable between the drive and one of the PCI/IDE connectors on the system board. If the drive is a non-IDE type, refer to the drive manufacturer's instructions for connecting a data cable and interface board and for configuring the drive.

■ Note

The system board provides two PCI/IDE headers for connecting IDE hard drives. You can connect up to two IDE drives (on the supplied cable) to each PCI/IDE header. If one PCI/IDE header already has two drives connected to it, you can connect additional IDE drives to the second PCI/IDE header.

8. Replace the 3.5-inch drive carrier.

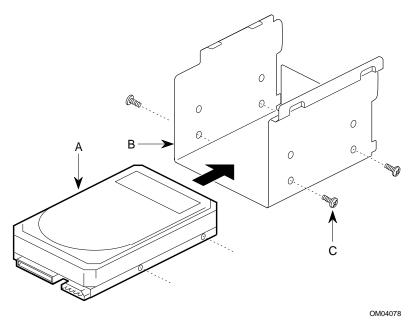


Figure 4-9. Installing an Internal Drive

Removing a Drive from the 3.5-inch Drive Carrier

- 1. Observe the precautions in "Before You Begin."
- 2. Disconnect the data cables and power cables from any drives in the rear drive carrier.
- 3. Remove the 3.5-inch drive carrier from the system.
- 4. Remove the four screws that attach the drive to the carrier.
- 5. Remove the drive from the carrier and place it on an antistatic surface.
- 6. Replace the 3.5-inch drive carrier.

Installing a 5.25-inch Device

ACAUTIONS

If you are installing a device that should not be accessible from the front, do not remove the EMI shield and filler panel.

When removing a plastic filler panel, be careful not to break the panel or its tabs. Save all EMI shields and filler panels for reuse if necessary.

- 1. Observe the precautions in "Before You Begin."
- 2. Remove one of the EMI shields from the chassis (Figure 4-10, A). Save the shield in case you need to it them later.
- 3. If the device will be accessible from the front, remove the screws securing the filler panel to the bezel (Figure 4-10, B). Remove the filler panel. Save the filler panel and screw in case you need to replace them later.
- Remove the device from its protective wrapper and place it on an antistatic surface. Record the model and serial number in the equipment log.

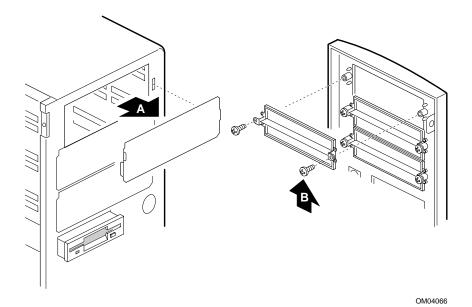


Figure 4-10. Removing EMI Shields and Filler Panels

- 5. Set any device jumpers or switches according to the manufacturer's instructions.
- 6. Use two screws (not supplied) plus the EMC caps to attach a plastic, snap-in slide rail to each side of the device (Figure 4-11, A, B, C).

System Product Guide

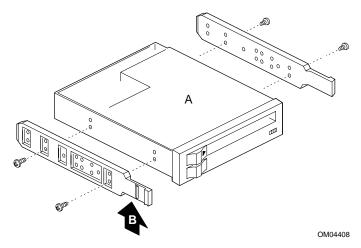


Figure 4-11. Installing the Snap-In Slide Rails

- 7. Position the drive so that the plastic slide rails on each side of the device engage the front peripheral bay guide rails.
- 8. Push the drive into the bay until the slide rails lock in place.
- 9. Connect power and data cables to the device.

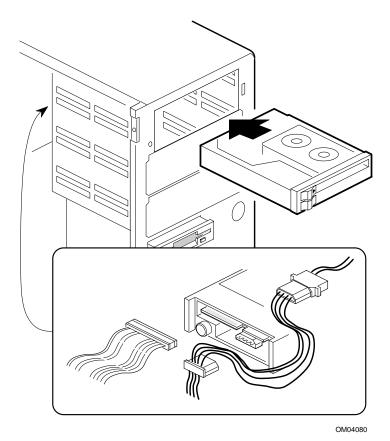


Figure 4-12. Installing a 5.25-inch Device

- 10. If the device won't be accessible from the front, replace the EMI shield.
- 11. Replace the bezel.

Removing a 5.25-inch Device

- 1. Observe the precautions in "Before You Begin."
- 2. Disconnect the power and data cables attached to the device.
- 3. While squeezing the protruding plastic snap-in rails attached to the device towards each other (Figure 4-12), carefully slide the device out of the bay.
- 4. Replace the EMI shield and secure it to the chassis with a screw.
- 5. Replace the filler panel and secure it to the bezel with two screws.

Removing the System Board

- 1. Observe the precautions in "Before You Begin."
- 2. Disconnect all internal cables connected to any add-in boards installed in the expansion slots.
- 3. Remove all add-in boards.
- 4. Disconnect all internal cables connected to the system board.
- 5. Remove the nine retaining screws and set them aside (Figure 4-13).
- 6. Carefully pop the board off of the snap-in standoff located near the card retaining bracket (be careful not to flex the board) and lift the board out of the chassis (Figure 4-13).

! CAUTION

Be careful not to scrape any board components. Do not flex the board. Place the board on a grounded, static-free surface or in an antistatic protective wrapper.

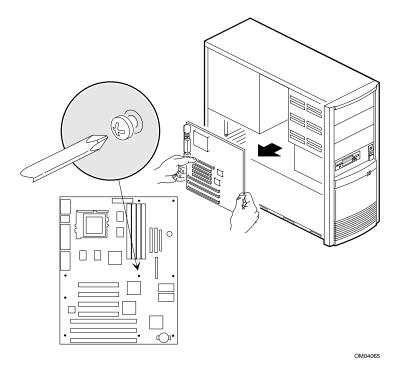


Figure 4-13. Removing the System Board

Installing the System Board

- 1. Observe the precautions in "Before You Begin."
- 2. Position the system board over the threaded standoffs inside the chassis and press it onto the snap-in standoff (Figure 4-13).
- 3. Secure the board to the chassis with nine screws.
- 4. Connect all internal cables to the system board.
- 5. Install any add-in boards.
- 6. Connect all internal cables that go to the add-in boards installed in the expansion slots.

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Installing and Configuring System Board Options

This chapter describes the following:

- The system board layout
- The system board configuration jumpers
- Installing an OverDrive processor upgrade
- Installing single in-line memory modules (SIMMs)
- Installing video DRAM (for systems with the optional video subsystem)
- Replacing the battery

Before You Begin

- Be sure to do each procedure in the correct order.
- The procedures (and warnings) for removing and reinstalling the system cover are assumed to precede all other procedures described in this chapter. Chapter 4 tells how to remove the system cover.
- Set up an equipment log to record the system model and serial numbers, all installed options, and other information about the system. If you need this information, it will be easier to consult the log than to open up and examine the system.
- You will need a flat blade screwdriver, and a jumper removal tool. We recommend that you use an antistatic wrist strap and a conductive foam pad when working on the system.

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.

The power supply in this system contains no user-serviceable parts. To avoid personal injury or damage to your equipment, refer repair or replacement of the power supply to qualified personnel only. All other areas and components of this system are considered user-accessible.

Disconnect the system 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 internal modems before you open the system or do any procedures can result in personal injury or equipment damage.

Do not operate the system with the cover removed. Always replace the cover before turning on the system.

ACAUTIONS

The total power draw on the system must not exceed the specifications for the power supply. See Chapter 7 for the power supply specifications.

Electrostatic discharge (ESD) can damage disk drives, add-in boards, and other components. Follow 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 system chassis.

Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the system, place the board flat on a grounded, static-free surface, component-side up. Use a conductive foam pad if available, but not the board wrapper. Do not slide the board over any surface.

System Board Components

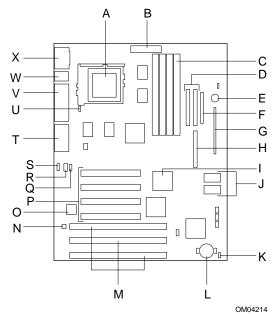


Figure 5-1. System Board Components

- A. Pentium microprocessor
- B. Primary power connector
- C. SIMM sockets
- D. IDE connectors
- E. On board speaker
- F. Floppy drive connector
- G. Front Panel connectors
- H. VESA[†] feature connector
- I. Optional S3 Trio64V+ graphics controller
- J. Video memory sockets
- K. Fan connector
- L. Battery
- M. ISA add-in board connectors

- N. Optional Yamaha[†] OPL3 synthesizer
- O. Optional Crystal Audio device
- P. PCI add-in board connectors
- Q. Voice modem audio interface
- R. Wave table connector
- S. CD-ROM audio connector
- T. Audio/MIDI/Game Port connectors (may not be fitted)
- U. Fan connector
- V. VGA[†]/Parallel port connectors
- W. PS/2 Mouse/Keyboard connectors
- X. COM1/COM2 connectors

Jumper Block Overview

The system board in your computer contains six jumper blocks with moveable jumpers. The jumpers make it possible to change certain aspects of the system configuration. For instance, you can prevent access to the system Setup program by moving one of the jumpers. If you forget your system password, you can clear the password by moving one of the jumpers. The system has been properly configured at the factory. Normally, the only time you will ever change the jumper is if you want to:

- Disable or enable access to the Setup program
- Reset the CMOS RAM settings to the default values
- · Clear the system password
- · Change the ISA bus speed
- Recover from a corrupted BIOS during a BIOS upgrade

Table 5-1 describes the function of the jumper blocks. Figure 5-2 shows the location of the jumper blocks on the system board. Descriptions of how to change the jumpers follow Figure 5-2.

ACAUTIONS

If you change a jumper, you will need to remove the system cover and possibly add-in boards or other system components. Be sure to follow the precautions and procedures provided in Chapter 4 when you remove the cover or other system parts.

Do not squeeze the pliers or other tool you use to remove a jumper, or you may bend or break the pins.

Notes

A jumper is a small plastic-encased conductor that slips over jumper pins. To change a jumper setting, use a pair of fine needle-nosed pliers to remove the jumper from its current location and slide it onto the new pins to obtain the desired setting.

Table 5-1. System Board Jumper Block Settings

Jumper in Figure 5-2	Function	Pins Jumpered
Jumpers J2G1, J10C2	Reserved	CAUTION: These jumpers were set by the factory for your system; do not change these jumpers from the factory setting.
J10C3	Reset CMOS settings to default CMOS RAM values	2-3 = Normal mode (Default) 1-2 = Reset CMOS settings
J10C3	Clear password	5-6 = Normal mode (Default); 4-5 = Clear password
J10C4	ISA bus clock speed: sets the ISA bus to a slower or faster setting.	2-3 = 8.33 MHz (50 MHz CPU bus) 7.5 MHz (60 MHz CPU bus) 8.25 MHz (66 MHz CPU bus) (Default) 1-2 = 8.33 MHz (50 MHz CPU bus) 10 MHz (60 MHz CPU bus) 11 MHz (66 MHz CPU bus)
J10C4	Enables/disables access to Setup Program	5-6 = Setup program can be accessed (Default) 4-5 = Setup program access disabled
J10K1	CPU Voltage Regulator: some upgrade processors may require changing from the default VR setting to the VRE setting.	2-3= VR mode (3.3 V - 3.465 V) (Default) 1-2= VRE mode (3.465 V - 3.63 V) Caution: This jumper should only be changed to the VRE setting if documentation that came with your upgrade CPU indicates that the required voltage must be between 3.465 V and 3.63 V

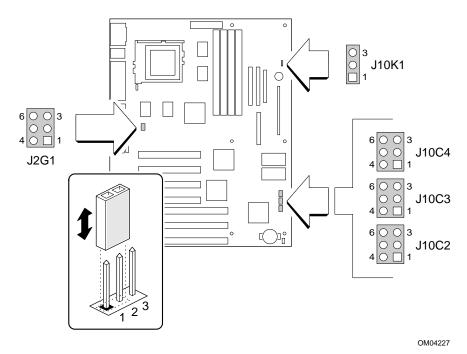


Figure 5-2. System Board Jumper Blocks (see Table 5-1)

How to Disable Access to the Setup Program

- 1. Turn off power and remove the system cover.
- 2. Move the jumper on J10C4 from pins 5-6 to pins 4-5.
- 3. Replace the system cover and turn power back on.
- 4. To enable access to the setup program, move the jumper on J10C4 from pins 4-5 to pins 5-6.

How to Clear CMOS RAM

This procedure should be done after the system BIOS is updated.

- 1. Turn off power and remove the system cover.
- 2. Move the jumper on J10C5 from pins 2-3 to pins 1-2.
- 3. Turn on power and allow the system to boot.
- 4. Turn off power.
- 5. Move the jumper on J10C4 from pins 1-2 back to pins 2-3 to restore normal operation.
- 6. Replace the system cover and turn power back on.

How to Clear the Password

This procedure should only be done if the user password has been forgotten.

- 1. Turn off power and remove the system cover.
- 2. Move the jumper on J10C3 from pins 5-6 to pins 4-5.
- 3. Turn on power and allow the system to boot.
- 4. Turn off power.
- 5. Move the jumper on J10C3 from pins 5-6 back to pins 4-5 to restore normal operation.
- 6. Replace the system cover and turn the power back on.

How to Set the ISA Bus Clock Speed Jumper

Depending on the speed of the CPU in your system, the *default* setting for the ISA bus clock jumper ranges from 7.5 MHz to 8.33 MHz. You may be able to improve the performance of some ISA add-in boards by speeding up the ISA bus clock speed. However, keep in mind that some ISA add-in boards may have problems operating above the ISA bus clock standard of 8 MHz. If you change the jumper on J10C4 to pins 1-2 and experience operating problems with ISA boards, you may want to move the jumper back to the slower position. Table 5-2 below shows how the two settings for jumper J10C4 affect the ISA bus clock speed for different CPUs.

Table 5-2. ISA Bus Clock Speeds

	ISA Bus Clock Speed	
CPU Bus Speed	Jumper J10C4 pins 2-3 (default setting)	Jumper J10C4 pins 1-2
50 MHz	8.33 MHz	8.33 MHz
60 MHz	7.5 MHz	10 MHz
66 MHz	8.25 MHz	11 MHz

To change the ISA bus clock speed:

- 1. Turn off power and remove the system cover.
- 2. Move the jumper on J10C4 to the desired position.
- 3. Replace the system cover and turn power back on.

Installing an OverDrive® Processor

This section tells how to install an OverDrive processor upgrade in your system. Be sure to read the "Clearance Requirements" section below before installing a processor upgrade in your system.

ACAUTION

You do not need to change any jumpers to install an OverDrive processor upgrade.

Clearance Requirements

The OverDrive processor comes with a heat sink mounted on top. To maintain proper airflow once the upgrade is installed in the system, the processor and heat sink require certain clearances. Table 5-3 shows the required clearances.

Table 5-3. Clearances for OverDrive Processor Upgrades

Location	Minimum Clearance
Clearance above the top of the OverDrive processor's heat sink	0.4 inches
Clearance on at least 3 of the 4 sides of the upgrade processor	0.2 inches

Installing the Upgrade

To install the upgrade, do the following:

- 1. Observe the precautions in "Before You Begin." We recommend you take the following steps to reduce the risk of electronic discharge damage to the processor and system board components:
 - Touch the metal chassis before touching the processor or system board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor.
 - Avoid moving around needlessly.
- 2. Turn off all peripheral devices connected to the system, and turn off the system.

A WARNING

The microprocessor and heat sink may be hot if the system has been running. To avoid the possibility of a burn, if the system has been running let the processor and heat sink cool for 10 minutes before going on with this procedure.

- 3. Remove any add-in boards that block access to the socket.
- 4. Figure 5-1 shows the location of the processor socket. You must first remove the clamp over the heat sink and CPU. Insert a small flat-bladed screwdriver into the slot on the end of the clamp. Release the clamp by pushing outward on the blade of the screwdriver as shown in Figure 5-3. As you move the clamp away from the socket, ease the clamp up and away from the processor and heat sink. When you remove the clamp, the heat sink will slide off the CPU.

! CAUTION

When you remove the CPU clamp, avoid scraping the clamp against any system board components.

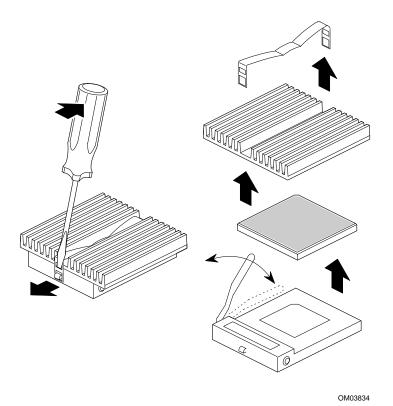


Figure 5-3. Removing the CPU Clamp

- Push the lever on the processor socket down and out until it pulls up freely. Lift the lever until it stands straight up (Figure 5-4). Remove the processor from the socket. Do not touch or bend the pins.
- 6. Place the old processor in a piece of conductive foam and store it in an antistatic package. Save the processor clamp and heat sink.
- 7. Remove the upgrade processor from its antistatic package; do not touch or bend the pins.
- 8. Center the processor over the socket. Take care to align the beveled edge of the processor (Pin 1) as shown in Figure 5-4, A.
- 9. With the processor in place, lower it gently, being careful not to bend the pins. Push the lever on the socket forward until it snaps into place (Figure 5-4).

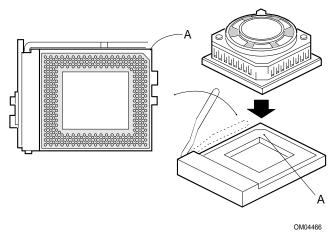


Figure 5-4. Installing a Microprocessor Upgrade

- 10. Replace any add-in boards that were removed.
- 11. If for any reason you need to reinstall the original processor, do steps 1 through 10 above. Remember to reinstall the original CPU clamp.

Installing Single In-line Memory Modules (SIMMs)

The system board contains four 72-pin, tin lead SIMM sockets. The sockets are defined as Bank 0 and Bank 1. Two SIMM sockets make up one SIMM bank. The types of SIMMs that can be installed in the system are as follows: 4 MB, 8 MB, 16 MB, and 32 MB. The computer can support up to 128 MB of DRAM.

When you install SIMMs, you must completely fill at least one 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. You can mix SIMM sizes and types between banks, but not within a bank. For example, you should not install a 4 MB SIMM in one socket of Bank 0 and install an 8 MB SIMM in the second socket of the same bank. Likewise, you should not mix EDO and Fast Page Mode (FPM) SIMMs in the same bank. You can, however, install 4 MB SIMMs in Bank 0 and 8 MB SIMMs in Bank 1. You can also install EDO SIMMs in one bank and FPM SIMMs in the second bank. When adding SIMMs, use only tin lead, 72-pin, EDO or FPM DRAM. Table 5-4 shows which speed DRAMs should be used with which CPU. Faster devices can be used but will not improve system performance.

Table 5-4. Required SIMM Speeds

CPU Bus Speed	Use EDO DRAM of at Least This Speed	Use Fast Page Mode DRAM of at Least This Speed
50 MHz	70 ns	70 ns
60 MHz	70 ns	70 ns
66 MHz	60 ns	70 ns

By using various combinations of SIMMs, you can configure the system memory from 8 MB to 128 MB. Table 5-5 shows the possible combinations of SIMM types and the resulting amount of system memory. Remember that each SIMM *bank* contains two SIMM *sockets*. Therefore, the amount of memory in one bank includes the memory installed in both sockets in that bank.

Table 5-5. Memory Options

For a Total System Memory Of	Install a 72-pin SIMM of the following size in each socket in SIMM Bank 0 (Sockets J7K3 + J7K2)	Install a 72-pin SIMM of the following size in each socket in SIMM Bank 1 (Sockets J7k1 + J6K1)
8 MB	4 MB (8 MB total in Bank 0)	Empty
16 MB	4 MB (8 MB total in Bank 0)	4 MB (8 MB total in Bank 1)
16 MB	8 MB (16 MB total in Bank 0)	Empty
24 MB	8 MB (16 MB total in Bank 0)	4 MB (8 MB total in Bank 1)
32 MB	8 MB (16 MB total in Bank 0)	8 MB (16 MB total in Bank 1)
32 MB	16 MB (32 MB total in Bank 0)	Empty
40 MB	16 MB (32 MB total in Bank 0)	4 MB (8 MB total in Bank 1)
48 MB	16 MB (32 MB total in Bank 0)	8 MB (16 MB total in Bank 1)
64 MB	16 MB (32 MB total in Bank 0)	16 MB (32 MB total in Bank 1)
64 MB	32 MB (64 MB total in Bank 0)	Empty
72 MB	32 MB (64 MB total in Bank 0)	4 MB (8 MB total in Bank 1)
80 MB	32 MB (64 MB total in Bank 0)	8 MB (16 MB total in Bank 1)
96 MB	32 MB (64 MB total in Bank 0)	16 MB (32 MB total in Bank 1)
128 MB	32 MB (64 MB total in Bank 0)	32 MB (64 MB total in Bank 1)

To install SIMMs, do the following procedure:

- 1. Observe the precautions in "Before You Begin."
- 2. Turn off all peripheral devices connected to the system.
- 3. Turn off the system.
- 4. Remove any full-length add-in boards or other components as needed to gain access to the sockets (see Chapter for assembly procedures and precautions).
- 5. Holding the SIMM only by the edges, remove it from its antistatic package. A SIMM has a small notch in the middle of the bottom edge that mates with a raised bump in the SIMM socket. There is also a notch at one side of the module.
- 6. Firmly insert the bottom edge of the SIMM into the socket (Figure 5-5). Press evenly against the module's upper corners to rotate it to a vertical position secured by the retaining clips of the connector. When properly installed, the SIMM is oriented at a 90° angle relative to the system board. 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.
- 7. Reinstall and reconnect any parts you removed or disconnected to gain access to the SIMM sockets.

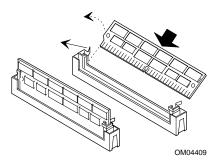


Figure 5-5. Installing SIMMs

Removing SIMMs

To remove a SIMM, do the following:

- 1. Observe the precautions in "Before You Begin."
- 2. Turn off all peripheral devices connected to the system.
- 3. Turn off the system.
- 4. Remove any full-length add-in boards or other components as needed to gain access to the sockets.
- 5. Gently spread the retaining clips just enough so you can 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.

Installing Video DRAM

A WARNINGS

Take care to correctly install the video DRAM chips. If installed incorrectly, video DRAMs can overheat, resulting in damage to the chips and possibly the system board.

If you think the video DRAMs might have been installed incorrectly, shut down system power and allow a cooling period before checking the chips for correct installation.

The optional video graphics controller comes with 1 MB of video DRAM installed on the system board. You can also install an additional 1 MB of video DRAM. The additional memory plugs into the empty sockets shown in Figure 5-6. Each socket holds a 256 KB x 16, 60 ns (or faster), SOJ DRAM component. Both sockets must be empty or both must be populated. You do not have to set any system jumpers if you install the additional video memory.

Contact your service representative for a recommendation on specific part numbers for installing the additional video DRAM.

Before you can install or remove video DRAM, you must remove the system cover and any add-in boards that are blocking access to the video memory sockets. After you are finished, replace any system parts you removed. Refer to Chapter 4, "Taking Apart Your System," for the procedures to remove and replace the system cover and add-in boards.

- 1. Remove one of the DRAMs from its antistatic package, being careful not to touch the pins on the device.
- 2. Position the DRAM so its orientation mark (either a notch or a small dot on the top of the short side) aligns with the end of socket that has a notch (Figure 5-6). Align the pins on the DRAM with the socket.
- 3. Press the DRAM into the socket.
- 4. Repeat steps 1 through 3 to install the remaining DRAM in the remaining empty video DRAM socket.

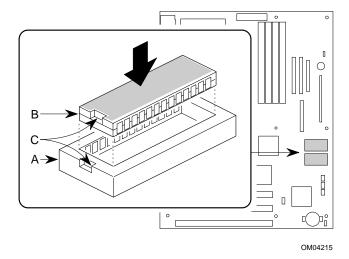


Figure 5-6. Installing Video DRAM on the System Board

Replacing the Battery

A lithium battery on the system board provides power to the real-time clock and CMOS RAM when the system is powered down. The battery has an estimated life expectancy of three years. When the battery starts to weaken, it looses voltage; when the voltage drops below a certain level, the system setting stored in CMOS RAM (for example, the date and time) may be wrong. If the battery fails, you will need to replace it with an equivalent battery. Figure 5-1 shows the location of the battery.

As long as local ordinance permits, you may dispose of individual batteries as normal trash. Do not expose batteries to excessive heat or fire. Keep all batteries away from children.

ACAUTION

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'li y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du méme type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

/ ADVARSEL

Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

NVARNING

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

NVAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käjtetty paristo valmistajan ohjeiden mukaisesti.

To replace the battery, do the following:

- 1. Observe the precautions in "Before You Begin."
- 2. Turn off all peripheral devices connected to the system.
- 3. Turn off the system.
- 4. Remove any components that are blocking access to the battery.
- 5. Figure 5-1 shows the battery location. Gently pry the battery free from its socket, taking care to note the "+" and "-" orientation of the battery (Figure 5-7).
- 6. Install the new battery in the socket.
- 7. Replace any system parts that were previously removed.
- 8. Run Setup to reset the date and time.

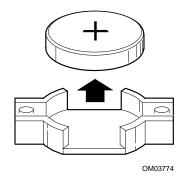


Figure 5-7. Replacing the Battery



Solving Problems 6

The first part of this chapter helps you identify and solve problems that might occur when the system is in use. The second part lists error code messages that might display.

Resetting the System

There are two ways to reset the system:

- Press <Ctrl + Alt + Del>
- Cycle the system power. To do this:
 - 1. Press in and release the front panel power control button.
 - 2. Wait at least 20 seconds.
 - 3. Press in and release the front panel power control button. The system will power up and immediately begin the power-on self test (POST).

Resetting the system will:

- Clear the system memory
- Restart the power-on self test (POST)
- Reinitialize all peripherals
- Load the operating system

Troubleshooting Procedure

This section provides a step-by-step troubleshooting procedure to identify a problem and locate its source.

♠ CAUTION

Turn off the system and any peripheral devices before you disconnect peripheral cables from the system. Otherwise, you can permanently damage the system or the peripheral devices

- Turn off the system and any peripheral devices. Disconnect all external
 peripherals from the system, except for the keyboard and the video
 display.
- 2. Make sure the system is plugged into a properly grounded power outlet.
- 3. Make sure your keyboard and video display are correctly connected to the system. Turn on the video display, and turn up its brightness and contrast controls to at least two-thirds of the maximum (refer to the documentation supplied with the video display).
- 4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in the diskette drive. If the operating system normally loads from a diskette, insert the operating system diskette into the drive.
- 5. Turn on the system. If the power indicator does not light, but the system seems to be operating normally, the indicator is probably defective.

6-2 Solving Problems

6. Monitor the power-on self test (POST) execution. Each time you turn on the system, the POST checks the system board, memory, keyboard, and certain peripheral devices.

Note

During the memory test, the POST displays the amount of memory it has tested. Depending on the amount of memory installed, the POST can take up to 60 seconds to complete. If you do not want to wait for the memory test to complete, you can terminate the test after it starts by pressing the <Esc>.

Check the following during the POST:

- a. If the POST does not detect any errors, the system beeps once and boots up.
- b. Errors that do not prevent the boot process (*non-fatal* errors) display a message that looks similar to the following:

```
Error Message Line 1
Error Message Line 2
Press <F1> for Setup,
<Esc> to Boot
```

You can note the error and press <Esc> to resume the boot-up process, or <F1> to enter Setup.

- c. Errors that prevent the boot process from continuing (fatal errors), are communicated by a series of audible beeps. If this type of error occurs, refer to the error codes and messages listed at the end of this chapter.
- 7. Confirm that the operating system has loaded.

Problems at Initial System Start-up

Problems that occur at initial start-up are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause.

Are all cables correctly connected and secured?
Are the configuration settings correct in Setup? See Chapter 3.
Are all drivers properly installed?
Are jumpers on the system board correct if changed from the defaul settings? See Chapter 5 for defaults.
Are all jumper and switch settings on add-in boards and peripheral devices set correctly? For the valid settings, see the documentation shipped with these devices. Ensure that there are no conflicts, for example, two add-in boards sharing the same interrupt.
Is the power supply set to the proper input voltage? See Chapter 2.
Are add-in boards and disk drives installed correctly? See Chapter 4.
Is there a keyboard attached?
Is a bootable diskette installed in drive A?
If the system has a hard disk, is it properly formatted or defined?
Are all SIMMs installed correctly? Try reseating the SIMMs. See Chapter 5.
Is the operating system properly loaded? See the operating system documentation.

6-4 Solving Problems

Problems After the System Has Been Running Correctly

After the system hardware and software have been running correctly, problems often indicate equipment failure. Go through the checklist below to see if the situation is one that may be easily corrected.

If the problem recurs after you have checked and corrected all of these items, refer to the troubleshooting procedures (see "Troubleshooting Procedure" in this chapter).

 If you are running the software from a diskette, try using a new copy.
 If you are running the software from a hard disk, try running it from a diskette. If the software runs correctly, there may be a problem with the copy on the hard disk. Reinstall the software on the hard disk and try again. Make sure all the necessary files are installed.
 Try clearing CMOS RAM (Chapter 5) and running Setup (Chapter 3).
 If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
 A transient voltage spike, power outage, or brownout may have occurred. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands. Reload the software and try again.
 Voltage spikes can occasionally cause the heads of the disk drive to contact the disk. This can corrupt or destroy data files. If you are experiencing voltage spikes on the power line, install a surge suppresser between the power outlet and the system power cord.
Try reseating the SIMMs.

Problems Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. Go through the checklist below to see if the situation is one that may be easily corrected. If the problem persists after you have checked and corrected all of these items, contact the software vendor's customer service representative.

Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
Is the software an authorized copy? Unauthorized copies often do not work. Obtain an authorized copy of the software.
If you are running the software from a diskette, is it a good copy?
If you are running the software from a hard disk, is the software correctly installed? Were all necessary procedures followed and files installed?
Are the correct device drivers installed?
Are the correct video drivers installed?
Is the software correctly configured for the system?
Are you using the software correctly?

6-6 Solving Problems

Problems Operating Add-in Boards

Problems related to add-in boards are usually related to improper board installation or interrupt and address conflicts. Go through the checklist below to see if you can correct the problem. If the problem persists after you have checked and corrected all of these items, contact the board vendor's customer service representative.

Did you install the add-in board according to the manufacturer's instructions? Check the documentation that came with the board.
Are all cables installed properly?
The following items are suggestions for troubleshooting problems related to ISA legacy (non-Plug and Play) add-in boards.
If the ISA legacy board uses an interrupt, run Setup and set the interrupt that is being used by the ISA board to Used by ISA Card.
If the ISA legacy board uses memory space between 80000H - 9FFFFH, run Setup and set conventional memory to 512 K.
If the ISA legacy board uses shared memory between C8000H - DFFFH, run Setup and enable shared memory for the appropriate memory space.

Problems and Suggestions

Contact your service representative if the suggested actions don't solve the problem.

What happens	What to do
Application software	Make sure all cables are installed correctly.
problems	Verify that the system board jumpers are set properly.
	Verify that your system hardware configuration is set correctly. In Setup, check the values against the system settings you recorded previously. If an error is evident (wrong type of drive specified, for example), make the change in Setup and reboot the system. Record your change.
	Make sure the software is properly configured for the system. Refer to the software documentation for information.
	Try a different copy of the software to see if the problem is with the copy you are using.
	Try running the software in a different speed mode. See "Using Keyboard Shortcuts" in Chapter 2.
	If other software runs correctly on the system, contact the vendor of the software that fails.
	If you check all of the above with no success, try clearing CMOS RAM (Chapter 5) and reconfiguring the system. Make sure you have your list of system settings available to re-enter, because clearing CMOS RAM sets the options to their default values.
Characters on-screen are distorted or incorrect	Make sure the brightness and contrast controls are properly adjusted.
	Make sure the video signal cable and power cables are properly installed.
	Make sure your monitor is compatible with the video mode you have selected.

6-8 Solving Problems

What happens	What to do
Characters do not appear	Make sure the video display is plugged in and turned on.
on screen	Check that the brightness and contrast controls are properly adjusted.
	Check that the video signal cable is properly installed.
	Make sure a video board is installed, enabled, and jumpered correctly.
	Reboot the system.
CMOS RAM settings are wrong	If system settings stored in CMOS RAM change for no apparent reason (for example, the time of day develops an error), the backup battery may no longer have enough power to maintain the settings. Replace the battery (Chapter 5).
Diskette drive light does not go on when drive is in	Make sure the power and signal cables for the drive are properly installed.
use or is tested by POST	Check that the drive is properly configured and enabled in Setup.
Hard drive light does not go on when drive is in use	Make sure the power and signal cables for the drive are properly installed.
or is tested by POST	Make sure the front panel connector is securely attached to the system board headers.
	Check that the drive is properly configured and enabled in Setup.
	Check the drive manufacturer's manual for proper configuration for remote hard disk drive activity.
Power-on light does not go on	If the system is operating normally, check the connector between the system board and the front panel. If OK, the light may be defective.
Prompt doesn't appear after system boots	See "Problems at Initial System Start-up".

What happens	What to do
Setup, can't enter	If you can't enter Setup to make changes, check the jumper that disables entry into Setup (Chapter 5). If the jumper is set to allow entry into Setup, you might need to clear CMOS RAM to the default values (Chapter 5) and reconfigure the system in Setup (Chapter 3).
System halts before completing POST	This indicates a fatal system error that requires immediate service attention. Note the screen display and write down any beep code emitted. Provide this information to your service representative.

6-10 Solving Problems

Error and Information Messages

The rest of this chapter describes beep codes, and error messages that you might see or hear when you start up the system:

■ Note

In all cases, if the problem persists, call your service representative.

Beep Codes

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry on the baseboard is faulty.
2	NA	Will not occur.
3	Base 64 KB Memory Failure	Memory failure in the first 64 KB.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 on the baseboard is not functioning.
5	Processor Error	The CPU on the baseboard generated an error.
6	8042 - Gate A20 Failure	The keyboard controller may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU 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	The 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.
11	Cache Error / External Cache Bad	The external cache is faulty.

Error and Information Messages

Error Message	Explanation
8042 Gate - A20 Error	Gate A20 on the keyboard cont4oller (8042) is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry on the baseboard.
Cache Memory Failure, Do Not Enable Cache!	Cache memory is defective.
CH-2 Timer Error	Most AT systems include two timers. There is an error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. 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 System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by the BIOS. Run Setup.
CMOS Memory Size Mismatch	The amount of memory on the baseboard is different than the amount in CMOS RAM. 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 DAM channel.
DMA #2 Error	Error in the second DMA channel.

6-12 Solving Problems

Error Message	Explanation
FDD Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
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 LockedPlease Unlock It	The keyboard lock on the system is engaged. The system must be unlocked to continue.
Keyboard Error	There is timing problem with the keyboard. Set the <i>Keyboard</i> option in CMOS setup to <i>Not Installed</i> to skip the keyboard POST routines.
KB/Interface Error	There is an error in the keyboard controller.

Error Message	Explanation
Off Board Parity Error	Parity error in memory installed in an expansion slot. The format is:
	OFF BOARD PARITY ERROR ADDR (HEX) = $(XXXX)$
	XXXX is the hex address where the error occurred.
Parity Error ????	Parity error in system memory at an unknown address.

6-14 Solving Problems

PCI Configuration Status and Error Messages

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

Message	Explanation
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 "Clear CMOS" jumper has been moved to the ON 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.
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, or CD-ROM drive) could not be found.

Message	Explanation
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.
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 1 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 Board Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.



6-16 Solving Problems

Technical Reference 7

Safety Compliance

This equipment meets or exceeds requirements for safety in the US (UL 1950), Canada (CSA 950), Europe (EN60950) and international IEC 950).

Dimensions

Width	21 cm (8.3 inches)
Depth	46.67 cm (18.375 inches)
Height (with feet installed)	39 cm (15.5 inches)
Weight (without peripherals)	9.7 kg (21.4 pounds)

System Environment

Parameter	Specification
Operating temperature	10 to 35° C (50 to 95° F)
Non-operating temperature	-40 to 70° C (-40 to 158° F)
Operating humidity (no hard disk drive)	80% RH @ 33°C
Non-operating humidity	92% RH @ 33°C

Power Supply Specifications

The following sections provide the specifications for the system's 200 watt power supply.

A WARNINGS

To avoid damage to the system board or power supply, do not exceed a total of 200 watts power draw.

Do not overload the system board by installing add-in boards that draw excessive current. The system is designed to provide 2 A of \pm 5 V current for each board in the system. The total \pm 5 V current draw in a fully-loaded system (all add-in board slots filled) must not exceed 14 A.

■ Note

In geographic regions that are susceptible to electrical storms, we highly recommend you plug your system into a surge suppressor.

AC Input

Input frequency is 50/60 Hz.

Voltage	Current
115 V (90 - 135 V)	4 A
230 V (180 - 265 V)	2 A

Power Supply Output

DC Voltage	Current (Maximum Continuous)
+5 V	22.0 A
-5 V	0.5 A
+12 V	6.0 A
-12 V	0.8 A

7-2 Technical Reference

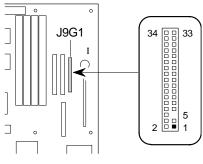
Board Connectors

This section provides the pinouts for the system board connectors. Chapter 5 shows the location of the connectors (Figure 5-1).

Primary Power Connector

Pin	Signal Name
1	3.3 V
2	3.3 V
3	GND
4	+5 V
5	GND
6	+5 V
7	GND
8	PWRGD
9	+5 V SB
10	+12 V
11	3.3 V
12	-12 V
13	GND
14	PS-
15	GND
16	GND
17	GND
18	-5 V
19	+5 V
20	+5 V

Diskette Drive Connector



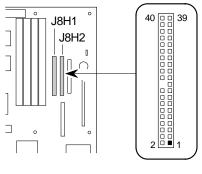
OM04225

Pin	Signal Name	Pin	Signal Name
1	Ground	2	DENSEL
3	Ground	4	Reserved
5	Key	6	FDEDIN
7	Ground	8	Index-
9	Ground	10	Motor Enable A-
11	Ground	12	Drive Select B-
13	Ground	14	Drive Select A-
15	Ground	16	Motor Enable B-
17	MSEN1	18	DIR-
19	Ground	20	STEP-
21	Ground	22	Write Data-
23	Ground	24	Write Gate-
25	Ground	26	Track 00-
27	MSEN0	28	Write Protect-
29	Ground	30	Read Data-
31	Ground	32	Side 1 Select-
33	Ground	34	Diskette Change -

7-4 Technical Reference

IDE Connectors

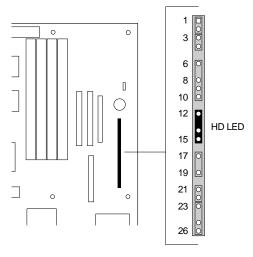
The system provides two PCI/IDE peripheral connectors.



OM04226

Pin	Signal Name	Pin	Signal Name
1	Reset IDE	2	Ground
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	Ground	20	Key
21	DDRQ0 (DDRQ1)	22	Ground
23	I/O Write-	24	Ground
25	I/O Read-	26	Ground
27	IOCHRDY	28	Vcc pull-up
29	DDACK0	30	Ground
31	IRQ14 (IRQ15)	32	Reserved
33	Addr 1	34	Reserved
35	Addr 0	36	Addr 2
37	Chip Select 1P (1S)-	38	Chip Select 3P (3S)-
39	Activity-	40	Ground

Hard Drive LED Connector

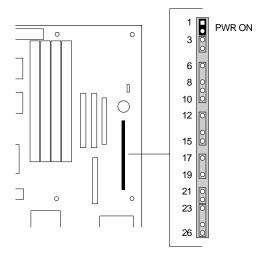


OM04221

Pin	Signal Name
12	+5 V
13	Key
14	HD ACTIVE
15	+5 V

7-6 Technical Reference

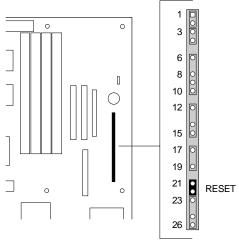
Remote On/Off



OM04218

Pin	Signal Name
1	Power on
2	Power return

Reset Connector

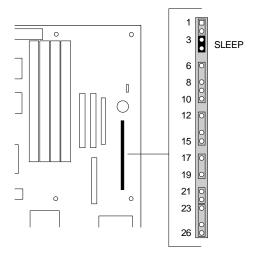


OM04223

Pin	Signal Name	
21	Ground	
22	RESET	

7-8 Technical Reference

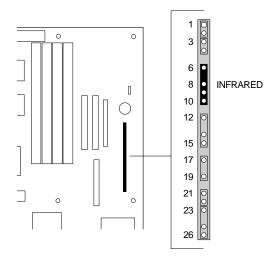
Sleep/Resume Connector



OM04219

Pin	Signal Name	
3	Comatose	
4	+5 V	

Infra-red Connector

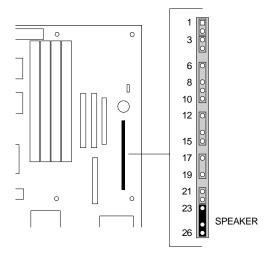


OM04220

Pin	Signal Name	
6	+5 V	
7	Key	
8	IR_RX	
9	Ground	
10	IR_TX	

7-10 Technical Reference

Speaker Connector



OM04224

Pin	Signal Name
23	+5 V
24	Key
25	SPKR_DAT connect
26	SPKR_DAT

Wave Table Connector

Pin	Signal	
1	Wave Right	
2	Ground	
3	Wave Left	
4	Ground	
5	Key	
6	Ground	
7	MIDI_Write	
8	Ground	

CD-ROM Audio Interface Connector

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

Voice Modem Audio Interface

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

7-12 Technical Reference

VGA Connector

Pin	Signal	
1	Ground	
2	Ground	
3	Blue	
4	Green	
5	Red	
6	Ground	
7	No connect (reserved)	
8	Ground	
9	Ground	
10	Ground	
11	DDCCLK (DDC Clock)	
12	VSYNC (Vertical Sync)	
13	HSYNC (Horizontal Sync)	
14	DDCDAT (DDC Data)	
15	No connect (reserved)	

VESA Feature Connector

Pin	Signal Name	Pin	Signal Name
1	Ground	2	Data 0
3	Ground	4	Data 1
5	Ground	6	Data 2
7	Data enable	8	Data 3
9	Sync enable	10	Data 4
11	PCLK enable	12	Data 5
13	Vcc	14	Data 6
15	Ground	16	Data 7
17	Ground	18	PCLK
19	Ground	20	BLANK
21	Ground	22	HSYNC
23	Vcc	24	VSYNC
25	Ground	26	N/C
27	key	28	key
29	IICCLK	30	Ground
31	IICDAT	32	N/C
33	EN1	34	EN2

7-14 Technical Reference

ISA Connectors

Pin	Signal Name	Pin	Signal Name
B1	GND	A1	IOCHK-
B2	RSTDRV	A2	SD7
В3	Vcc	А3	SD6
B4	IRQ9	A4	SD5
B5	-5 V	A5	SD4
В6	DRQ2	A6	SD3
В7	-12 V	A7	SD2
B8	0WS-	A8	SD1
В9	+12 V	A9	SD0
B10	GND	A10	IOCHRDY
B11	SMEMW-	A11	AEN
B12	SMEMR-	A12	SA19
B13	IOW-	A13	SA18
B14	IOR-	A14	SA17
B15	DACK3-	A15	SA16
B16	DRQ3	A16	SA15
B17	DACK1-	A17	SA14
B18	DRQ1	A18	SA13
B19	REFRESH-	A19	SA12

Continued

ISA Connectors

Pin	Signal Name	Pin	Signal Name
B20	SYSCLK	A20	SA11
B21	IRQ7	A21	SA10
B22	IRQ6	A22	SA9
B23	IRQ5	A23	SA8
B24	IRQ4	A24	SA7
B25	IRQ3	A25	SA6
B26	DACK2-	A26	SA5
B27	TC	A27	SA4
B28	BALE	A28	SA3
B29	Vcc	A29	SA2
B30	OSC	A30	SA1
B31	GND	A31	SA0
KEY		KEY	
D1	MEMCS16-	C1	SBHE-
D2	IOCS16-	C2	LA23
D3	IRQ10	С3	LA22
D4	IRQ11	C4	LA21
D5	IRQ12	C5	LA20
D6	IRQ15	C6	LA19
D7	IRQ14	C7	LA18
D8	DACK0-	C8	LA17

Continued

7-16 Technical Reference

ISA Connectors

Pin	Signal Name	Pin	Signal Name
D9	DRQ0	C9	MEMR-
D10	DACK5-	C10	MEMW-
D11	DRQ5	C11	SD8
D12	DACK6-	C12	SD9
D13	DRQ6	C13	SD10
D14	DACK7-	C14	SD11
D15	DRQ7	C15	SD12
D16	Vcc	C16	SD13
D17	Master-	C17	SD14
D18	GND	C18	SD15

PCI Connectors

Pin	Signal Name						
A1	GND	B1	-12 V	A32	AD16	B32	AD17
A2	+12 V	B2	No Connect	A33	3.3 V	B33	CBE2-
А3	No Connect	В3	GND	A34	FRAME-	B34	GND
A4	No Connect	B4	No Connect	A35	GND	B35	IRDY-
A5	Vcc	B5	Vcc	A36	TRDY-	B36	3.3 V
A6	PCIINT3-	B6	Vcc	A37	GND	B37	DEVSEL-
A7	PCIINT1-	B7	PCIINT2-	A38	STOP-	B38	GND
A8	Vcc	B8	PCIINT4-	A39	3.3 V	B39	PLOCK-
A9	Reserved	B9	No Connect	A40	SDONE	B40	PERR-
A10	Vcc	B10	Reserved	A41	SBO-	B41	3.3 V
A11	Reserved	B11	No Connect	A42	GND	B42	SERR-
A12	GND	B12	GND	A43	PAR	B43	3.3 V
A13	GND	B13	GND	A44	AD15	B44	CBE1-
A14	Reserved	B14	Reserved	A45	3.3 V	B45	AD14
A15	SPCIRST-	B15	GND	A46	AD13	B46	GND
A16	Vcc	B16	PCLKE	A47	AD11	B47	AD12
A17	AGNT-	B17	GND	A48	GND	B48	AD10
A18	GND	B18	REQA-	A49	AD9	B49	GND
A19	Reserved	B19	Vcc	A50	KEY	B50	KEY
A20	AD30	B20	AD31	A51	KEY	B51	KEY
A21	3.3 V	B21	AD29	A52	CBEO-	B52	AD8

Continued

7-18 Technical Reference

PCI Connectors

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A22	AD28	B22	GND	A53	3.3 V	B53	AD7
A23	AD26	B23	AD27	A54	AD6	B54	3.3 V
A24	GND	B24	AD25	A55	AD4	B55	AD5
A25	AD24	B25	3.3 V	A56	GND	B56	AD3
A26	AD22 (IDSEL)	B26	CBE3-	A57	AD2	B57	GND
A27	3.3 V	B27	AD23	A58	AD0	B58	AD1
A28	AD22	B28	GND	A59	Vcc	B59	Vcc
A29	AD20	B29	AD21	A60	SREQ64-	B60	SACK64-
A30	GND	B30	AD19	A61	Vcc	B61	Vcc
A31	AD18	B31	3.3 V	A62	Vcc	B62	Vcc

System I/O Addresses

Address Range (Hexadecimal)	Size (Decimal)	Description
0000 - 000F	16 bytes	PIIX - DMA 1
0020 - 0021	2 bytes	PIIX - Interrupt Controller 1
002E-002F	2 Bytes	Ultra I/O configuration registers
0040 - 0043	4 bytes	PIIX - Timer 1
0048 - 004B	4 bytes	PIIX - Timer 2
0060	1 byte	Keyboard Controller Data Byte
0061	1 byte	PIIX - NMI, speaker control
0064	1 byte	Keyboard Controller, CMD/STAT Byte
0070, bit 7	1 bit	PIIX - Enable NMI
0070, bits 6:0	7 bits	PIIX - Real Time Clock, Address
0071	1 byte	PIIX - Real Time Clock, Data
0078	1 byte	Reserved - Brd. Config.
0079	1 byte	Reserved - Brd. Config.
0080 - 008F	16 bytes	PIIX - DMA Page Register
00A0 - 00A1	2 bytes	PIIX - Interrupt Controller 2
00C0 - 00DE	31 bytes	PIIX - DMA 2
00F0	1 byte	Reset Numeric Error
0170 - 0177	8 bytes	Secondary IDE Channel
01F0 - 01F7	8 bytes	Primary IDE Channel
0278 - 027B	4 bytes	Parallel Port 2
02F8 - 02FF	8 bytes	On-Board Serial Port 2
0376	1 byte	Sec IDE Chan Cmd Port

Continued

7-20 Technical Reference

System I/O Addresses

Address Range (Hexadecimal)	Size (Decimal)	Description
0377	1 byte	Sec IDE Chan Stat Port
0378 - 037F	8 bytes	Parallel port 1
03BC - 03BF	4 bytes	Parallel Port x
03E8 - 03EF	8 bytes	Serial Port 3
03F0 - 03F5	6 bytes	Floppy Channel 1
03F6	1 byte	Pri IDE Chan Cmnd Port
03F7 (Write)	1 byte	Floppy Chan 1 Cmd
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	On-Board Serial Port 1
LPT + 400h	8 bytes	ECP port, LPT + 400h
04D0-04D1	2 bytes	Edge/Level INTR Control Reg
0CF8-0CFA*	4 bytes	PCI Config Address Reg
0CFB	1 byte	Turbo & Reset control Reg
0CFC-0CFF*	4 bytes	PCI Config Data Reg
FF00-FF07	8 bytes	IDE Bus Master Reg

^{*} Only accessible by DWORD accesses.

Memory Map

Address Range (Decimal)	Address Range (Hexadecimal)	Size	Description
1024K-131072K	100000-8000000	127M	Extended Memory
960K-1023K	F0000-FFFFF	64K	AMI System BIOS
952K-959K	EE000-EFFFF	8K	Main BIOS
948K-951K	ED000-EDFFF	4K	ESCD (Plug and Play configuration area)
944-947K	EC000-ECFFF	4K	OEM LOGO (available as UMB)
896K-943K	E0000-EBFFF	47K	BIOS RESERVED (Currently available as UMB)
800-895K	C8000-DFFFF	96K	Available HI DOS memory (open to ISA and PCI bus)
640K-799K	A0000-C7FFF	160K	Available HI DOS Memory (normally reserved for) video)
639K	9FC00-9FFFF	1K	Extended BIOS Data (moveable by QEMM, 386MAX)
512K-638K	80000-9FBFF	127K	Extended conventional
0K-511K	00000-7FFFF	512K	Conventional

7-22 Technical Reference

Board Interrupts

Interrupt Request	System Resource
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	User available
6	Floppy
7	Parallel Port 1
8	Real Time Clock
9	User available
10	User available
11	User available
12	On-board Mouse Port (Avail if no PS/2 mouse)
13	Reserved, Math coprocessor
14	Primary IDE
15	Secondary IDE if present, else User available

DMA

DMA Channel	Data Width	System Resource
0	8- or 16-bits	Open
1	8- or 16-bits	Open
2	8- or 16-bits	Floppy
3	8- or 16-bits	Parallel Port (for ECP/EPP Config.)
4		Reserved - Cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	Open

7-24 Technical Reference

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility Notice (USA)

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, there is no 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 to correct the interference by one or more of the following measures:

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

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC class B limits may be attached to this computer product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables, connected to peripherals, that are not shielded and grounded may result in interference to radio and TV reception.

Note

If a Class A device is installed within this system, then the system is to be considered a Class A system. In this configuration, operation of this equipment in a residential area is likely to cause harmful interference.

Electromagnetic Compatibility Notices (International)

この装置は、第二種情報装置(住宅地域又はその隣接した地域において使用されるべき情報装置)で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会 (VCCI) 基準に通合しております。

しかし、本装電をラジオ、テレビジョン受信機に近接してご使用になると、受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

(English translation of the notice above)

This equipment is in the Class 2 category (information equipment to be used in a residential area or an area adjacent thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

The system was tested and found to be compliant with CISPR 22/85 Class B, and VCCI Class II regulations.

Declaration of the Manufacturer or Importer

This system is in compliance with EU directive 89/336/EEC, using the EMC standards EN55022 and EN50082-1.

7-26 Technical Reference

BIOS Update A

BIOS Update

The system BIOS resides on a flash component. You can upgrade a flash BIOS through software, without taking the system apart or replacing the flash component. This appendix tells how to upgrade your system BIOS from a diskette. Your service representative can provide you with the latest BIOS upgrade for your system.

Using the Upgrade Utility

- 1. Write down the Setup selections currently set on your system (Chapter 3 tells about the Setup program).
- 2. Insert the upgrade diskette in your system's diskette drive.
- 3. Reboot the system.
- 4. When the flash upgrade menu appears, choose "Update Flash Memory Area from a file."
- 5. When the menu asks you to enter a path/filename, use the arrow keys to select the .bio file, and press <Enter>.
- 6. The utility asks for a confirmation that you want to load the new flash into memory. Select "Continue with Programming."
- 7. After the upgrade completes, remove the upgrade disk.
- 8. Reboot the system and start the Setup program. Press <F5> to reset the BIOS defaults. Then, use the copy of the Setup selections you made at the beginning of this procedure to set the options.

System Product Guide A-1

Installing Software Drivers

This appendix tells you how to install:

- Power management software
- Plug and Play software

Each of these are contained on a separate diskette. Each diskette contains a SETUP.EXE program that installs the software or drivers. The files on the diskettes are compressed to conserve space. The files can not be copied directly to the hard disk; you must use the Setup Program located on each installation diskette.

Certain models are not supplied with this software.

Installing Plug and Play Software

The Plug and Play software must be installed from Windows.

- 1. Close any open applications so that only Windows is running.
- 2. Insert the Plug and Play diskette into the diskette drive.
- 3. From the Program Manager *File* menu, select *Run*.
- 4. In the Command Line dialog box, type A:\SETUP and press <Enter>.
- 5. Follow the instructions in the Setup utility.

Refer to the README.TXT file on the diskette for more information about the Plug and Play software.

Installing Power Management Software

The APM software must be installed from Windows.

- 1. Close any open applications so that only Windows is running.
- 2. Insert the APM Software diskette into the diskette drive.
- 3. From the Program Manager *File* menu, select *Run*.
- 4. In the Command Line dialog box, type A:\SETUP and press <Enter>.
- 5. Follow the instructions in the Setup utility.

Refer to the README.TXT file on the power management diskette for information about the APM software.

Turning the System Off with APM Installed

There are three ways to power off the system.

In hardware:

Press the power button.

In software

- In Windows 3.1 or 3.11, click the PowerMan icon and select the *PowerDown* option.
- In Windows 95, clicking on the *Shutdown* button in the Start menu turns the system off after a dialog box appears.

Using the Suspend/Resume Feature

The system supports a suspended mode of operation. Suspending the system reduces energy consumption in accordance with the EPA Energy Star specification. This feature also allows the system to resume, that is, return to an active state.

To suspend system operation, do one of the following:

- Press a user-defined keyboard hot-key sequence (the Hot Key option in the Power Management Configuration Subscreen, described in Chapter 3).
- Wait until the Inactivity Timer automatically switches the system into suspended mode (the Inactivity Timer option in the Power Management Configuration Subscreen, described in Chapter 3).

To resume system operation, do one of the following:

- Press any key on the keyboard.
- Move or click the mouse (configurable via the PowerMan application).

Optional Integrated Audio System

Your system may contain an on-board 16-bit audio component from Crystal Semiconductor Corporation. The software that came with the system includes several audio applications for DOS and Windows 3.x. This appendix describes:

- · Features of the audio system
- Audio connectors on the system back panel
- · Audio software
- How to use the basic audio controls

■ Note

For Windows 95, you do not need to install audio software drivers. This appendix is applicable only to DOS and Windows 3.x.

Audio System Features

The audio system provides the following features:

- Support for four major sound standards: Sound Blaster Pro 2.0, Windows Sound System, Ad Lib, and MPU-401
- 16-bit and 8-bit stereo digital sound recording and playback
- Sampling rates selectable from 4 kHz to 44 kHz
- Stereo analog/digital mixer
- Selectable input source with individual mute and volume control
- Mixing of all input sources with individual volume control
- Yamaha OPL3 stereo FM music synthesizer that produces 20 independent stereo voices
- MIDI interface
- Full duplex interface

C-1

System Board Audio Connectors

There is one audio-related connector on the system board: the CD-ROM-to-audio interface connector. The connector is briefly described below (see Figure 5-1 for the location of the system board connectors).

CD-ROM-to-Audio Interface Connector

If you install a CD-ROM drive in the system, this 4-pin connector makes it possible to connect the audio from a CD-ROM drive to the audio system mixer. This connector is compatible with the CD-ROM-to-audio cable supplied with most CD-ROM drives.

Voice Modem Audio Interface Connector

This four pin connector is for mixing the speaker output from a voice assisted telephony modem into the MIC IN audio stream into the audio system and redirecting the MONO OUT audio stream into the telephony modem. This connector allows the telephony modem to be properly configured for use without requiring cables to be installed into the external audio jacks. The connector is compatible with the typical cable that is supplied with CD-ROM readers for interfacing to audio add-in cards.

Audio Software

The system includes Windows and MS-DOS software for getting the most out of your audio system. This section describes the Windows and MS-DOS applications that come with your audio software.

■ Note

For Windows 95, you do not need to install audio software drivers.

Windows Software

The Crystal group contains three Windows software applications: Audio Input, Audio Mixer, and Audio Transport.

Audio Input

This is a control panel that allows you to modify the input gain settings for the on-board audio.

Audio Mixer

This is a control panel that allows you to modify the mixer attenuation settings for the on-board audio.

Audio Transport

This is an application that allows you to record input from multiple audio devices, play back recorded sounds, and use Windows object linking and embedding (OLE) to embed audio files in Windows applications.

DOS Software

The audio software includes one TSR (terminate-and-stay-resident) program and five applications. The TSR and application executable files are described below.

CS32HMX.EXE

This is a memory-resident utility that allows you to control the volume with hot-keys.

CS32MIX.EXE:

This command line utility allows you to control the sound mixer.

CS4232C.EXE

This utility lets you choose between running a DOS application in either the on-board audio's Sound Blaster or Windows Sound System mode.

CSACGUCD.EXE

This is an audio CD player application.

CS32DIAG.EXE

This is the diagnostics application.

CS32INTR.EXE

This is a launching utility for the CS32MIX.EXE, CSACGUCD.EXE, and CS32DIAG.EXE.

Basic Audio System Controls

How to Play a MIDI File

The easiest way to play a MIDI file is to use the Media Player application in the Windows Accessories program group.

To play a MIDI file, do the following:

- 1. Start the Media Player in the Windows Accessories group.
- 2. From the Media Player File menu, open the MIDI file you want to play.
- 3. Click on the Play button.

How to Play a WAV File

The easiest way to play a WAV file is to use the Sound Recorder application in the Windows Accessories program group.

To play a sound, do the following:

- 1. Start the Sound Recorder in the Windows Accessories program group.
- 2. From the Sound Recorder File menu, open the WAV file you want to play.
- 3. Click on the Play button.

How to Control the Volume

Use the mixer utility software to adjust the volume. The mixer is located in the Crystal program group.

How to Mix Sounds

Use the mixer utility software to mix sounds. The mixer is located in the Crystal program group.



Optional Graphics Controller

The onboard S3 Trio64V+ integrated PCI graphics controller is an optional system component. The S3 controller provides the following features:

- Standard 1 MB of graphics memory, expandable to 2 MB
- Multiple screen resolutions/color densities available
- Support for 8-bit bi-directional VESA advanced feature connector
- Support for VESA Display Power Management Signaling (DPMS) monitor power savings modes
- Support for VESA Display Data Channel (DDC2B) that permits transfer of monitor identification and resolution support data for ease of use

■ Note

For Windows 95, you do not need to install software drivers. This chapter is applicable only to DOS and Windows 3.x.

Installing Video Drivers

The video drivers for Windows 3.x must be installed from Windows.

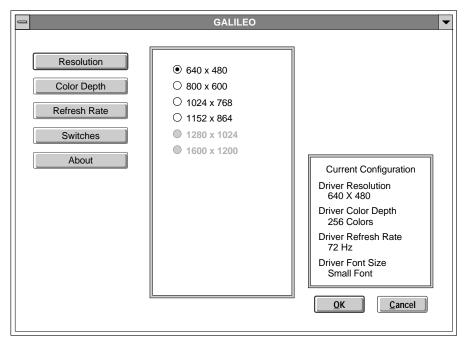
- Close any open applications so that only the Program Manager is running.
- 2. Insert the video drivers diskette into the diskette drive.
- 3. Select *Run* from the Program Manager *File* menu.
- 4. Type a:\setup in the Command Line field and click the OK button.
- 5. Follow the instructions in the Setup utility.

Refer to the README.TXT file on the diskette for more information about the video drivers.

Using the Galileo Control Panel

You can make certain changes to your graphics system configuration by using the Galileo control panel. To access the control panel:

- 1. Start Windows.
- 2. In the Main program group, open the Control Panel icon.
- 3. Open the panel called Galileo to view the graphics system control panel (Figure D-1).



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Figure D-1. Galileo Graphics Control Panel

The Galileo control panel provides five buttons that you can select to either make changes to the graphics configuration or get information about the graphics system. When you click on any of the buttons, a menu or information screen appears.

D-2 Graphics Controller

Resolution

The Resolution menu allows you to select a graphics resolution that the system will use while running Windows. Any resolution that is not available to your system appears in faint gray and cannot be selected.

Color Depth

The Color Depth menu makes it possible to choose the number of colors that will be available to your system while running Windows. Any color depth that is not available to your system will appear in faint gray and cannot be selected.

Refresh Rate

The Refresh Rate menu allows you to select the monitor refresh rate used by the graphics system. In general, the higher the refresh rate, the better your display quality will appear. However, depending on what resolution you've selected (see Resolution above), some refresh rates may not be available. Any refresh rate that is not available will appear in faint gray and cannot be selected.

Switches

The Switches menu allows you to select certain support modes to enhance graphics appearance and operation.

Small/Large Fonts Enabled Switch

Under certain resolutions, this switch allows you to change the fonts used by Windows.

Polygon and Ellipse Support Switches

These switches are for environments where CAD or illustrator's workstation applications are being used. If your system will be used as a drafting or illustrator's workstation, these switches should be turned on.

About

When you click on the About button, an information screen appears that describes the specific S3 Trio graphics controller in your system. The information screen also lists the current graphics configuration selected for your system.

Available Resolutions

The graphics controller in your system supports the resolutions and refresh rates shown in Table D-1. Keep in mind that many monitors do not support all of the resolutions and refresh rates. It is possible to set a graphics mode that your monitor does not support. Therefore, before setting or changing the mode for your monitor, read the documentation that came with your monitor to see which resolutions and refresh rates are supported. Also note that some resolutions require 2 MB of video DRAM.

Table D-1. Supported Resolutions

Pixel Resolution	Number of Colors	Refresh Rate (Hz)	Memory Required
640x480	16	60	1 MB
640x480	256	60, 72, 75, 85	1 MB
640x480	65536	60, 72, 75	1 MB
640x480	16.7 million	60, 72, 75	2 MB
800x600	256	56, 60, 72, 75, 85	1 MB
800x600	65536	60, 72, 75	1 MB
800x600	16.7 million	60, 72, 75	2 MB
1024x768	256	43(I), 60, 70, 75, 85	1 MB
1024x768	65536	43(I), 60, 70, 75	2 MB
1280x1024	16	45(I), 60, 72, 75	1 MB
1280x1024	256	45(I), 60, 72, 75	2 MB

⁽I) = interlaced



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APRICOT COMPUTERS LIMITED 3500 PARKSIDE BIRMINGHAM BUSINESS PARK BIRMINGHAM B37 7YS UNITED KINGDOM

TRAVELLERS LANE HATFIELD HERTFORDSHIRE ALIO 8XB UNITED KINGDOM

APRICOT COMPUTERS LIMITED MITSUBISHI ELECTRIC EUROPE GmbH GOTHAER STRASSE 8 POSTFACH 1548 40835 RATINGEN DEUTSCHLAND