

EPSON®

User's Guide



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Important Safety Instructions

Read all of these instructions and save them for later reference. Follow all warnings and instructions marked on the computer.

- Unplug the computer before cleaning. Clean with a damp cloth only. Do not spill liquid on the computer.
- Do not place the computer on an unstable surface or near a radiator or heat register.
- Do not block or cover the openings in the computer's cabinet. Do not insert objects through the slots.
- Use only the type of power source indicated on the computer's label.
- Connect all equipment to properly grounded power outlets. Avoid using outlets on the same circuit as photocopiers or air control systems that regularly switch on and off.
- Do not let the computer's power cord become damaged or frayed.
- If you use an extension cord with the computer, make sure the total ampere rating of the devices plugged into the extension cord does not exceed the cord's ampere rating. Also, make sure the total of all devices plugged into the wall outlet does not exceed 15 amperes.
- Except as specifically explained in this User's Guide, do not attempt to service the computer yourself.
- Unplug the computer and refer servicing to qualified service personnel under the following conditions:

If the power cord or plug is damaged; if liquid has entered the computer; if the computer has been dropped or the cabinet damaged; if the computer does not operate normally or exhibits a distinct change in performance. Adjust only those controls that are covered by the operating instructions.

- If you plan to use the computer in Germany, observe the following:

To provide adequate short-circuit protection and over-current protection for this computer, the building installation must be protected by a 16 Amp circuit breaker.

Beim Anschluß des Computers an die Netzversorgung muß sichergestellt werden, daß die Gebäudeinstallation mit einem 16 A Überstromschutzschalter abgesichert ist.

Importantes instructions de sécurité

Lire attentivement les instructions suivantes et les conserver pour les consulter en cas de besoin. Observer soigneusement tous les avertissements et directives marques sur l'ordinateur.

- Debrancher l'ordinateur avant de le nettoyer. N'utiliser qu'un chiffon humide. Veiller a ne pas renverser de liquides sur l'appareil.
- Ne pas placer l'ordinateur sur une surface instable ni pres d'une source de chaleur.
- Ne pas bloquer ni couvrir les orifices d'aération de l'appareil. Ne pas introduire d'objets dans les ouvertures.
- Utiliser seulement le type de source d'alimentation électrique indiqué sur l'etiquette.
- Tout l'equipement doit être branche sur des prises de courant avec contact de terre. Ne jamais utiliser une prise sur le même circuit qu'un appareil a photocopies ou un système de controle de ventilation avec commutation marche-arrêt automatique.
- S'assurer que le cordon d'alimentation de l'ordinateur n'est pas abîme ni effiloché.
- Dans le cas ou on utilise un cordon de rallonge avec l'ordinateur, s'assurer que l'intensite en amperes requise pour tous les appareils branches sur ce cordon ne soit pas superieure a la capacite du cordon. S'assurer aussi que cette intenste ne depasse jamais la somme de 15 amperes pour l'ensemble des appareils.
- Sauf dans les cas specifiques expliques dans ce manuel de l'utilisateur, ne pas essayer d'entretenir ou de reparer l'ordinateur soi-même.
- Debrancher l'ordinateur et contacter un technicien qualifie dans les circonstances suivantes:

Si le cordon ou la prise sont abîmes; si un liquide a pénétré a l'intérieur de l'appareil; si on a laissé tomber l'appareil ou si le boîtier est endommagé; si l'ordinateur ne fonctionne pas normalement ou fonctionne dune manière très différente de l'ordinaire. N'ajuster que les commandes décrites dans les directives.

- Pour utiliser l'ordinateur en Allemagne, il est nécessaire que le bâtiment soit muni d'un disjoncteur de 16 amperes pour proteger l'ordinateur contre les courts-circuits et le survoltage.

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Introduction

Your EPSON@ computer represents the state-of-the-art in PC technology by incorporating the high-performance Intel@ Pentium™ microprocessor and PC1 bus architecture. Your system includes the following features:

- ☐ A 60 MHz Intel Pentium microprocessor
- ☐ 8MB of random access memory (RAM) on two 4MB single in-line memory modules (SIMMs), expandable up to 128MB
- ☐ 256KB of secondary cache memory on the system board
- ☐ Integrated AT1 Mach32 high-performance, local bus PC1 graphics controller with a 15-pin analog VGA port
- ☐ 1MB of video RAM (VRAM) expandable to 2MB using eight 256KB VRAM modules
- ☐ Two PC1 expansion slots (for one full-length board and one half-length board)
- ☐ Three 16-bit, ISA expansion slots (for one full-length board and two half-length boards)
- ☐ Super I/O controller integrating the serial ports, the parallel port, the diskette drive, and the IDE hard disk drive controller functions into a single chip
- ☐ IDE ISA hard disk drive interface
- ☐ Diskette drive controller supporting 2.88MB drives and providing auto-sensing capabilities
- ☐ System BIOS in a flash EEPROM including support for the Setup program and PC1 adapter auto-configuration utility

- ☐ 145 Watt power supply switchable between 115 and 230 VAC
- ☐ Two RS-232C compatible, 9-pin serial connectors
- ☐ One multimode, 25-pin, Centronics® compatible parallel port
- ☐ PS/2™ compatible keyboard and mouse ports
- ☐ Mach 32 video drivers and utilities for Microsoft® Windows™ 3.1
- ☐ VESA™ compliant 8514/A standard feature connector
- ☐ A drive bay for one full-height or two half-height, 5.25-inch drives and a drive carrier for one 3.5-inch, 1.44MB diskette drive (standard) and one 3.5-inch hard disk drive
- ☐ Password security
- ☐ An auxiliary fan for additional cooling.

Central Processing Unit (CPU)

Your computer uses the 60 MHz Intel Pentium microprocessor. In addition to its expanded data and addressing capabilities, the Pentium includes the following features:

- ☐ Backward compatibility with Intel microprocessor architecture
- ☐ Integrated numeric coprocessor compatible with the Intel 486DX microprocessor and compliant with ANSI/ IEEE standard 754-1985
- ☐ Internal 16KB cache (8KB for data and 8KB for code)
- ☐ Burst-mode bus cycles.

System Memory

System memory includes base (conventional) and extended memory. Operating systems such as MS-DOS,[®] OS/ 2,[®] UNIX[®] Novell[®] NetWare,[®] NextStep,[®] and all application programs use base memory. For better performance, OS/ 2, UNIX, NetWare, and NextStep-as well as many MS-DOS applications-use extended memory.

The system supports up to 128MB of RAM, which can be installed using 72-pin, 70ns (nanosecond) or faster SIMMs.

Cache Memory

The Pentium microprocessor includes 16KB of internal cache. The core chip set includes a cache controller that also supports the 256KB of secondary cache memory installed on the main system board.

Video

The system contains an onboard AT1 Mach32 extended super VGA, local bus PCI controller that provides superior graphics performance. The video subsystem is backward compatible with MDA, CGA, Hercules@ Graphics, EGA, and VGA video standards. The system supports non-interlaced as well as interlaced monitors.

The computer comes with 1MB of VRAM providing resolutions up to 1024 x 768 in 256 colors. You can install an additional 1MB of VRAM (2MB total) to provide a maximum resolution of 1280 x 1024 in 256 colors.

You can use the VESA compliant, 8514/A feature connector on the system board if you install an auxiliary video subsystem in one of the expansion slots, such as an 8514/A compatible video card or DVI[®] board.

Video drivers for the Mach32 controller, and drivers and utilities for Windows 3.1 are included on the AT1 Mach32 driver diskette.

Mass Storage

The system supports up to four drives, 3.5-inch or 5.25-inch. A removable drive carrier bay holds up to two 3.5-inch drives, including the 1.44MB diskette drive that comes with your system. The other drive bay holds up to two 5.25-inch drives (or 3.5-inch drives with 5.25-inch mounting frames), either one full-height or two half-height.

In these bays, you can install optional diskette or hard disk drives, as well as tape drives, CD-ROM drives, and optical drives.

System BIOS

The system BIOS is contained in a flash EEPROM on the main system board. The BIOS includes the following:

- ☐ ISA and PC1 compatibility
- ☐ Power-on self test (POST) routines
- ☐ Setup program
- ☐ PC1 auto-configuration utility (described below)
- ☐ BIOS update and recovery code.

Your computer supports shadowing of the system BIOS to allow any BIOS routines to be executed from fast, 32-bit RAM instead of from the slower, S-bit flash device.

PCI Auto-configuration

The PC1 auto-configuration utility works in conjunction with the Setup program to support PC1 expansion boards. The utility complies with version 2.0G of the PC1 BIOS specification. When you turn on the computer's power after installing a PC1 board, the BIOS automatically configures interrupts, DMA channels, I/O space, etc. Since PC1 boards use the same interrupt resources as ISA expansion boards, you must specify the interrupts used by the ISA boards in the Setup program.

BIOS Upgrades

Because the BIOS is stored in a flash EEPROM device, you can easily upgrade the BIOS without replacing the chip. The flash upgrade process can be done by running a utility from a diskette or hard disk, or over a network.

How to Use this Manual

You don't have to read everything in this book; see the following chapter summaries to find the sections you need

Chapter 1 provides simple instructions for setting up your system and guidelines for installing optional devices.

Chapter 2 describes how to run the Setup program to define your computer's configuration. You may need to do this the first time you use your computer, or later if you change the configuration.

Chapter 3 covers general operating procedures, such as resetting the computer, using the password, and changing the processor speed. It also describes upgrading the system BIOS.

Chapter 4 describes how to remove and replace the computer's cover, change jumper settings, and install optional equipment such as option cards, memory modules, and VRAM chips.

Chapter 5 explains how to install and remove disk drives.

Chapter 6 describes the video modes, refresh rates, and monitors that you can use with your system and tells you how to use the video drivers and utilities.

Chapter 7 contains troubleshooting tips.

Appendix A lists the specifications of your computer.

At the end of this manual you'll find an **Index** and a list of U.S. and international marketing locations.

Conventions Used in This Manual

This manual uses the following conventions in the text:

Example	Meaning
Enter	Keys you press on the keyboard
Ctrl C	Keys you press at the same time; hold down the key marked Ctrl and press the letter C
c:\dos	Text as it appears on the screen
DISKCOPY A: B:	Text that you type exactly as shown
<i>path\filename</i>	Words printed in lowercase italics represent optional parameter names; here you would type the actual path and filename, such as \WORK\CONTACT
COM1	Names of labeled hardware elements

Where to Get Help

If you purchased your computer in the United States or Canada, EPSON provides customer support and service through a network of Authorized EPSON Service Centers. EPSON also provides support services through the EPSON Connection.” In the United States, dial **1-800-922-8911**. In Canada, dial **1-800-GO-EPSON**. (You can also contact EPSON at 310-782-0770 and ask for the EPSON Connection.)

Call the EPSON Connection for the following:

- ☐ Technical assistance with the installation, configuration, and operation of EPSON products
- ☐ Assistance in locating your nearest Authorized EPSON Reseller or Service Center
- ☐ Sales of accessories, manuals, or parts for EPSON products
- ☐ Customer relations
- ☐ EPSON technical information library fax service
- ☐ Product literature on current and new products.

When you call for technical assistance, be ready to identify your system and its configuration, and provide any error messages to the support staff. See Chapter 7 for more information.

If you purchased your computer outside the United States or Canada, contact your EPSON dealer or the marketing location nearest you for customer support and service. International marketing locations are listed at the end of this manual.

If you need help with any software application program you are using, see the documentation that came with that program for technical support information

CompuServe On-line Support

The fastest way to access helpful tips, specifications, drivers, application notes, tables for DIP switch or jumper settings, and bulletins for EPSON products is through the Epson America Forum on CompuServe.®

If you are already a CompuServe member, simply type **GO EPSON** at the menu prompt to reach the Epson America Forum.

If you are not currently a member of CompuServe, you are eligible for a free introductory membership as an owner of an EPSON product. This membership entitles you to:

- ☐ An introductory \$15 credit on CompuServe
- ☐ Your own user ID and password
- ☐ A complimentary subscription to *CompuServe Magazine*, CompuServe's monthly publication.

To take advantage of this offer, call 1-800-848-8199 in the United States and Canada and ask for representative #529. In other countries, call the following U.S. telephone number: 1-614-529-1611, or your local CompuServe information number.

Chapter- 1

Setting Up Your System

This chapter explains how to set up your system, including:

- ☐ Choosing a location
- ☐ Setting the input voltage
- ☐ Checking the power cord
- ☐ Installing optional devices
- ☐ Locating front panel and back panel features
- ☐ Turning the computer on and off.

Choosing a Location

When you are ready to set up your system, choose a safe, convenient location that provides the following:

- ☐ A flat, hard surface. Surfaces like beds and carpets attract static electricity, which can erase data on your disks, damage the computer's circuitry, and prevent proper ventilation.
- ☐ Moderate environmental conditions. Select a cool, dry area and protect your computer from extremes in temperature, humidity, dust, and smoke. Avoid direct sunlight or other sources of heat.
- ☐ Good air circulation. Leave several inches of space around the computer so air can move freely.

- ☐ No electromagnetic interference. Do not place your system too close to any electrical device, such as a telephone or television, which generates an electromagnetic field.
- ☐ Appropriate power source. Connect all your equipment with the appropriate power cords for the power source in your area. See “Checking the Power Cord” on page 1-3 for more information.

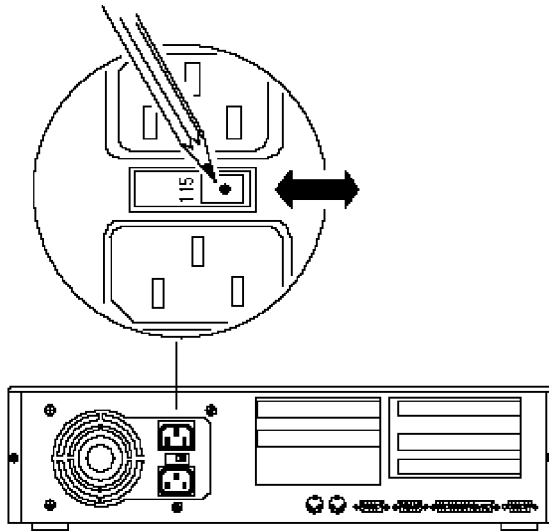
Setting the Input Voltage

A 145 Watt power supply is integrated into the system to provide power for system resources, expansion boards, and drives. You can use the voltage selector switch on the back panel to set the power supply to operate at 115 VAC (in the range of 100-120 VAC) or 230 VAC (in the range of 200-240 VAC).

Verify that your system has the correct setting by checking the voltage selector switch. When set correctly, the selected voltage is displayed on the switch. If you need to change the setting, use a pen or other pointed tool to slide the switch to the left or right.

Caution

Be sure to check the voltage selector switch setting before you turn on the computer so you do not damage your system.



Checking the Power Cord

If the power cord supplied with this system is not compatible with the electrical outlet in your region, you must obtain a suitable power cord that meets the following criteria:

- ☐ The cord must be rated for use with the available AC voltage that is at least 125% of the current rating of the product.
- ☐ The connector at the end of the cord that plugs into an electrical outlet must be a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region.

- ☐ The connector at the product end of the cord must be an IEC type CEE-22 female connector.
- ☐ The cord must be less than 14.8 feet (4.5 meters) long.

Caution

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

Installing Optional Devices

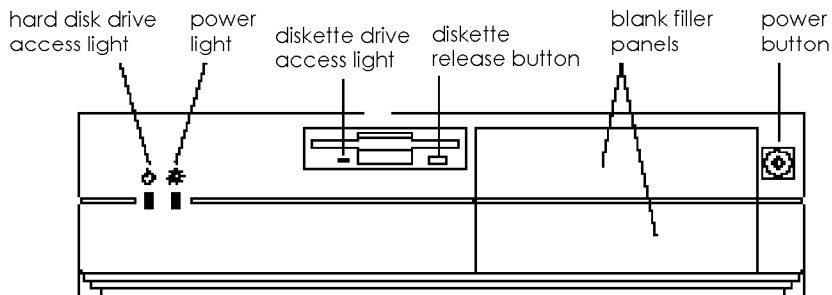
Before you install optional devices, such as drives, expansion boards, and software, be sure to connect a keyboard and a monitor, turn on your computer, and let it run the power-on self test. (See “Turning On the System” on page 1-6 before you turn on the power.)

Once your system has started successfully, you can turn it off and add the rest of your optional devices.

Note

If you plan to operate your system without a keyboard or a monitor (for example, as a network server), you must still connect these devices to test the system and run the Setup program. You can disconnect them after you perform these steps.

Front Panel Features



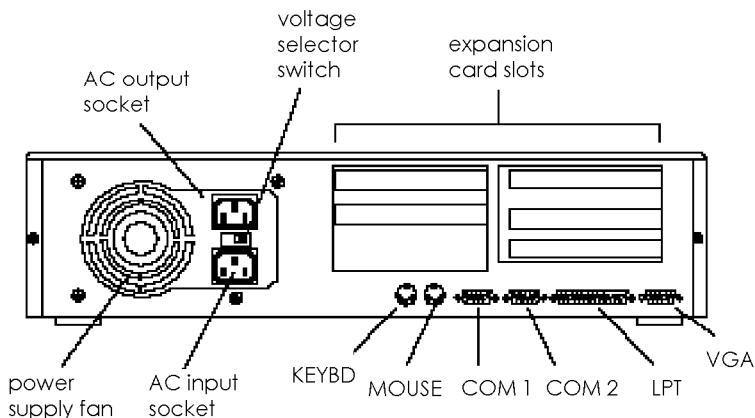
Front panel features

Feature	Function
Hard disk drive access light	Blinks when the computer is reading data from or writing data to a hard disk
Power light	Green when the computer's power is turned on
Diskette drive access light	Blinks when the computer is reading data from or writing data to a diskette
Diskette release button	Press to eject a diskette from the drive
Blank filler panels	Cover the 5.25-inch drive bays
Power button	Press to turn the computer on or off

Note

Your computer does not include a Reset button. To reset your system, you must press **Ctrl Alt Del** or turn the computer off, wait 20 seconds, and then turn it back on.

Back Panel Features



Turning On the System

Before you turn on your computer, check the following safety rules to avoid accidentally damaging your computer or injuring yourself

- ☐ Do not connect or disconnect any peripheral device cables (including the keyboard or a mouse) or power cables unless the computer's power is off.
- ☐ Never turn off or reset your computer while a disk drive light is on. This can destroy data stored on the disk.
- ☐ Never turn on the computer with a protective card in a diskette drive.
- ☐ Always wait at least 20 seconds after you turn off the power before you turn it on again to prevent possible damage to the computer's electrical circuitry.

To turn on the system, first turn on your monitor, printer, and any other peripheral devices you have installed. Then press the power button on the computer's front panel. The green power light goes on and the system begins its power-on self test.

Each time you turn on the system, the self test checks the system board, memory, keyboard, and certain installed peripheral devices. During the memory test, the screen displays the amount of memory that it has tested. The self test can take up to 60 seconds to complete. If you do not want to wait for the memory test to complete, you can stop it by pressing **ESC**. (The computer does not test memory after you press **Ctrl Alt Del**.)

It is unlikely that any errors will occur during testing. If the self test does find an error, it may display an error message or emit a series of beeps (called beep codes). See Chapter 7 for a description of error messages, beep codes, and troubleshooting procedures for your system.

After a moment you see the following prompt:

Press **<F1>** to run Setup

If you want to start the Setup program, press **F1**. You have from two to five seconds to press **F1** before the prompt disappears and the system boots.

Turning Off the System

Whenever you turn off your system, follow these steps:

1. Save your data and exit any application program you are using.
2. Check the hard disk drive and diskette drive access lights to make sure they are not on. Do not turn off the computer if a drive light is on because you can damage the drive or lose data.
3. Remove any diskette(s) from the diskette drive(s)
4. Press the power button to turn off the computer.
5. Turn off the monitor, printer, and any other peripheral devices.

Chapter 2

Running the Setup Program

Your computer's Setup program is built into the system BIOS so you can change and store system configuration information without inserting a diskette. This information is stored in CMOS RAM, which is backed up by a battery even when the computer's power is off.

You can use Setup to change or verify information about your system, such as the types of drives installed in the computer, the amount of memory installed, and whether a password and various other functions are enabled.

You need to run Setup the first time you use your computer and you should also run it after you do any of the following:

- ☐ Change the system configuration (for example, adding a drive or installing memory)
- ☐ See a system prompt to run Setup because a configuration error was detected
- ☐ Replace the real-time clock.

Starting the Setup Program

When you boot the system, it performs a power-on self test which checks the settings stored in CMOS RAM against the actual hardware configuration. Your next step after booting depends on what the test finds, as described in the table below.

If this happens...	Do the following...
If the settings in CMOS RAM match the hardware configuration, and if the test does not find any errors, the power-on testing continues	No action needed
If the test finds a fatal error (preventing the system from booting), it generates a series of beeps; a specific number of beeps indicates a certain error message	See Chapter 7 for a description of the system beep codes and troubleshooting procedures
If the test finds a non-fatal error (does not stop the booting process), the system displays a message in the following format: Error message Press <F1> to resume In addition to an error message, the test may also display the following message: RUN SETUP	Locate the error message in Chapter 7 and take action as indicated under the explanation for the message; if needed, run the Setup program
If you need to reconfigure the system, start the Setup program	Press F1 after the computer starts the memory test; you have two to five seconds to press F1 before the boot process continues
If you need to begin again, reboot the system	Press Ctrl Alt Del

The Setup program initially displays a menu of general utilities and actions. This general menu also provides the option of saving or discarding Setup changes that you've made. Under each utility listed in the menu are Setup options for modifying your configuration.

To select a menu item, press the up, down, right, or left arrow keys. Use **PgUp** or **PgDn** to change the setting of the selected option. The keys you can use are listed at the bottom of each Setup screen.

You can also use the following function keys in Setup; not all of the keys are available on every screen.

Key	Function
F1	Lists help information for the currently highlighted item
F2 and F3	Change the color combinations used for the Setup program (only operable on color monitors)
F5	Loads the Setup values currently stored in the CMOS RAM
F6	Loads the default CMOS values contained in the flash ROM
F7	Loads the CMOS values stored at the last power-on of the system

Setup Options

The table below lists the options available on the general Setup menu. See the next sections for detailed descriptions of each option

Option	Description
Standard CMOS Setup	Basic options for configuring your computer, such as setting the time and date, selecting diskette and hard drive types, and verifying the amount of system memory
Advanced CMOS Setup	Advanced options, such as enabling or disabling parity checking, cache, Num Lock, shadowing, ISA interrupts, and ISA linear frame buffers
Peripheral Management Setup	Options for setting and modifying peripheral devices associated with the super I/O controller, such as the serial and parallel port addresses
Configure with BIOS Defaults	Allows you to reload the CMOS with the default values contained in the flash ROM
Configure with Power-On Defaults	Allows you to reload the CMOS with the values stored at the last power-on of the system
Change Password	Allows you to set, change, or disable a password that will be required to run Setup or boot the operating system
Write to CMOS and exit	Saves the new configuration to CMOS RAM
Do not write to CMOS and exit	Discards any changes made to the configuration and does not save it to CMOS RAM

Standard CMOS Setup

Date

Specify the current date

Time

Specify the current time in hours, minutes, and seconds using a 24-hour clock (for example, 1 P.M. is hour 13). You can only reset the seconds to **0**.

Floppy Drive A:

Select the size and type of the diskette drive installed as drive A **or select Not installed**. The default setting is **1.44MB, 3 $\frac{1}{2}$ -inch**.

Floppy Drive B:

Select the size and type of the diskette drive installed as drive B. The default setting **is Not installed**.

Drive C, D, E F: Type

There are three choices for configuring each IDE hard drive:

- ☐ **AUTO-CONFIG**. This causes the BIOS to automatically sense the hard drive in the system and configure it appropriately. You should select this option to see if the computer automatically senses your drive.

- ☐ User Type 1. This setting allows you to explicitly configure the hard drive if the computer does not automatically sense the drive when **you select AUTO-CONFIG. Select User Type 1** for your first drive.
- ☐ User Type 2. Same as User Type 1, except you should use this type for your second drive, if necessary.

Drive C, D, E F: Timeout

This option allows you to specify the amount of time the system can take to automatically configure an IDE drive before printing an error message. Select 0, 5, 15, or 31 seconds. The default setting is 5 seconds.

Keyboard

If you are not going to use a keyboard with your system, select **Not installed** to disable testing of the keyboard by the power-on self test and avoid keyboard errors. The default setting is **Installed**.

Base Memory

Displays the amount of base memory currently selected. You cannot change this setting; however, you can use the **Base Memory Size option** on the Advanced CMOS Setup screen to change the size.

Extended Memory

Displays the amount of extended memory. You cannot change this setting.

Advanced CMOS Setup

Typematic Rate Programming

This option allows you to customize the way your keyboard operates. You can select enabled or disabled. (The default setting is **Disabled.**) When enabled, the following options are applicable:

- ☐ **Typematic Rate Delay determines how long it takes** for a key to repeat input when you hold it down. You can **choose 250, 500, 750, or 1000 millisecond (ms) delays.** The default setting is 500 ms.
- ☐ **Typematic Rate determines the speed at which** characters repeat when you hold down a key. The higher the number, the faster the characters repeat. You can choose 30, 24, 20, 15, 12, 10, 8, or 6 characters per second (cps). The default setting is 15 cps.

Press F1 Message Display

This option allows you to enable or disable the message, **Press <F1> to run Setup that appears during the** power-up sequence. The default setting is **Enabled.**

System Boot Up Num Lock

This option sets the initial state (either On or **Off**) **of the** computer's Num Lock feature when the system boots. The default setting is On.

System Boot Up Sequence

This option determines which drive the system checks first to find an operating system. The following options are available:

- ☐ Drive A: before C (default): The system checks drive A before checking drive C. This selection allows you to boot from a diskette, if necessary.
- ☐ Drive C: before A: The system checks drive C first.
- ☐ Check only C: The system checks drive C and no other drives.

System Boot Up CPU Speed

This option allows you to set the initial CPU speed used by the computer when you boot the system. You can select either high or low speed. High speed is 60 MHz and low speed simulates an 8 MHz operating speed. The default setting is **High**.

Cache Memory

This option allows you to enable or disable both the internal and secondary cache memory. The default setting is **Enabled**.

Network Password Checking

If you enable this option, you will be prompted for a password when you attempt to connect to the network. You must set a password (described on page 2-13) for this option to take effect. The default setting is **Disabled**.

ISA Linear Frame Buffer

The ISA linear frame buffer is for video expansion boards that take advantage of a linear frame buffer. See your video board manual to see if this option applies to your board. You can specify the buffer size to be either 1MB, 2MB, or 4MB. If you enable this option, video board performance may be improved. (If this option is enabled, the Set Linear **Frame Address To** option is set automatically.) The default setting is **Disabled**.

Set Linear Frame Address To

When you enable the ISA linear frame buffer, this selection is set automatically. When you disable the linear frame buffer, the setting becomes **N/A** (not applicable).

Disable Shadow Memory Size

This option is tied to the next option, **Disable Shadow Memory Base**. If you set **Disable Shadow Memory Base** to either C0000H or D0000H, you can select a **Disable Shadow Memory Size of** 16KB, 32KB, 48KB, or 64KB. The default setting is **Disabled**.

Disable Shadow Memory Base

This option allows you to exclude a memory location for use as shadow RAM. The choices are in the C0000H or D0000H range, with several settings in each range. For example, within the C0000H range, you can choose C0000H, C4000H, CS000H, or CC000H.

This option affects the previous option, **Disable Shadow Memory Size**. Once you set this option, you can alter the **Disable Shadow Memory Size option**.

The maximum disabled shadow memory size is 64KB. You can reach a 64KB size only if you set the disabled shadow memory base to **C0000H** or **D0000H**. Selecting the other **Disable Shadow Memory Base** settings causes the **Disable Shadow Memory Size** to be smaller.

Base Memory Size

You can select a base memory size of either **640KB** or **512KB**. The default setting is **640KB**.

IDE DMA Transfer Mode

You can choose from three types of IDE DMA transfers: **Standard (compatible)**, **Type B**, or **Type F**. You should select **Type F** because it is the fastest mode, but not all hard drives support this mode. For information about supported transfer modes, see the documentation that came with your hard disk drive. The default setting is **Disabled**.

IDE Multiple Sector Mode

This option is tied to the previous option, **IDE DMA Transfer Mode**. The **setting programs** the IDE DMA cycles to transfer multiple sectors per burst. You can select 1, 2, 4, 8, 16, 32, or 64 S/B (sectors per burst). If you select 64 **S/B**, you will be assured of the maximum burst size supported by the drive installed in the system. The default setting is **Disabled**.

Enhanced ISA LBA Translators

This option enables or disables the ISA logical block address translators. If you install an IDE hard disk drive that has a capacity greater than 512MB, enable this option. The default setting is **Disabled**.

Enhanced ISA Timing

When you enable this option, the ISA bus operates at 10 MHz. This can result in faster system performance if the ISA expansion boards in the system can operate at 10 MHz (instead of the standard 8 MHz). The default setting is Disabled.

ISA IRQ 9, ISA IRQ 10, and ISA IRQ 11

These options set the IRQ 9 through IRQ 11 use for the PC1 auto-configuration code. You can select Free or Used for each option. Select Used if there is an ISA board in your system that uses the specified interrupt. If you set an interrupt to Free, the PC1 auto configuration code may attempt to use it.

Peripheral Management Setup

Programming Option

This option allows you to select whether you want to manually configure the peripheral devices controlled by the super I/O controller or whether you want the computer to do it automatically. The default setting is Auto.

If Auto is selected, the rest of the Peripheral Management Setup option settings have no effect.

On-board Floppy Drive

This option allows you to enable or disable the built-in diskette drive controller. The default setting is Enabled.

On-board IDE Drive

This option allows you to enable or disable the built-in IDE hard disk drive controller. The default setting is **Enabled**.

First Serial Port Address

You can select a COM1 address of 2E8H, 3E8H, 2F8H, or 3F8H. If Programming Option is set to **Auto**, this option is set to **Disabled**.

Second Serial Port Address

You can select a COM2 address of 2ESH, 3ESH, 2FSH, or 3FSH. If Programming Option is set to **Auto**, this option is set to **Disabled**.

Parallel Port Address

You can select an address of 278H, 378H, or 3BCH. If Programming Option is set to **Auto**, this option is set to **Disabled**.

IRQ Active State

This option allows you to set the IRQ signal **High or Low** to assert the interrupt. The default setting is **High**.

Parallel Port Mode

This option sets the mode used by the built-in parallel port. You can select **Normal or Extended** (or EPP, enhanced bidirectional parallel port, for higher performance when you use an EPP device). The default setting is **Normal**.

Configure With BIOS Defaults

This option loads the CMOS with the default values contained in the flash ROM.

Configure With Power- on Defaults

This option reloads the CMOS with the values stored at the last power-on of the system.

Change Password

When you set a password with this option, you enable the system password function. The password prevents unauthorized users from accessing the Setup program or from booting the operating system.

You can enter a password of up to six characters. Setup prompts you to enter the password twice; then you see the message, Password Now Enabled. Press **ESC** to exit.

You can also change or delete the password with this option: if necessary. To delete the password and disable password checking, enter the current password at the first prompt and then press **Enter** when Setup prompts you to enter a new password.

If you forget your password, you must change the setting of a jumper on the main system board. See Chapter 4 for instructions.

Write to CMOS and Exit

After making changes to your configuration in Setup, select **Write to CMOS and Exit to save the settings to the CMOS** and exit the Setup program.

Do Not Write to CMOS and Exit

If you do not want to save any of the changes you have made to your configuration, select this option to discard those changes and exit Setup.

Chapter- 3

Using Your Computer

This chapter briefly describes the following operations:

- ☐ Stopping a command or program
- ☐ Resetting the computer
- ☐ Using the password
- ☐ Changing the processor speed
- ☐ Upgrading the BIOS.

Stopping a Command or Program

You may sometimes need to stop a command or program while it is running. If you entered a DOS command that you want to stop, try one of the following:

- ☐ Press **Pause**
- ☐ Press **Ctrl C**
- ☐ Press **Ctrl Break.**

If these methods do not work, you may need to reset the computer as described below. Do not turn off the computer to exit a program or stop a command unless you have to, because the computer erases any data you did not save.

Resetting the Computer

Occasionally, you may want to clear the computer's memory without turning it off. You can do this by resetting the computer.

For example, if an error occurs and the computer does not respond to your commands, you can reset it to reload your operating system and try again. However, resetting erases any data in memory that you have not saved; so reset only if necessary.

Caution

Do not reset the computer to exit a program. Some programs classify and store new data when you exit them. If you reset the computer without properly exiting a program, you may lose data.

When you reset the computer, the operating system must be either on the hard disk or on a diskette in drive A; so if you do not have a hard disk, insert the operating system diskette in drive A. Then press **Ctrl Alt Del**.

Note

If you set the System Boot Up Sequence option in Setup to **Check only C** : (see Chapter 2) the operating system must be on the hard disk when you reset the computer.

If resetting the computer does not correct the problem, you probably need to turn it off and on again. Remove any diskette(s) from the diskette drive(s). Turn off the computer and wait 20 seconds. If your operating system is not on the hard disk drive, insert a bootable diskette in drive A. Then turn on the computer.

Using a Password

If you set a password in the Setup program, you'll see the prompt, Enter CURRENT Password: whenever you turn on or reset your computer. (If you press **F1** to enter Setup, you'll see the prompt after you press **F1**.) When you see the prompt, type your password and press **Enter**; the computer loads the operating system or starts Setup.

If you don't enter the correct password, nothing happens and you cannot access your system. You can try to enter the correct password as many times as you like.

Note

If you want to change or delete your password, you must run the Setup program as described in Chapter 2.

If you do not remember your password, you must change the setting of a jumper on the main system board. See Chapter 4 for instructions.

Changing the Processor Speed

Your computer's processor can operate at two speeds: high (60 MHz) or low (simulated 8 MHz). Low speed is available to provide compatibility with older application programs.

You should use high speed for almost everything you do because your programs will work faster. However, certain application programs have specific timing requirements and can run only at the slower speed. See your software manual to determine if this is the case.

Some copy-protected programs require the computer to run at low speed while accessing the program on a diskette. These programs also usually require *you* to leave a *key disk-the* diskette that contains the copy protection-in the diskette drive. If you use a copy-protected program, you can change the speed to low to access the diskette and return it to high speed when you are finished.

You can change the processor speed temporarily by entering one of the following commands from the numeric keypad on your keyboard :

- ☐ To select low speed, press **Ctrl Alt -**. You hear a low-toned beep.
- ☐ To select high speed, press **Ctrl Alt +**. You hear a high-toned beep.

Note

You can use the commands listed above while you are running a program. However, if the program uses one of these commands for another function, you cannot use it to change the processor speed.

The speed setting remains in effect until you do one of the following:

- ☐ Reset your computer
- ☐ Turn off your computer
- ☐ Change the speed with another keyboard command.

Upgrading the BIOS

Your computer's BIOS is stored on a flash device, making it easy to upgrade the BIOS by running a utility from a diskette, hard disk, or network. You can use the BIOS upgrade and recovery utility to do the following:

- ☐ 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 ensure that the system has the correct BIOS version.

If you need to upgrade your BIOS, the BIOS upgrade and recovery utility and your new BIOS file will be available through the following sources:

- ☐ Call the EPSON Connection at 1-800-922-8911 (in the United States) or 1-800-GO-EPSON (in Canada) and ask for technical assistance. The technical support staff will help you download the file from the EPSON Bulletin Board System.
- ☐ Call CompuServe to access the Epson America Forum. See page 8 of the Introduction in this manual, if necessary, for instructions on contacting CompuServe.

Once you obtain the utility and the new BIOS file, you can copy them to a bootable diskette to upgrade your system. If you want to run the utility from your hard disk or a network drive, you must remove any installed memory managers before you perform the upgrade.

When you are ready to upgrade your BIOS, follow these steps:

1. Run the Setup program and make a note of your current settings so you can enter them again later, if necessary.
2. Turn off the system.
3. Change the setting of jumper J12H1 on your main system board so it is set to enable BIOS upgrades. See Chapter 4 for instructions.
4. Insert the bootable diskette containing the BIOS upgrade utility and the new BIOS file in drive A.
5. Turn on your system.
6. The system boots from the diskette and you see the BIOS upgrade utility title screen. Press **Enter**.
7. You see the Main Menu. Select **Update FLASH Memory Area from a File**.
8. At the **next menu**, select **Update System BIOS**.
9. You **see** the **Enter Path/Filename screen**. Select the .BIO file you copied to the diskette.
10. The utility asks you to confirm loading of the new BIOS. Select **Continue with programming**.
11. The utility upgrades your BIOS and you see a message confirming the success of the operation. (If you receive an error message or have other problems, see the next section to recover your BIOS.)
12. Remove the diskette from drive A and press **Enter** to reboot your system and verify that it starts correctly. (If you do not have a hard disk drive, you will see a message asking you to insert a bootable diskette; this is normal.)

13. Turn off your system and then change the setting of jumper J12H1 back to the normal flash operation setting. Also change the setting of jumper J13H1 to set your CMOS values to their default settings. See Chapter 4 for instructions.
14. Turn on your system and verify that it boots correctly.
15. Turn off the system and change jumper J13H1 back to the setting for normal CMOS operation.
16. Turn on your system. When you see the Setup prompt, press **F1** to run Setup and change your settings as necessary.

Recovering an Interrupted BIOS Upgrade

If an interruption or error occurred as you were upgrading the BIOS, follow these steps to recover your BIOS:

1. Change the setting of jumper J12H1 to allow a flash recovery of your BIOS. See Chapter 4 for instructions.
2. Insert the bootable diskette containing the BIOS upgrade and recovery utility and the new BIOS file in drive A.
3. Turn on your system. You will not see any video display during the rest of this procedure because of the small amount of code available in the non-erasable boot block area. Listen to your computer's speaker and watch the diskette drive access light (as described below) to monitor the utility's operation.

The system beeps once and the diskette drive LED lights up. The recover operation is in progress. When it is finished copying the recovery code, the system beeps twice and the diskette drive access light goes out.

4. Remove the diskette from drive A and reboot your system to verify that it starts correctly.
5. Turn off your computer and then change the setting of jumper J12HI back to the normal flash operation setting. See Chapter 4.
6. Insert the bootable BIOS utility diskette in drive A again.
7. Turn on your system.
8. Follow the instructions in the previous section to upgrade your BIOS.

Chapter- 4

Installing and Removing Options

This chapter describes how to install and remove the following optional devices:

- ☐ Expansion boards
- ☐ Memory modules
- ☐ Video RAM modules.

It also tells you how to remove and replace the computer's cover so you can access these options and any drives you want to install or remove (as described in Chapter 5).

Caution

Never install options or change jumper settings when the computer is turned on or the power cable is connected to the computer. Always turn off and unplug the computer before you remove the cover.

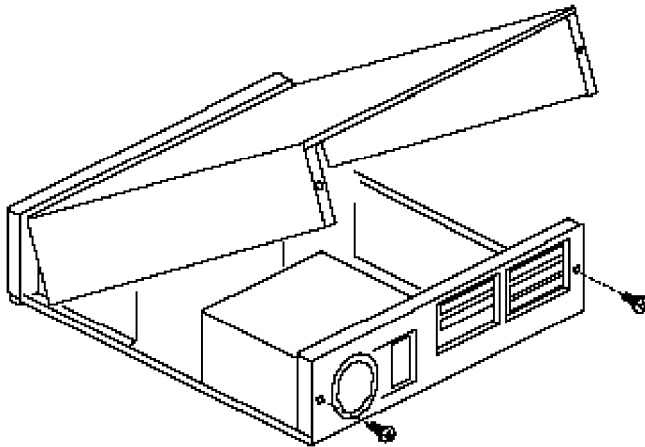
For help in locating system components and controlling system functions, you'll also find a main system board map and a list of jumper settings on pages 4-4 and 4-5.

When you finish installing or removing options, see "Post-installation Setup" on page 4-17.

Removing the Computer 's Cover

Follow these steps to remove the computer's cover:

1. Turn off all peripheral devices connected to the system.
2. Turn off the computer.
3. Disconnect all cables from the computer. If necessary, put identification tags on the cables so you can reconnect them correctly.
4. Remove the two retaining screws securing the cover to the computer's back panel.



5. Lift up the back of the cover as shown above; then pull it away from the computer case.

Caution

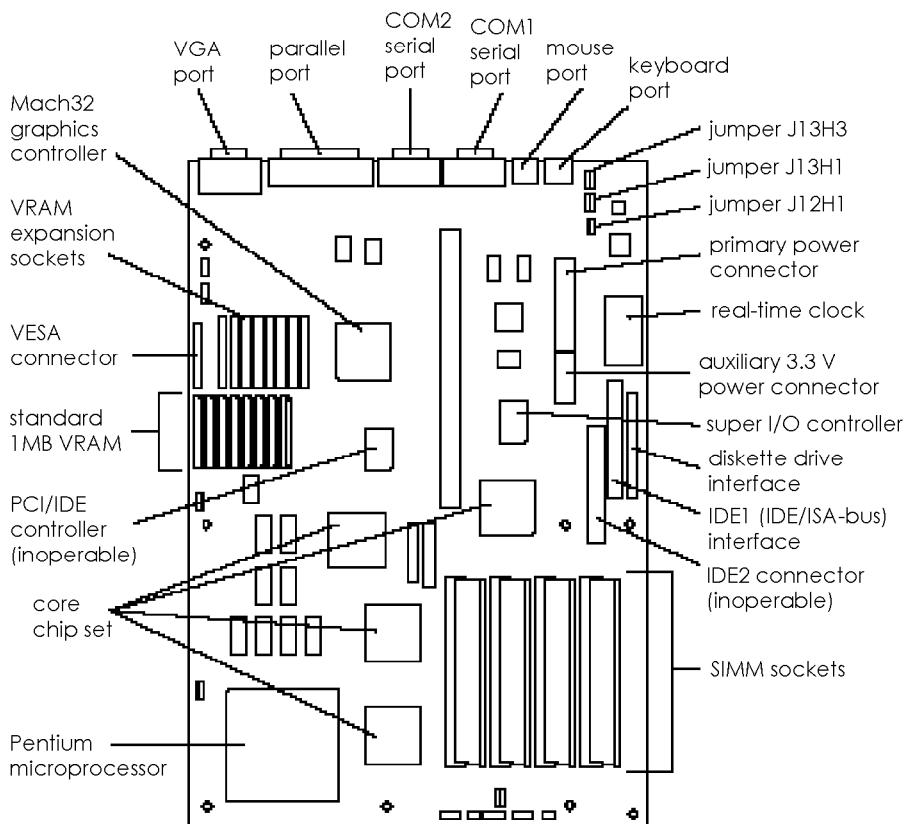
Before you touch any components inside your computer, ground yourself by touching the inside of the computer's back panel to avoid conducting static electricity.

Replacing the Computer's Cover

1. Make sure you did not leave any tools or loose parts inside the computer. Check that everything is properly installed and that all retaining screws are tightened.
2. Hold the cover above the computer at an approximately 45 degree angle, as shown in the previous illustration. Make sure the side of the cover with the retaining screw holes faces the back panel.
3. Lower the front of the cover down onto the computer case and insert the lip of the cover beneath the edge of the front bezel. Then lower the back of the cover into place.
4. Replace the two retaining screws in the back panel.
5. Reconnect all external cables to the system

Main System Board Map

Use the illustration below to locate components on the main system board.



Main System Board Jumpers

The table below lists the functions of the main system board jumpers. Each jumper controls two functions. To locate these jumpers, see the main system board map on page 4-4.

Main system board jumper settings

Jumper number	Settings	Function
J12H1	1-2	Flash memory recovery mode; allows recovery of the default BIOS if it is corrupted during an upgrade
	2-3 *	Normal flash memory operation
	4-5	Enable BIOS upgrades to the flash memory
	5-6 *	Write protect the flash memory to prevent BIOS upgrades
J13H1	1-2 *	Normal CMOS operation
	2-3	Clear current CMOS settings to reset to the factory default settings
	4-5 *	Enable the current password
	5-6	Disable the current password
J13H3	1-2	Monochrome monitor is installed
	2-3 *	Color monitor is installed
	4-5 *	Enable entry into the Setup program
	5-6	Disable entry into the Setup program

* Factory setting

Installing an Expansion Board

You can install up to five expansion boards in your system: two PC1 boards and three ISA boards. The expansion slots on the expansion card riser board can accommodate up to two full-length boards (one ISA and one PCI) and up to three half-length boards (two ISA and one PCI).

Caution

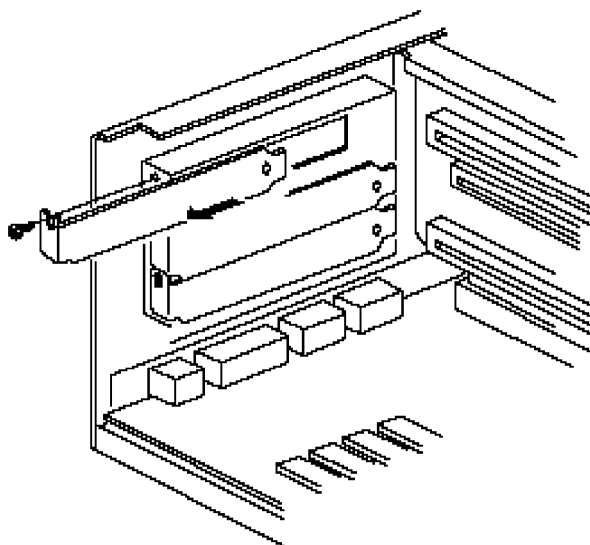
Before you install any expansion boards in your system, make sure that no board draws current in excess of the limits listed on page A-6.

Follow these steps to install an expansion board in your system:

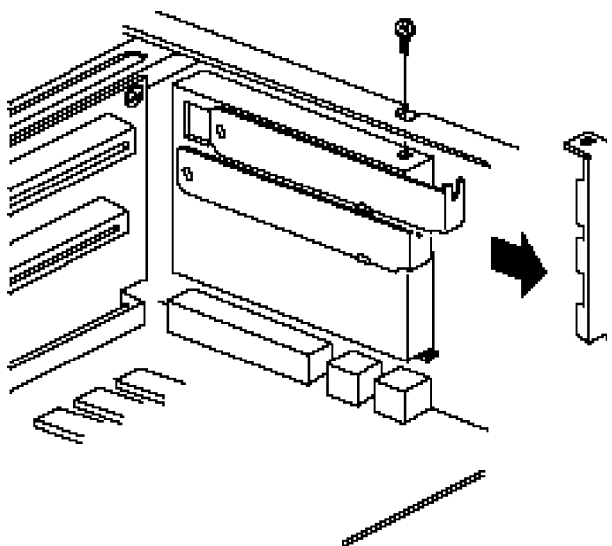
Note

If you are installing a video expansion board containing a secondary controller, it must be an MDA or CGA card with no BIOS. You must use the computer's built-in VGA controller as the primary controller.

1. Remove the computer's cover; see page 4-2.
2. Remove the retaining screw and the expansion slot cover from the slot you plan to use. Save the slot cover to install on a vacant slot (if you remove a board later) and use the screw to secure your new board.



To remove an expansion slot cover on the side of the riser card nearest the power supply, you must first remove the expansion slot retaining bracket, as shown below.

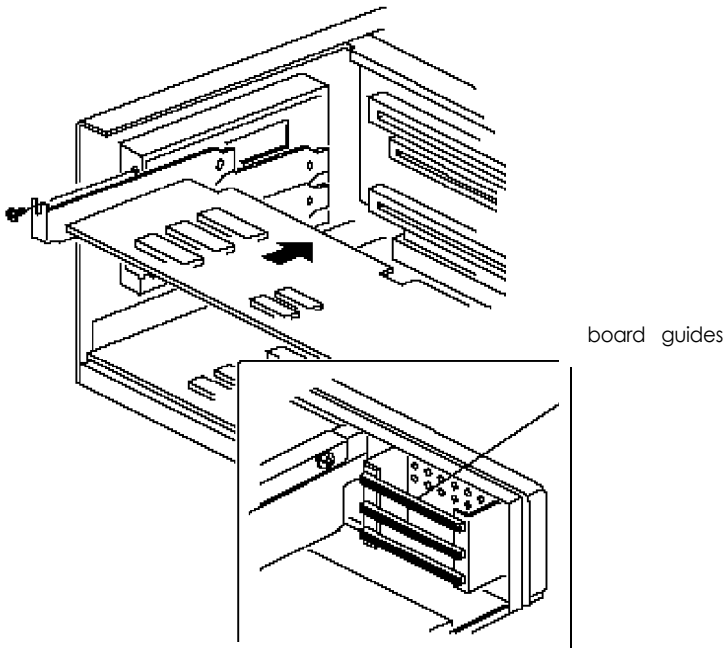


3. Remove the board from its packaging and place it on a grounded, static-free surface with the component side facing up.

Caution

Be careful not to conduct static electricity as you handle the expansion board or you may damage its circuitry.

4. Set any jumpers or switches on the board according to the manufacturer's instructions.
5. Hold the board by its top edge or upper corners, and position it as shown below. If you are installing a full-length board, align it with the board guides inside the computer's front panel. Then firmly press the board into the expansion slot connector on the riser card.



6. Align the rounded notch in the board's end bracket with the threaded hole in the expansion slot frame and then insert the retaining screw. Be sure to push the bracket up against the screw before you tighten it or the bracket may interfere with an adjacent expansion board.
7. If you removed the expansion slot retaining bracket to install the board, reinstall the bracket and secure it with the retaining screw. Refer to the illustration on page 4-7.
8. Connect any internal cables to the board, if necessary
9. Replace the computer's cover,
10. See "Post-installation Setup" on page 4-17 for instructions on configuring your system with the new expansion board.

Removing an Expansion Board

Follow the steps below to remove an expansion board from your system.

Caution

Be careful not to conduct static electricity as you handle the expansion board or you may damage its circuitry.

1. Disconnect any cables from the board you are going to remove.
2. Remove the computer's cover; see page 4-2.
3. Remove any internal cables connected to the board, if necessary.

4. If you are removing a board on the side of the riser card nearest the power supply, you must remove the expansion slot retaining bracket in order to remove the board. Refer to the illustration on page 4-7.
5. Remove the screw that holds the board to the computer case.
6. Hold the board at each end and pull it out firmly until the edge connectors are free of the expansion slot. Be careful not to scrape the board against any other components.
7. Store the board in an anti-static protective wrapper.
8. Replace the expansion slot cover for the open slot and secure it with the retaining screw.

Caution

You must install an expansion slot cover on any vacant expansion slots to maintain the electromagnetic emissions and cooling characteristics of the system.

9. If you removed the expansion slot retaining bracket in order to remove the board, reinstall the bracket and secure it with the retaining screw. Refer to the illustration on page 4-7.
10. See “Post-installation Setup” on page 4-17 for instructions on configuring your system without the expansion board.

Installing SIMMs

Your system comes with 8MB of memory installed on two 4MB SIMMs (single inline memory modules) on the main system board. You can expand your memory up to 128MB by installing 1MB, 2MB, 4MB, 8MB, 16MB, or 32MB SIMMs in the four SIMM sockets.

The SIMM sockets are organized in two banks (Bank 0 and Bank 1) consisting of two sockets each. You must install the same type of SIMM in a bank. For example, you can install two 4MB SIMMs in Bank 0, but not one 4MB SIMM and one 8MB SIMM. However, you can install different types of SIMMs in the two banks; for example, two 4MB SIMMs in Bank 0 and two 8MB SIMMs in Bank 1.

The SIMMs you install must be 32- or 36-bit, 72-pin, 70ns, tin-plated, fast-page mode, parity/ no parity type. You can install faster SIMMs, but they will not improve system performance. The table below lists the 16MB and 32MB SIMMs approved for use in your system. You can install these SIMMs or their equivalents.

Manufacturer	Description	Part number
Samsung®	16MB; with parity	KM41C00BJ-7
Samsung	16MB; no parity	KMM5324000BG-7
Hitachi®	32MB; with parity	HM5117400J7

The table below lists possible combinations of SIMMs you can install; do not use any configuration other than one of those listed in the table.

SIMM configurations

Bank 0		Bank 1		Total memory
J4H1	J4H2	J4G1	J4F1	
4MB	4MB			8MB *
4MB	4MB	1MB	1MB	10MB
4MB	4MB	2MB	2MB	12MB
4MB	4MB	4MB	4MB	16MB
4MB	4MB	8MB	8MB	24MB
4MB	4MB	16MB	16MB	40MB

SIMM configurations (continued)

Bank 0		Bank 1		Total memory
J4H1	J4H2	J4G1	J4F1	
4MB	4MB	32MB	32MB	72MB
8MB	8MB	1MB	1MB	18MB
8MB	8MB	2MB	2MB	20MB
8MB	8MB	4MB	4MB	24MB
8MB	8MB	8MB	8MB	32MB
8MB	8MB	16MB	16MB	48MB
8MB	8MB	32MB	32MB	80MB
16MB	16MB	1MB	1MB	34MB
16MB	16MB	2MB	2MB	36MB
16MB	16MB	4MB	4MB	40MB
16MB	16MB	8MB	8MB	48MB
16MB	16MB	16MB	16MB	64MB
16MB	16MB	32MB	32MB	96MB
32MB	32MB	1MB	1MB	66MB
32MB	32MB	2MB	2MB	68MB
32MB	32MB	4MB	4MB	72MB
32MB	32MB	8MB	8MB	80MB
32MB	32MB	16MB	16MB	96MB
32MB	32MB	32MB	32MB	128MB

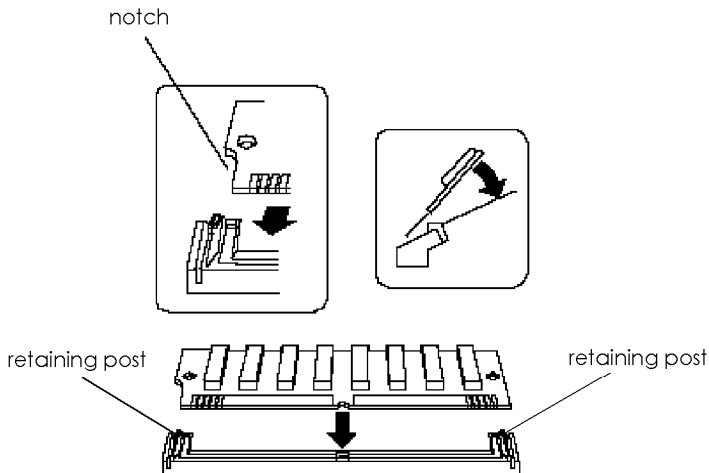
* Factory configuration

Follow these steps to install SIMMs:

1. Remove the computer's cover; see page 4-2.

2. Remove any expansion boards you may have installed that block your access to the SIMM sockets. See page 4-9 for instructions.
3. Remove the 3.5-inch drive carrier so you can access the SIMM sockets. See the instructions in Chapter 5.
4. Locate the SIMM sockets on the main system board using the map on page 4-4.
5. Hold the SIMM only by its edges and remove it from its anti-static package.
6. You install SIMMs in Bank 0 first (sockets J4H1 and J4H2) and then install them in Bank 1 (sockets J4G1 and J4F1).

Position the SIMM at the angle shown below with the notched edge of the SIMM facing the computer's back panel. Insert the SIMM firmly into the socket; then rotate it down toward the main system board until it is at about a 45 degree angle and clicks into place.



The small notch in the middle of the SIMM's bottom edge should fit over a raised bump in the SIMM socket and the sides of the SIMM should fit beneath the metal retaining posts. If the SIMM is not seated correctly, press outward on the metal retaining posts to remove it and try again.

7. Repeat steps 5 and 6 for each SIMM you need to install.
8. Replace the 3.5-inch drive carrier as described in Chapter 5.
9. Replace any expansion boards you removed; see page 4-6.
10. Replace the computer's cover.
11. See "Post-installation Setup" on page 4-17 for instructions on configuring your new memory.

Removing SIMMs

To remove a SIMM, do the following:

1. Remove the computer's cover; see page 4-2
2. Remove any expansion boards that block your access to the SIMM sockets. See page 4-9 for instructions.
3. Remove the 3.5-inch drive carrier so you can access the SIMM sockets. See the instructions in Chapter 5.
4. Locate the SIMM sockets on the main system board using the map on page 4-4.
5. Gently push outward on the retaining clips at each end of the SIMM just enough to allow you to rotate the SIMM's top edge upward to the angle shown in the previous illustration.

6. Hold the SIMM only by its edges and lift it away from the socket. Store the SIMM in an anti-static package.
7. Repeat steps 5 and 6 for each SIMM you need to remove.
8. Replace the 3.5-inch drive carrier as described in Chapter 5.
9. Replace any expansion boards you removed; see page 4-6.
10. Replace the computer's cover.
11. See "Post-installation Setup" on page 4-17 for instructions on configuring your new memory.

Installing VRAM

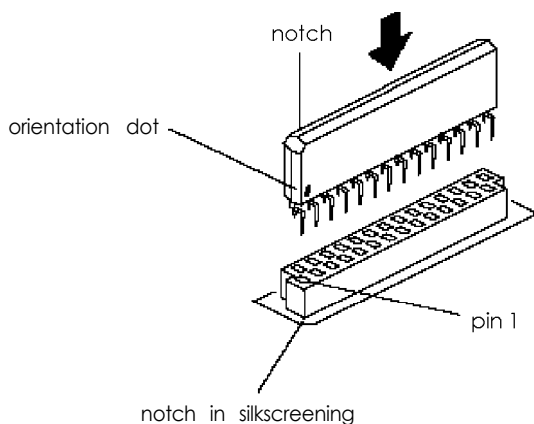
Your computer comes with 1MB of VRAM soldered onto the main system board which provides video resolutions up to 1024 x 768 in 256 colors. You can install an additional 1MB of VRAM to increase the maximum resolution to 1280 x 1024 in 256 colors. (See Chapter 6 for a list of all supported video modes.)

The additional VRAM plugs into eight VRAM sockets on the main system board (U10C1, U10B5, U10B4, U10B3, U10B2, U10B1, U10A2, and U10A1). Each socket holds a 256KBx 4, 60ns, fast-page mode ZIP VRAM. You must fill all eight sockets.

Follow these steps to install additional VRAMs:

1. Remove the computer's cover; see page 4-2.
2. Remove any expansion boards that block your access to the VRAM sockets. See page 4-9 for instructions.
3. Locate the VRAM sockets on the main system board using the map on page 4-4.

4. Remove one of the VRAMs from its anti-static package, being careful not to touch the pins on the device.
5. You install the first VRAM in socket U10C1. Position the VRAM so that its orientation mark (either a notch or a small dot) is aligned with the end of the socket containing pin 1. This is the end of the socket that is nearer to the computer's back panel. (There is a notch in the silkscreening on the main system board, but it may be difficult to see.)



6. Align the pins on the VRAM with the holes in the socket and press in the VRAM. Be careful not to bend the pins.
7. Repeat steps 4 through 6 to install the remaining seven VRAMs in sockets U10B5, U10B4, U10B3, U10B2, U10B1, U10A2, and U10A1.
8. Replace any expansion boards you removed; see page 4-6.
9. Replace the computer's cover.
10. See "Post-installation Setup" on page 4-17 for instructions on configuring your new VRAM.

Removing VRAM

1. Remove the computer's cover; see page 4-2.
2. Remove any expansion boards you may have installed that block your access to the VRAM sockets. See page 4-9 for instructions.
3. Locate the VRAM sockets on the main system board using the map on page 4-4.
4. Use a pair of small needle-nose pliers to grasp the sides of the VRAM and lift it out of its socket. Place the VRAM in an anti-static package. Be sure to remove all of the VRAMs.
5. Replace any expansion boards you removed; see page 4-6.
6. Replace the computer's cover.
7. See "Post-installation Setup," below, for instructions on configuring your new VRAM.

Post-installation Setup

After you install or remove options such as memory modules, VRAM chips, or disk drives, you must run the Setup program to update the computer's configuration. See Chapter 2 for instructions. Additionally, you may need to add or delete commands to your configuration files. See your operating system manual and the manual that came with your optional equipment.

Chapter- 5

Installing and Removing Drives

This chapter describes how to install and remove optional drives in your computer. You can use these instructions to install a variety of devices, including hard disk drives, a diskette drive, a tape drive, a CD-ROM drive, or an optical drive. Although your drive may look different from the ones illustrated here, you should be able to install it the same way.

Your computer can hold up to four mass storage devices. You can install one 3.5-inch, internal half-height drive in the 3.5-inch drive carrier (along with the 3.5-inch diskette drive that came with your computer). In the 5.25-inch drive bay, you can install up to two 5.25-inch devices (or 3.5-inch devices with 5.25-inch mounting frames installed on them). This bay can hold hard disk drives or externally accessible drives, such as diskette drives, tape drives, CD-ROM drives, or optical drives.

To install or remove a drive, first remove the computer's cover as described in Chapter 4. Then follow the appropriate instructions in this chapter to do the following:

- ☐ Set the hard disk drive jumpers
- ☐ Remove the mounting frames from a drive
- ☐ Remove and replace the 3.5-inch drive carrier
- ☐ Install or remove a drive in the 3.5-inch drive carrier
- ☐ Install or remove a 5.25-inch drive.

Note

Some of the steps in this chapter may not apply to your drive. See your drive documentation for more information.

When you finish installing or removing drives, see “Post-installation Setup” in Chapter 4 for instructions on configuring your computer with your new drive(s).

Note

You may want to know the number of cylinders, heads, sectors, etc., on your drive(s) if the `AUTO-CONFIG` option in Setup cannot correctly identify your drive type. See Chapter 2 and the documentation that came with your drive for this information.

Setting the Hard Disk Drive Jumpers

Before you install any IDE hard disk drives, you need to check or change the settings of the drive’s jumpers to be sure they are set correctly for your drive configuration.

The table below lists the jumper settings for high-capacity, optional EPSON hard disk drives. If your drive is not listed, check the documentation that came with it or call the manufacturer for the jumper settings.

IDE hard disk drive jumper-settings

Model number	Single drive	Master drive	Slave drive
Conner CP30254 (250MB)	C/D jumpered	C/D jumpered	No jumpers
Conner CP30344 (340MB)	C/D jumpered	C/D jumpered	No jumpers
Conner CFS420A (420MB)	C/D jumpered	C/D jumpered	No jumpers
Conner CFA540A (540MB)	C/D jumpered	C/D jumpered	No jumpers
Quantum LPS240AT (245MB)	DS jumpered *	SP and DS jumpered *	No jumpers *
Western Digital AC2250 (240MB)	No jumpers	MA jumpered	SL jumpered
Western Digital AC2340 (340MB)	No jumpers	MA jumpered	SL jumpered

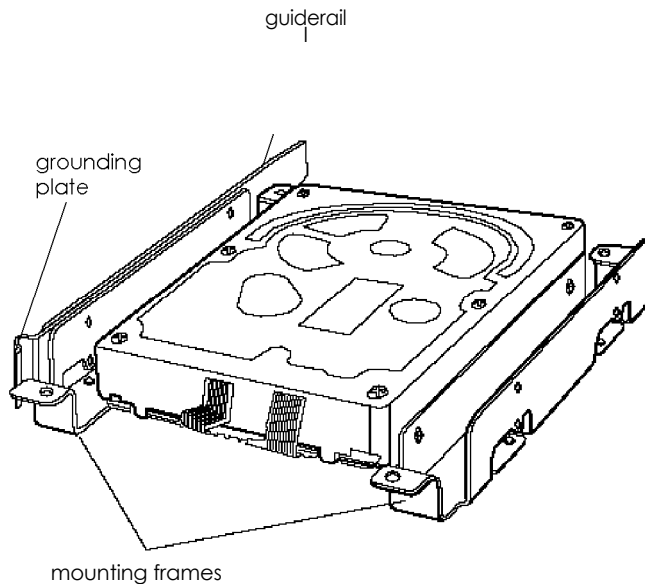
- * CS (cable selection) can be jumpered for any configuration. When CS is used, the drive is a master if pin 28 is grounded and a slave if pin 28 is not grounded.

Removing the Drive's Mounting Frames

If there are mounting frames attached to a drive you want to install, you may need to remove them before you can install the drive. If you are installing a 3.5-inch drive in the 3.5-inch drive carrier or a 5.25-inch drive in the 5.25-inch drive bay, you need to remove any drive mounting frames so the drive will fit. However, if you are installing a 3.5-inch drive in the 5.25-inch drive bay, leave the mounting frames on the drive.

Follow these steps to remove a drive's mounting frames:

1. On your drive, there may be a plastic guiderail and metal grounding plate attached to one of the mounting frames. If so, remove the screws securing them to the mounting frame and remove the guiderail and grounding plate.



2. Then remove the two screws securing each mounting frame to the drive and remove the frames.

Removing the 3.5-inch Drive Carrier

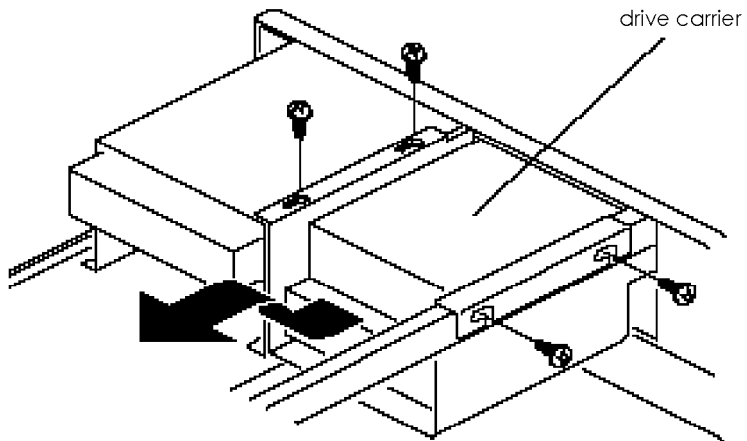
The 3.5-inch drive carrier in your computer holds the diskette drive that came with your system and has an additional 3.5-inch drive bay you can use to install an internal drive. You must remove the carrier from the computer before you can do the following:

- ☐ Install or remove any 3.5-inch drives in the carrier
- ☐ Install or remove any drives in the 5.25-inch drive bay
- ☐ Install or remove SIMMs on the main system board beneath the carrier.

Follow these steps to remove the drive carrier:

1. Remove the computer's cover; see Chapter 4.
2. Remove any expansion boards installed in the computer. See Chapter 4 for instructions.
3. Disconnect the drive and power cables from the back of any drive(s) in the drive carrier.

4. Remove the four screws securing the drive carrier to the computer.



5. Slide the drive carrier toward the computer's back panel. Then lift up the back of the carrier and pull it out of the computer at an approximately 45 degree angle.

If you are going to install a drive in the 3.5-inch drive carrier, see page 5-7; if you are going to remove a 3.5-inch drive, see page 5-8.

If you removed the carrier to install or remove a 5.25-inch drive, return to the instructions you have been following.

If you removed the carrier to install or remove SIMMs, see Chapter 4 for additional instructions.

Installing the 3.5-inch Drive Carrier

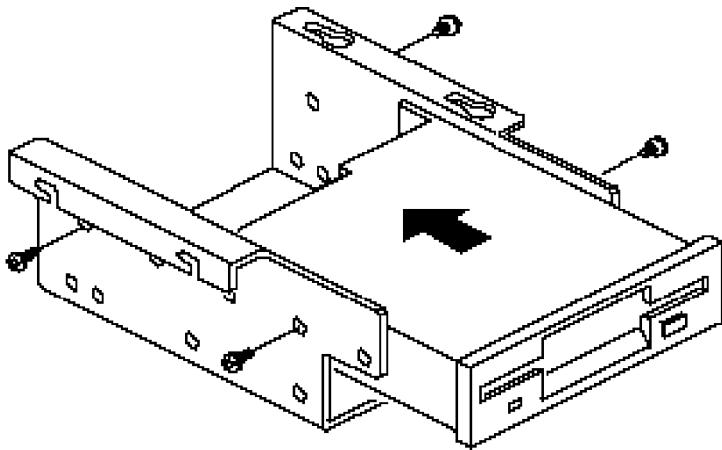
Follow these steps to reinstall the drive carrier in the computer:

1. Position the drive carrier above the computer at a 45 degree angle. Make sure the front of the diskette drive faces the front of the computer and the drive connectors face the back.
2. Lower the carrier into the computer and slide it forward until the diskette drive fits squarely into its slot in the front bezel.
3. Align the four screw holes in the drive carrier with the holes on top of the 5.25-inch drive bay and the side of the riser board brace, as shown in the previous illustration. Then secure the carrier with the retaining screws.
4. Reconnect the drive and power cables to the 3.5-inch drive(s). If you removed a drive that you are not replacing in the computer and it is the only drive on its drive cable, disconnect the drive cable from its main system board connector.
5. Reinstall any expansion boards you removed from the computer; see Chapter 4.
6. Replace the computer's cover; see Chapter 4.
7. See "Post-installation Setup" in Chapter 4 for instructions on configuring your system with the new drive configuration.

Installing a 3.5-inch Drive

Follow these steps to install a drive in the 3.5-inch drive carrier:

1. Follow the instructions on page 5-4 to remove the drive carrier from the computer.
2. Position the drive so its front panel faces the front of the drive carrier and the drive's connectors face the back. Then slide the drive into the carrier.

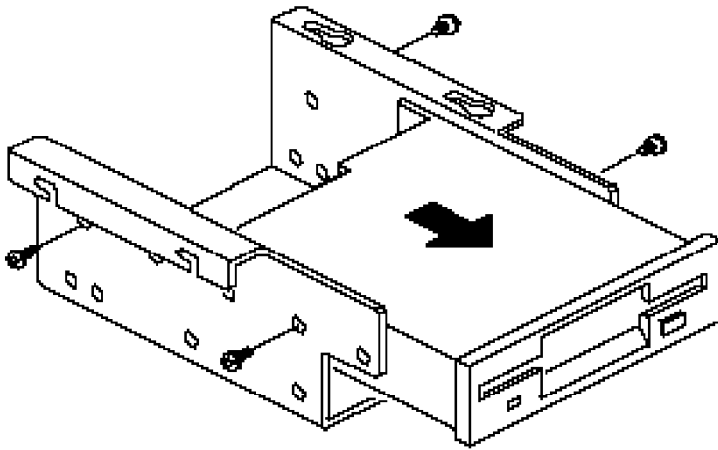


3. Install the four screws that came with the drive to secure it to the drive carrier. If you are installing a drive in the lower drive carrier bay, you can install the screws on the bottom of the carrier or at the sides.
4. Follow the instructions on page 5-6 to reinstall the drive carrier in the computer.

Removing a 3.5-inch Drive

Follow these steps to remove a drive from the 3.5-inch drive carrier:

1. Follow the instructions on page 5-4 to remove the drive carrier from the computer.
2. Remove the four screws securing the drive to the carrier. (If you are removing a drive in the lower carrier bay, it may be secured with four screws on the bottom of the carrier instead of the sides.)



3. Slide the drive out of the carrier. If you are removing the diskette drive that came with your computer, you may need to pull firmly because the drive fits snugly in the carrier.
4. When you finish removing or installing drives in the carrier, see page 5-6 for instructions on reinstalling it in the computer.

Installing a 5.25-inch Drive

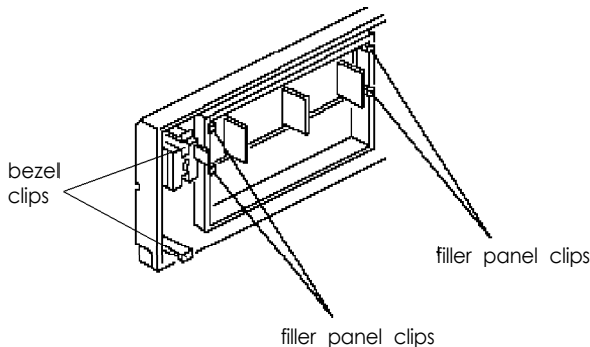
The 5.25-inch drive bay can accommodate one full-height or two half-height drives.

To install a 3.5-inch drive in the 5.25-inch drive bay, make sure the drive has 5.25-inch mounting frames attached to it.

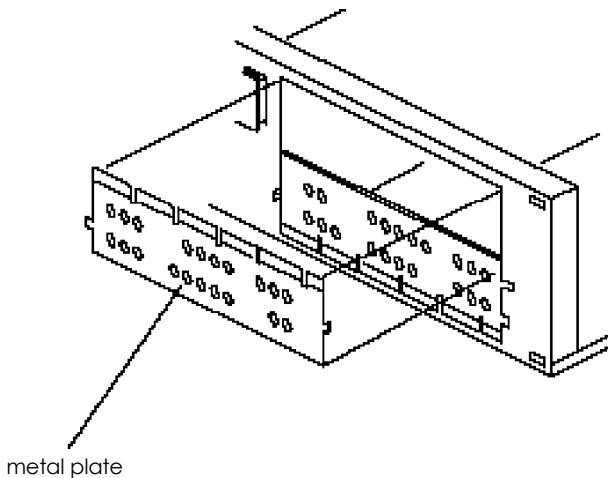
If your system did not come with an IDE hard disk drive and you are going to install one or more of them, you need to obtain a data cable that daisy-chains connectors for drives. IDE cables are available at many computer stores or through computer magazines.

Follow these steps to install a 5.25-inch drive:

1. Remove the computer's cover; see Chapter 4
2. Follow the instructions on page 5-4 to remove the 3.5-inch drive carrier from the computer.
3. To remove the computer's front bezel, locate the retaining clips inside the computer's front metal panel. Press the top clip down and the bottom clip up to remove one side of the bezel. Then repeat this step for the other side. The bezel will still be connected to the computer by the LED cables, so carefully lay the bezel next to the computer.

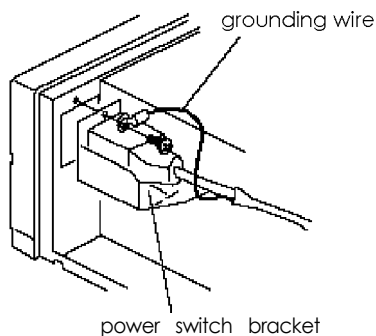


4. If you are installing an externally accessible drive, you need to remove the front bezel filler panel for that drive slot. Press in on the four retaining clips inside the filler panel and push it out the front of the bezel, as shown in the previous illustration.
5. To remove the metal plate covering the front of the selected drive slot, pull the plate outward slightly to release its tabs from the slots in the computer case. Save the plate for future use in case you remove the drive later.

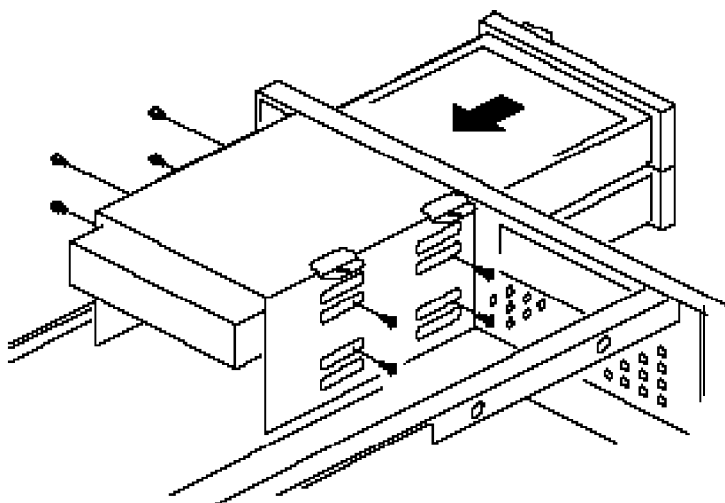


6. Set any jumpers or switches (if required) on the drive you are installing according to the manufacturer's instructions.
7. Slide the drive into the front of the bay. Adjust its position so the front of the drive either protrudes from the computer's front panel (for externally accessible drives) or fits completely behind the front panel (for internal drives).
8. Align the holes in the drive with the appropriate holes in the drive bay.

If you need to use the holes in the upper bay that are the closest to the front of the computer, you must disconnect the computer's power switch assembly to access the holes. Remove the screw securing the switch's grounding wire. Then lift up the back of the power switch bracket and push the power switch assembly from the front of the computer toward the back.



9. Secure the drive with the four retaining screws that came with it.



10. If you installed an IDE hard disk drive, go to step 11

If you installed a 5.25-inch diskette drive, connect it to the appropriate type of free connector on the diskette drive cable. This cable is connected to the main system board interface J851. (See the main system board map in Chapter 4 to locate this interface.) Then go to step 12.

If you installed a different type of drive (not an IDE hard disk drive or a diskette drive), see the manufacturer's instructions to connect the drive cable to the drive and the appropriate controller interface.

11. Connect the hard disk drive cable to the IDE1 interface on the main system board (see the map on page 4-4). Be sure to align pin 1 on the cable with pin 1 on the board.

Some drives require cabling between the drive and an expansion board. If your drive requires this, you need to route the cable over the top of the riser card.

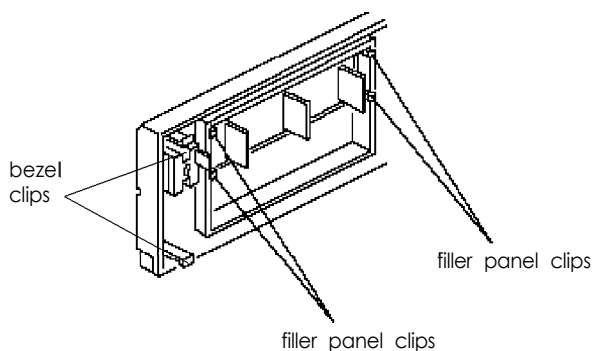
12. Connect the appropriate power supply connector to the drive.
13. If you secured the drive in the upper bay using the holes that are the closest to the front of the computer, you must reinstall the computer's power switch assembly that you removed earlier. Insert the assembly into its hole in the computer's front panel making sure the two tabs on the assembly rest on the bottom of the hole. Secure the switch and its grounding wire with the retaining screw. See the illustration on page 5-11.
14. Replace the 3.5-inch drive carrier in the computer; see page 5-6.
15. Replace the computer's cover; see Chapter 4.

16. See “Post-installation Setup” in Chapter 4 for instructions on configuring your system with the new drive configuration.

Removing a 5.25-inch Drive

Follow these steps to remove a 5.25-inch drive:

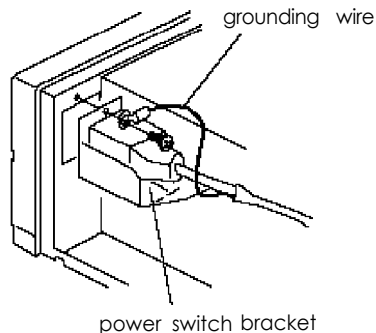
1. Remove the computer’s cover; see Chapter 4.
2. Follow the instructions on page 5-4 to remove the 3.5-inch drive carrier from the computer.
3. To remove the computer’s front bezel, locate the retaining clips inside the computer’s front metal panel. Press the top clip down and the bottom clip up to remove one side of the bezel. Then repeat this step for the other side. The bezel will still be connected to the computer by the LED cables, so carefully lay the bezel next to the computer.



4. Disconnect the data and power supply cables from the connectors on the back of the drive you are going to remove.

5. Remove the screws securing the drive to the drive bay

If you use the holes in the upper bay that are the closest to the front of the computer, you must disconnect the computer's power switch assembly to access the holes. Remove the screw securing the switch's grounding wire. Then lift up the back of the power switch bracket and push the power switch assembly from the front of the computer toward the back.



6. Slide the drive out of the front of the drive bay and store it in a safe place.
7. If you removed an externally accessible drive, you need to replace the front bezel filler panel for that drive slot. Press the filler panel into the front of the slot until the four retaining clips click into place.
8. If you removed an externally accessible drive, you also need to replace the metal plate covering the front of the selected drive slot. For the top plate, insert the tab on the left side into the slot in the left side of the drive bay. The lower tab rests on the outside edge of the slot. (For the bottom plate, insert the tab on the right side.) Then flex the plate slightly to insert the tab on the other side into the slot on the other side of the bay.

Caution

You must install a metal plate and filler panel in any open drive slot to maintain the electromagnetic emissions characteristics of the system and to ensure proper cooling of the interior.

9. If you secured the drive in the upper bay using the holes that are the closest to the front of the computer, you must reinstall the computer's power switch assembly that you removed earlier. Insert the assembly into its hole in the computer's front panel, making sure the two tabs on the assembly rest on the bottom of the hole. Secure the switch and its grounding wire with the retaining screw. See the illustration on page 5-14.
10. To install the computer's front bezel, align the retaining clips inside each side of the bezel with the slots in each side of the computer's front panel. Be sure the LED cables on the left side of the front panel fit inside the front bezel. Then press in on the bezel until the retaining clips click into place.
11. Replace the 3.5-inch drive carrier in the computer; see page 5-6.
12. Replace the computer's cover; see Chapter 4.
13. See "Post-installation Setup" in Chapter 4 for instructions on configuring your system with the new drive configuration.

Chapter- 6

Using the video Utilities

Your system has an integrated AT1 Mach32, PC1 local bus graphics accelerator chip which provides the following features:

- ☐ Zero wait-state VGA for MS-DOS application performance
- ☐ Acceleration for Windows/ graphical user interface (GUI) performance
- ☐ Linear Frame Buffer for fast image data transfer.

The Mach32 incorporates many performance functions for accelerating graphics including BitBLT, polygon fill, line draw, hardware cursor, and much more. It supports up to 2MB of video memory and is 100% VGA/ VESA and IBM® 8514/A register-level compatible.

Your computer comes with a Mach32 driver installation program that you can use to install the following programs:

- ☐ Mach32 drivers
- ☐ Microsoft Windows drivers and the FlexDesk utility
- ☐ 8514-AI graphics adapter interface

You can also use the Mach32 installation program to run diagnostics on the graphics accelerator. This chapter describes all of these programs, which are on the AT1 Mach32 driver diskette.

The chapter also lists the refresh rates, video modes, and monitor types you can use with your system, as described in the sections below.

Supported Video Refresh Rates

The system supports a variety of vertical refresh rates, listed below.

Resolution	Supported vertical refresh rates
640 × 480	Up to 72 Hz
800 × 600	Up to 76 Hz non-interlaced and 95 Hz interlaced
1024 × 768	Up to 76 Hz non-interlaced and 87 Hz interlaced
1280 × 1024	Up to 76 Hz non-interlaced and 87 Hz and 95 Hz interlaced

The resolution used by your software application is independent of the refresh rate. The refresh rate depends on the monitor type you selected in Setup and the capabilities of your monitor. See Chapter 2 for information about Setup and see your monitor manual for information about its refresh rate(s).

Supported Video Modes

The table below lists the modes supported by your system.

Resolution	Color depth bpp (1)	Vertical Hz (refresh rate)	Horizontal Hz	1MB support	2MB support
640 × 480	8	60	31.5	Y	Y
640 × 480	8 (2)	72	37.0	Y	Y
640 × 480	8 (3)	72	44.6	Y	Y
640 × 480	16	60	31.5	Y	Y
640 × 480	16	72	37.0	Y	Y
640 × 480	16	72	44.6	Y	Y

Resolution	Color depth bpp (1)	Vertical Hz (refresh rate)	Horizontal Hz	1MB support	2MB support
640 × 480	24	60	31.5	Y	Y
640 × 480	24	72	37.0	Y	Y
640 × 480	24	72	44.6	Y	Y
800 × 600	8	95 (4)	33.8	Y	Y
800 × 600	8	56	35.2	Y	Y
800 × 600	8	60	37.9	Y	Y
800 × 600	8	70	44.5	Y	Y
800 × 600	8	72	48.0	Y	Y
800 × 600	8	76	52.4	Y	Y
800 × 600	16	95 (4)	33.8	Y	Y
800 × 600	16	56	35.2	Y	Y
800 × 600	16	70	44.5	N	Y
800 × 600	16	72	48.0	N	Y
800 × 600	16	76	52.4	N	Y
800 × 600	24	95 (4)	33.8	N	Y
800 × 600	24	56	35.2	N	Y
800 × 600	24	60	37.9	N	Y
800 × 600	24	70	44.5	N	Y
800 × 600	24	72	48.0	N	Y
1024 × 768	8	87 (4)	35.5	Y	Y
1024 × 768	8	60	48.4	Y	Y
1024 × 768	8	66	53.9	Y	Y
1024 × 768	8	70	56.1	Y	Y
1024 × 768	8	72	57.9	Y	Y
1024 × 768	8	76	61.4	Y	Y

Resolution	Color depth bpp (1)	Vertical Hz (refresh rate)	Horizontal Hz	1MB support	2MB support
1024 × 768	16	87 (4)	35.5	N	Y
1024 × 768	16	60	48.4	N	Y
1024 × 768	16	66	53.9	N	Y
1024 × 768	16	70	56.1	N	Y
1024 × 768	16	72	57.9	N	Y
1024 × 768	16	76	61.4	N	Y
1280 × 1024	4/8	87 (4)	50.0	N	Y
1280 × 1024	4/8	95 (4)	50.0	N	Y
1280 × 1024	8	60	64.0	N	Y
1280 × 1024	8	70	74.6	N	Y
1280 × 1024	8	74	81.1	N	Y

(1) bpp=bits per pixel: 4 bpp=16 colors, 8 bpp=256 colors,
16 bpp=65,000 colors, 24 bpp=16.7 million colors

(2) 32 MHz setting

(3) 40 MHz setting

(4) Interlaced

Monitor- List

The following table lists the monitors that are directly supported by the Mach 32 accelerator. Some monitors are listed twice because the manufacturer may have released an upgraded version of a monitor that supports higher refresh rates. Use the entry that matches the information in the documentation for your monitor.

If your monitor is not in this list, check your monitor documentation to see if its characteristics match one of the listed types. If so, select that type when you use the Mach 32 installation program.

If you have an EPSON monitor, see the second table for information on the monitor type you should select.

Mach 32 monitor list

Monitor	640 × 480	800 × 600	1024 × 768	1280 × 1024
VGA or PS/2	60 Hz	—	—	—
IBM 8514/A	60 Hz	95 Hz *	87 Hz *	—
NEC 5FG/6FG	72 Hz	76 Hz	76 Hz	70 Hz
NEC4FG	72 Hz	70 Hz	70 Hz	87 Hz *
NEC 3FGx	72 Hz	60 Hz	87 Hz *	—
NEC 5D	72 Hz	72 Hz	72 Hz	60 Hz
NEC 4D/5D	72 Hz	72 Hz	70 Hz	87 Hz *
NEC 4D	60 Hz	60 Hz	70 Hz	87 Hz *
NEC 3D	60 Hz	60 Hz	87 Hz *	—
MAG MX17F	60 Hz	72 Hz	70 Hz	60 Hz
MAG MX15H	60 Hz	72 Hz	60 Hz	60 Hz
NANAO/EIZO F340iW	72 Hz	76 Hz	76 Hz	56 Hz
NANAO 9070U-US	60 Hz	72 Hz	60 Hz	—
NANAO 9080i	72 Hz	72 Hz	76 Hz	87 Hz *
MITA HA3905ADK	60 Hz	95 Hz *	87 Hz *	—
MITA HL6935TK	72 Hz	72 Hz	72 Hz	—
JVC GDH8121SHW	60 Hz	72 Hz	76 Hz	60 Hz
Sony CPD1304	72 Hz	70 Hz	60 Hz	—

* Interlaced

EPSON monitor types

EPSON monitor	Select type	640 × 480	800 × 600	1024 × 768	1280 × 1024
14" VGA monochrome (A880611)	VGA or PS/2 (default)	60 Hz	—	—	—
15" Extended VGA (A804211)	Custom	72Hz	72Hz	70 Hz	
17" Professional Series (A804241)	Custom	72Hz	72Hz	70 Hz	70 Hz
20" Professional Series II (A804341)	Custom	72Hz	72Hz	75 Hz	76 Hz

If your monitor does not match any of these types, you can set up a custom monitor, as described on page 6-9.

Before You Run the Mach32 Installation Program

You may not need to run the Mach32 installation program if your video configuration matches the program's default settings. Check the table below and your monitor documentation to see if the default settings for the amount of video memory installed in your computer match your video configuration.

Characteristic	1MB video memory installed	2MB video memory installed
Monitor type	VGA or PS/2, 60 Hz, 640 × 480 (8514/A also supported by the hardware)	VGA or PS/2, 60 Hz, 640 × 480 (8514/A also supported by the hardware)
Power-up video mode	VGA (CV80)	VGA (CV80)
VGA memory size	Shared	256KB

Note

If your monitor supports resolutions greater than 640 x 480, you should run the Mach32 installation program.

If you do need to run the Mach32 installation program, be sure to do the following to make sure the program runs correctly:

- ☐ Make sure no system hardware, such as fax/ modem boards or LAN boards, use the address COM4 (2E8) or any address in the range 2E0 to 2EF.
- ☐ Check to be sure no LAN boards, scanner boards, or other adapters are using the upper memory addresses between C000 and C7FF.
- ☐ Make a note of the amount of system memory currently installed in your system.
- ☐ Remove all commands to load memory manager device drivers from your CONFIG.SYS file until you have installed all the video device drivers.

Starting the Mach 32 Installation Program

Follow these steps to start the Mach32 installation program :

1. Insert the AT1 Mach32 driver diskette in drive A.
2. Type `A:\INSTALL` and press **Enter**.

3. You see this menu:

Main Selection Menu

Set Power-Up Configuration
Set Current Video Mode/Configuration
Test Graphics Adapter
Install Video Adapter Utilities
Install Device Drivers
Install Adapter Interface

These options are described in the sections below.

Note

If you see a message indicating that your adapter is in a new or changed configuration, press any key so the installation program can update the adapter's configuration information.

The keys you can use as you run the program are listed at the bottom of the screen. The available key functions change throughout the program, so check the listed keys before you perform any operations.

Setting the Power- Up Configuration

Select the first option on the Main Selection Menu, **Set Power-Up Configuration**. This option informs your graphics accelerator of the type of monitor connected to the system and determines the options that are enabled when you turn on your computer.

You see the following menu:

Set Power-Up Configuration

Monitor Type	: VGA or PS/2 color
Power-Up Video Mode	: VGA (CVSO)
VGA Memory Size	: Shared

If the configuration shown is correct for your system, press **F10** to save the configuration and return to the Main Selection Menu.

If you need to change any of the settings, follow these steps:

1. Select Monitor Type. You see a list of supported monitors, as shown on page 6-4.

If your monitor is not in this list, check your monitor documentation to see if its characteristics match one of the listed types. If so, select that type and go to step 3.

If your monitor does not match any of these types, you can set up a custom monitor. Go to step 2.

2. Select Custom from the monitor list. You see a list of resolutions. You need to select the correct refresh rate (in Hertz) that your monitor uses for each of the resolutions. Check your monitor documentation for the correct refresh rates.

Caution

You must select the correct refresh rates for each resolution, or you could damage your monitor. Check your monitor manual carefully as you select these rates.

Follow the instructions on the screen to select a resolution and the refresh rate it uses. When you see the Screen Adjustment display, follow the instructions on the screen to adjust the display parameters. If the adjustments are still incorrect, use the controls on your monitor to make further adjustments.

When you have set a refresh rate for each resolution, be sure to save your settings.

3. The Power-Up Video Mode option is set to the default setting of VGA (CVSO) , and you should probably leave it at this setting. If you need to use a different video mode each time you turn on or reset your computer, select this option and set it to either EGA, CGA, MDA720X350, or MDA640X400.
4. The VGA Memory Size option sets the amount of video memory made available to VGA and Super VGA applications. VGA drivers and VESA drivers may restrict the resolution and color depth if you do not allocate enough video memory. When the Mach32 accelerator is running in accelerated modes, most Mach32 drivers override this setting to ensure that enough video memory is available.

If you have 1MB of video memory installed, the default setting of Shared is correct for your system. If you have 2MB, you should select 512Kb.

5. When you have selected all the correct settings, press **F10** to save the configuration.

The settings you selected become the power-on default settings. If you need to change these settings temporarily, select the Set Current Video Mode/Configuration option from the Main Selection Menu and follow the instructions on the screen.

Now see the next section for instructions on testing the graphics adapter.

Running the Graphics Adapter Diagnostics

You can test the operation of the Mach32 graphics adapter by running the diagnostic tests on the AT1 Mach32 driver diskette. You might want to run these tests after you set the power-up configuration and later if you have any problems with your adapter.

If you have not yet started the Mach32 installation program, follow the instructions on page 6-7.

Note

Do not run the graphics adapter tests from an MS-DOS window in the Windows program.

When you see the Mach32 installation program's Main Selection Menu, select Test Graphics Adapter. You see a list of tests you can run. Follow the instructions on the screen to run the tests and verify that your adapter is operating correctly.

Installing the Video Adapter Utilities

After you have configured and tested the graphics adapter, you can install the Mach32 video adapter drivers and utilities.

To install the Mach32 drivers and utilities, follow the instructions on page 6-7 to start the Mach32 installation program, if you have not already done so. When you see the Main Selection Menu, select Install Video Adapter Utilities. Follow the instructions on the screen to install the program files on your computer.

Once you have installed these drivers and utilities, you can install Windows on your system. If you have already installed Windows, run Windows Setup and select the Mach32 driver as your Display. See your Windows documentation for instructions.

Then see the next section for instructions on installing the Mach32 Windows drivers and configuring Windows for using them.

Installing the Windows Device Drivers

After you have installed the Mach32 drivers and utilities, and installed Windows, you can install the Windows device drivers.

To install the drivers, start the Mach32 installation program as described on page 6-7, if you have not already done so. When you see the Main Selection Menu, select **Install Device Drivers**. Follow the instructions on the screen to install the drivers on your computer.

Now start Windows. The program uses the 640 x 480,256 color video driver when you start it the first time. To select a different resolution, use the FlexDesk utility. FlexDesk is a Mach32 utility that you installed on your computer; see the next section for instructions on using it.

Be sure to use the Windows Write utility to read the file C:\ WINDOWS\ MACH.WRI that the driver installation program copied to your computer. This file provides additional information on the FlexDesk features. Follow the instructions in your Windows documentation to use the Write utility.

Using FlexDesk

FlexDesk is a Windows application that allows you to select your screen resolution and color depth. It also activates various advanced features.

When you start Windows, the Program Manager displays the Control group. The group contains the FlexDesk control icon. You can move this icon to another group by dragging and dropping it where you want it.

To start FlexDesk, double-click on the icon. The FlexDesk panel opens and displays two selection boxes: Screen and Colors. You also see several push buttons: OK, Cancel, Defaults, Help, Advanced, DeskScan, Crystal, and Video.

The sections below describe the FlexDesk options. Use the Help function within FlexDesk for additional information.

Screen

Use the Screen box to select the screen resolution (the total number of pixels displayed on the screen). Generally, you should select the highest resolution your monitor supports

Note

If you will use one of the high resolution Mach32 drivers with AutoCAD[®] 3386, AutoShade,[®] or 3D-Studio, you must select your resolution as follows; if you have 1MB of video RAM, select any resolution, as long as you have enough memory to support the mode and the refresh rate it uses; if you have 2MB of video RAM, you should select a resolution with 256 colors or more.

Colors

Use the Colors box to specify the number of colors displayed. Colors and Screen are interdependent. Generally, the higher the resolution, the fewer the available colors; the more available colors, the lower the resolution.

Push buttons

OK

Accept new settings and restart Windows. A message is displayed confirming that Windows will be restarted, or that you can Cancel your selections and return to the FlexDesk control panel.

Cancel

Discard the options you have selected and restore the previous settings.

Defaults

Set Screen and Colors to their default settings (Screen: 640 x 480, Colors: 256).

Help

Display on-line help.

Advanced

See “Advanced Settings,” below.

DeskScan

DeskScan allows you to set up keyboard control of virtual desktop panning, and also allows zooming, a feature not accessible with the mouse. With zooming you can dynamically change your screen resolution so that you can see more or less of the virtual desktop on the screen at one time.

You can assign a keystroke to the following functions:

Pan Left	Move the screen left
Pan Right	Move the screen right
Pan Up	Move the screen up
Pan Down	Move the screen down
Zoom In	Zoom in (make the screen image larger)
Zoom Out	Zoom out (make more of the screen visible).

Select the Primary key to be assigned to the selected function. For example, to address Zoom In to **Ctrl Alt Home**, select Zoom In as the Function, Home as the Primary key, and check the Ctrl and Alt boxes.

The Alt, Ctrl, and Shift boxes modify the Primary key you selected for the function. This enables you to avoid conflicts with applications that may use the primary keys.

Crystal

The Crystal anti-aliased fonts are available only in 256 color modes. If you installed AT1 GSFONTS, these fonts are used. If you did not install AT1 GSFONTS, the system will use the installed TrueType fonts. Turn off the Crystal fonts if you are not going to use them. If you turn them on, use the Character Control slider to adjust the darkness of the characters.

video

The video button gives access to the AT1 Video Acceleration Driver's configuration panel. This panel is displayed if you have installed Microsoft Video for Windows and the AT1 Video Acceleration Drivers.

Advanced settings

Use the Advanced Settings panel to specify the following:

- ☐ DeskTop size
- ☐ Color format in 16 bpp (bits per pixels) modes
- ☐ Screen font environment (logical dots per inch)
- ☐ Color palette enabling
- ☐ Dithering.

The sections below describe these features.

DeskTop

This option sets the size of the Windows virtual desktop. It can be greater than or equal to the current resolution. (You cannot specify a resolution that exceeds the current desktop size.)

This feature provides expanded workspace on your screen if your system has limited memory or your monitor cannot display the resolution you want.

You can pan vertically and horizontally across the virtual desktop by moving the mouse to the extreme edges of the screen.

16 BPP

This feature is available only when you select 65,000 colors from the Colors box. You can use this feature to specify the color format (bits per pixel of red, green, and blue).

The options are:

☐ **5/5/5**

☐ **6/6/4**

☐ **6/5/5**

☐ **5/6/5**

The most popular color formats are 5/ 5/ 5 (often referred to as Hi-color) or 5/ 6/ 5 (used as Targa-16 file formats). If your application displays strange color combinations when using a 15-bit or 16-bit image, change the color format.

Environment

This feature specifies the logical dots per inch (LDPI). Because these are logical dots, the effect differs, depending on your screen size. The options are:

☐ Small Desktop/ Large Font 96 LDPI

☐ Large Desktop/ Small Font 120 LDPI

☐ DTP (desktop publishing) 128 LDPI

2.56 Color Palette

This feature is available only when you select 256 color mode from the Colors box. You can use this feature to create your own Windows color palette.

Note

Windows runs faster when the palette is turned off.

Select **On** to create your own palette or **off** to set the palette to the default color settings.

Dithering

The Mach32 driver normally uses an optimized dither (combining two or more colors to produce the illusion of a third color) when running in 16 and 256 color modes. However, this may result in some unusual colors. When you use 256 color mode with the 256 Color Palette set to On, you can set the dithering to **VGA Standard**. This is a slower mode but it should result in more natural colors.

Installing the Adapter Interface

There are two categories of software drivers that support the IBM 8514 A graphics adapter: Direct-to-register (those which write directly to the 8514 A registers) and Adapter Interface (those which access the 8514 A through the Adapter Interface or AI).

A direct-to-register driver writes directly to the registers of the 8514 A. Examples of such programs are: Microsoft Windows, OS/ 2 Presentation Manager, and AutoCAD. If you followed the driver installation instructions in this chapter, these programs will run without any further steps.

However, many programs access the graphics controller (8514/A) using a software interface called the 8514-AI (Adapter Interface). Examples of such programs are: Lotus@1-2-3,[®] WordPerfect,[®] and Turbo-Pascal[®] for MS-DOS. Most MS-DOS-based programs use the AI approach, eliminating the need for separate graphics drivers for each application. Contact your application program vendor for information on AI support modes.

The Turbo Adapter Interface (AI) is a programming interface written exclusively for the Mach32. The AI provides access to the Mach32 coprocessor by providing a call interface to programs performing display functions in the 8514 A compatible part of the controller. It is 100% compatible with AI programs written for the IBM 8514/A.

Note

A system with 1MB of video memory with VGA set to 512KB will not support AI programs. A 2MB system with VGA set at any level will provide full 8514/ A support in AI mode.

Any application that needs the Adapter Interface will ask for a TSR (terminate and stay resident) program called HDILOAD.EXE. You can use the Mach32 installation program to install the Adapter Interface TSR as described on page 6-7. When you see the Main Selection Menu, select **Install Adapter Interface**.

Certain applications require that the AI reside in a directory called \ HDIPCDOS, so you should accept the destination directory as prompted during installation.

The installation program will attempt to set up an automatic loading of the adapter interface. If you do not want automatic loading, you can manually load and unload the AI program using the following commands:

C:\HDILOAD

C:\HDILOAD UNLOAD

Chapter- 7

Troubleshooting

If you have any problems as you set up and use your computer, refer to this chapter. You can correct most problems by adjusting a cable connection, repeating a software procedure, or resetting the computer.

If the suggestions here do not solve the problem, contact your Authorized EPSON Servicer or the EPSON Connection.

Identifying Your System

When you request technical assistance, be ready to provide the serial number of your computer, its system BIOS version number, its configuration (including the type of disk drives, monitor, and expansion boards), and the names and version numbers of any software programs you are using.

Use these guidelines to locate information about your system :

Serial number:	Look on the back panel of the computer to find the serial number.
System BIOS version:	Restart your system. You'll see the system BIOS version number displayed on the screen when your system performs its power-on self test.
System configuration:	Start Setup and check your configuration.
MS-DOS version:	At the MS-DOS prompt, type VER and press Enter to see the MS-DOS version number.

- Software versions: In Windows and Windows applications, select About from the Help menu. As your software application starts, it usually displays a version number on the banner screen. Also, you can check your software manual.
- CONFIG.SYS: At the MS-DOS prompt, type `TYPE C:\CONFIG.SYS` and press **Enter** to see a listing of your CONFIG.SYS file, which contains your system configuration commands.
- AUTOEXEC.BAT: At the MS-DOS prompt, type `TYPE C:\AUTOEXEC.BAT` and press **Enter** to see a listing of your AUTOEXEC.BAT file, which contains your system startup commands.

Error and Information Messages

This section lists the beep codes, error messages, and ISA nonmaskable interrupt (NMI) messages that you might see or hear when you start the system.

Beep Codes

Number of beeps	Error message	Description
1	Refresh Failure	The memory refresh circuitry on the main system board is faulty
2	Parity Error	Parity error in the first 64KB of memory
3	Base 64KB Memory Failure	Memory failure in the first 64KB of memory
4	Timer Not Operational	Memory failure in the first 64KB of memory or Timer 1 on the main system board is not functioning
5	Processor Error	The CPU 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; 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 Messages

Message	Description
8042 Gate - A20 Error	Gate A20 on the keyboard controller is not working; replace the controller
Address Line Short!	Error in the address decoding circuitry on the main system board
Cache Memory Bad, Do Not Enable Cache!	Cache memory is defective; replace it
CH-2 Timer Error	Error in timer 2
CMOS Battery State Low	The CMOS RAM battery power is low; replace the battery
CMOS Checksum Failure	The previous CMOS RAM checksum 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 main system board 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 diskette in drive A is corrupt and cannot be used to boot the system; use another diskette and follow the screen instructions
DMA Error	Error in the DMA controllers
DMA #1 Error	Error in the first DMA controller
DMA #2 Error	Error in the second DMA controller
FDD Controller Failure	The BIOS cannot communicate with the diskette drive controller; check all appropriate connections after you turn off the system

Message	Description
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller; check all appropriate connections after you turn off the system
INTR #1 Error	Interrupt controller 1 failed POST
INTR #2 Error	Interrupt controller 2 failed POST
Invalid Boot Diskette	The BIOS can read the diskette in drive A, but cannot boot the system; use another diskette
Keyboard is Locked...Unlock It	The keyboard lock is enabled; unlock it to continue
Keyboard Error	There is a timing problem with the keyboard; set the Keyboard option in Setup to Not Installed to skip the keyboard self test
KB/Interface Error	There is an error in the keyboard connector
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
Onboard Parity Error	Parity error in memory installed in a SIMM slot. The format is: ON 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

ISA NMI Messages

ISA NMI message	Description
Memory Parity Error at <i>xxxxx</i>	Memory failed; if the memory location can be determined, it is displayed as <i>xxxxx</i> ; if not, the message is Memory Parity Error <i>????</i>
I/O Card Parity Error at <i>xxxxx</i>	An expansion card failed; if the address can be determined, it is displayed as <i>xxxxx</i> ; if not, the message is I/O Card Parity Error <i>????</i>
DMA Bus Time-out	A device has driven the DMA bus signal for more than 7.8 microseconds

General Troubleshooting

This section provides general troubleshooting steps to identify a problem and locate its source.

Caution

Turn off the system and any peripheral devices before you disconnect any cables from the system or you may permanently damage the computer or peripheral devices.

1. Turn off the system and any peripheral devices. Disconnect all external devices 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 monitor are securely connected to the system. Turn on the monitor and turn up its brightness and contrast controls to at least two-thirds of the maximum (refer to the documentation supplied with the monitor).

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

Note

During the memory test, the computer displays the amount of memory it has tested. Depending on the amount of memory installed, the self test can take up to 60 seconds to complete. If you do not want to wait for the memory test to complete, you can terminate it after it starts by pressing **ESC**. The computer does not perform a memory test after you have pressed **Ctrl Alt Del**.

One of the following will happen during the self test:

- ☐ If the self test does not detect any errors, the system beeps once and then boots
- ☐ Errors that do not prevent the boot process (non-fatal errors) display a message that looks similar to the following:

ERROR *Message 1*

ERROR *Message 2*

Press **<F1>** to **RESUME**

Make a note of the error and press **F1** to resume.

For most non-fatal error messages, there is only one message. If a second error message is displayed, it will be **RUN SETUP**. If this message appears, press **F1** to run Setup.

- ☐ 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 beginning of this chapter.

7. Confirm that the computer loaded the operating system.

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. Check the following conditions:

- ☐ Are all cables correctly connected and secured?
- ☐ Are the configuration settings correct in Setup? See Chapter 2.
- ☐ Are all the drivers properly installed?
- ☐ Are all the jumpers on the main system board set correctly? See Chapter 4.
- ☐ Are all jumper and switch settings on expansion 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 boards sharing the same interrupt.

- ☐ Is the power supply set to the proper input voltage? See Chapter 1.
- ☐ Are expansion boards and disk drives installed correctly? See Chapters 4 and 5.
- ☐ 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 4.
- ☐ Is the operating system properly loaded? See the operating system documentation.

Problems When the System was Running Correctly

After the system hardware and software have been running correctly, problems often indicate equipment failure. Go through the following checklist to see if you can easily correct the situation:

- ☐ 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 the CMOS RAM by changing a jumper setting (Chapter 4) and running Setup (Chapter 2).

- ☐ If the problem recurs, you may need to reformat the hard disk. If the problem persists after reformatting the disk, the super I/O controller on the system board may be defective.
- ☐ 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 suppressor between the electrical outlet and the system power cord.
- ☐ Try reseating the SIMMs. See Chapter 4.

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 you can easily correct the situation. 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? See 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?
- ☐ Is the software infected with a virus? Run a virus detection program on your system to test both your hard disk(s) and the software distribution diskettes.

Miscellaneous Problems

Contact your Authorized EPSON Servicer or the EPSON Connection if the suggested actions in the table below do not solve the problem.

Problem	Solutions
Application software problems	Make sure all cables are installed correctly. 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 at a different speed. See Chapter 3. 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 4) and run Setup (Chapter 2). Make sure you have your list of system settings available to re-enter, because clearing CMOS RAM sets the options to their default values.
Beep pattern is absent	If the system operates normally but there was no beep, the speaker may be disabled or has failed. Check that the speaker is enabled in Setup.

Problem	Solutions
Characters on the screen are distorted or incorrect	Make sure the brightness and contrast controls are properly adjusted. Make sure the video signal and power cables are properly installed.
Characters do not appear on screen	Make sure the monitor is plugged in and turned on. Check that the brightness and contrast controls are properly adjusted. Check that the video signal cable is properly installed. If you installed a video expansion board, make sure it 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.
Diskette drive access light does not go on when a diskette drive is in use or is tested by the self test	Make sure the power and signal cables for the drive are properly installed. Check that the drive is properly configured and enabled in Setup.
Hard disk drive access light does not go on when a hard disk drive is in use or is tested by the self test	Make sure the power and signal cables for the drive are properly installed. Make sure the front panel connector is securely attached to the main 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.

Problem	Solutions
Power light does not go on	If the system is operating normally, check the connector between the main system board and the front panel. If it is connected, the light may be defective.
Prompt doesn't appear after system boots	See "Problems at Initial System Start-up" above.
You cannot enter Setup	If you cannot enter Setup to make changes, you may need to clear the CMOS RAM to set the default values and reconfigure the system (see Chapters 2 and 4).
System halts before completing the self test	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 when you call for technical support.
You installed a network adapter and it will not initialize when you load the driver	If you installed Type 1 of the IBM 16/4 Token Ring network adapter, the card will not work in your system. Instead, install the Type 3 adapter and disable the appropriate shadow memory area and assign the correct IRQ 9 setting (if you use IRQ 2). For example, if you set the adapter's ROM address to DC000h, the RAM address to D8000h, the RAM size to 16KB, and the IRQ setting to IRQ 2, you must make the following changes to these Advanced CMOS Setup options: Disable Shadow Memory Base option: Set to D8000h Disable Shadow Memory Size option: Set to 32KB ISA IRQ 9 option: Set to Used

Appendix A

Specifications

CPU and Memory

CPU

Intel Pentium 60 MHz microprocessor; backward compatible with 8086, 80286, i386,[™] and i486[™] CPUs; supports read and write burst mode bus cycles; built-in 16KB write-back cache; integrated math coprocessor

System speed

High and low speeds available; high speed is 60 MHz and low speed is simulated 8 MHz for compatibility; speed selection through Setup program or keyboard commands

System memory

8MB standard memory on two 4MB SIMMs; expandable to 128MB using 1MB, 2MB, 4MB, 8MB, 16MB, and 32MB SIMMs; SIMMs must be 32-bit or 36-bit, 72-pin, 70ns or faster, tin-plated, fast-page mode, parity/ no parity type (see page 4-11 for a list of approved SIMMs)

Cache memory

Built-in 16KB of internal write-back cache in the Pentium microprocessor; 256KB of secondary, direct-mapped, write-through cache on eight 32KB x 8,15ns SRAMs on the main system board; tag and control logic on the 82434LX PCMC core chip

ROM

128KB system and video BIOS located on a flash EEPROM device; contains Setup program code, power-on self test code, update recovery code, and the PC1 board auto-configuration utility; upgradable and write-protectable

video RAM

1MB of standard video RAM providing video resolutions up to 1024 x 768 in 256 colors; expandable to 2MB by installing eight 256KB x 4, 60ns ZIP VRAMs on the main system board to provide resolutions up to 1280 x 1024 in 256 colors

Shadow RAM

Supports shadowing of system and video BIOS ROM, and ROM located on expansion board adapters, into RAM

**Clock/
calendar**

Real-time clock, calendar, and 128-byte CMOS RAM (114 bytes for general purpose non-volatile CMOS RAM and 14 bytes for clock and control registers) on socketed DS12887 device; integrated battery and oscillator; CMOS RAM clearable and resetable using the Setup program or by setting a main system board jumper

Controllers

Video

AT1 68800AX Mach32 graphics accelerator connected directly to the PC1 bus; compatible with MDA, CGA, Hercules Graphics, EGA, and VGA video standards; supports normal and enhanced video modes; supports interlaced and non-interlaced monitors

Diskette

SMC FDC37C665 super I/O controller with interface on the main system board controls up to two diskette drives or one diskette drive and one tape drive; 16-byte data FIFO (first-in-first-out) with 2.88MB diskette drive support

Hard disk

SMC FDC37C665 super I/O controller with interface on the main system board controls up to two IDE hard disk drives; BIOS provides hard disk auto-sensing function

Parallel port

SMC FDC37C665 super I/O controller provides bidirectional functions and multiple modes: standard (IBM and Centronics compatible), enhanced (EPP with BIOS/ driver support), and high speed (ECP compatible)

Serial ports

SMC FDC37C665 super I/O controller supports two RS-232C compatible serial ports

Interfaces

Video

SVGA PC1 local bus interface with standard, 15-pin analog connector; VESA compliant 8514/ A feature connector on main system board for auxiliary video subsystem installed in an expansion slot

Parallel

Multimode, bidirectional parallel port with 25-pin, D-shell connector

Serial

Two RS-232C compatible, programmable, asynchronous serial ports with 9-pin, D-shell connectors

Keyboard

PSI 2 compatible keyboard port with 6-pin, mini DIN connector

Mouse

PSI 2 compatible mouse port with 6-pin, mini DIN connector

Expansion slots

Five expansion slots on expansion board riser card: one full-length, 16-bit ISA slot; two half-length, 16-bit ISA slots; one full-length PC1 slot, and one half-length PC1 slot

Mass Storage

Internal bays: one 3.5-inch, one-inch high bay (for the standard diskette drive) and one 3.5-inch, 1.6-inch high bay for an optional internal drive in the drive carrier

Externally accessible bays: Two 5.25-inch, half-height bays (can be used as one 5.25-inch, full-height bay)

Keyboard

Detachable, two-position height; 101 or 102 sculpted keys; country-dependent main typewriter keyboard; numeric/cursor control keypad; four-key cursor control keypad; 12 function keys

Setup Program

Stored in ROM; accessible by pressing **FI** during boot

Physical Characteristics

Dimension	Specification
Width	17.2 inches (43.7 cm)
Depth	16.2 inches (41.1 cm)
Height	4.3 inches (11.0 cm)
Weight	20 lb (9.1 kg) without drives or keyboard

Power Supply**Type**

145 Watt, switchable voltage; maximum power dissipation: 120 Watts

Input ranges

90 to 135 VAC and 180 to 265 VAC;
50/60 Hz

**A C input
current**

5.0 Amps at 90 to 135 VAC;
3.0 Amps at 180 to 265 VAC

**AC power
outlet**

2.0 Amps maximum for 100 to 120 VAC;
1 Amp maximum for 200 to 240 VAC

Cables

Two to main system board; four to mass storage devices

DC output

DC voltage	Maximum continuous current	Peak current; 15 seconds	Minimum current load
+5V	18.0 Amps	18.0 Amps	2.5 Amps
–5V	0.3 Amp	0.3 Amp	0 Amp
+12V	4.2 Amps	6.0 Amps	0.5 Amp
–12V	0.3 Amp	0.3 Amp	0 Amp

Power consumption

DC voltage	Current	Watts (total: 30.67 W)
+5 V	6.0 Amps (5%)	30 W
–5V	0.016 Amp (5%)	0.008 W
+12 V	0.044 Amp (10%)	0.528 W
–12V	0.011 Amp (10%)	0.132 W
3.3 V	0 Amp (5%)	0 W

Expansion board power limits

Board type	Maximum current per board				
	–5V	+5V	+12V	–12V	+3.3V
PCI (57.8 W per slot)	—	5 Amps	500 ma	100 ma	7.6 Amps
ISA (16-bit; 66 W per slot)	1.5 Amps	4.5 Amps	1.5 Amps	1.5 Amps	—

Caution

To avoid damage to the system board or power supply, do not exceed a total of 145 Watts power draw.

Environmental Requirements

Condition	Operating	Non-operating
Temperature	50° to 95° F (10° to 35° C)	40° to 158° F (40° to 70° C)
Humidity (no hard disk drive)	80% RH at 36° C	92% RH at 36° C
Altitude	10,000 ft (3048 m)	50,000 ft (15,240 m)

Tested Operating Environments

Although your system will run most software applications, the following operating environments have been tested for compatibility with your system :

- Microsoft MS-DOS
- Novell DR DOS® 6.0
- Novell NetWare 2.2, 3.12, and 4.01
- Novell NetWare Lite 1.1
- IBM OS/ 2 2.1
- SCO® UNIX release 3.2, version 4.2
- SCO Open Desktop 3.0
- Microsoft Windows 3.0 and 3.1
- Microsoft Windows for WorkGroups 3.11
- Microsoft Windows NT 3.1
- NextStep version 3.2
- LAN Manager

Your system has also received Novell's "Yes, NetWare tested and approved" certification as a workstation and file server. As new environments become available, these also will be tested and certified.

Options Available from EPSON

Many options for enhancing and supplementing this product are available from EPSON, including the following:

Monitors

- 14" VGA monochrome and color monitors
- 15" high-resolution color VGA monitor
- 17" and 20" Professional Series monitors

Keyboards and Mouse

- 101 or 102 key USA keyboard
- 102 key International keyboard
- 6-pin PS/2-type mouse

Mass storage devices

- 5.25-inch and 3.5-inch diskette drives
- Hard disk drives in various capacities

Printers

- 9-pin and 24-pin dot matrix printers
- Laser printers
- Ink jet printers
- Scanners

Miscellaneous

- High-performance video adapters
- CD-ROM drives
- Magneto-optical drives
- SCSI adapters, scanners, and drives
- PCMCIA card readers
- Sound boards
- VRAM
- Fax/ modems
- NICs

System Memory Map

Address range (hexadecimal)	Size	Description
1000000-7FFFFFFF	112MB	Extended memory
FE0000-FFFFFF	128KB	System and video BIOS copy
1000000-FDFFFF	15232KB	Extended memory
F0000-FFFFF	64KB	System BIOS
EE000-EFFFF	8KB	Flash boot block (available as HIMEM)
ED000-EDFFF	4KB	User flash area (available as HIMEM if no user information is here)
E8000-ECFFF	20KB	Setup program (disable via setup pre-boot only; this option open to HIMEM)
E0000-E7FFF	32KB	Available Hi DOS
C8000-DFFFF	96KB	Available Hi DOS memory (open to the ISA bus)
C000-C7FFF	32KB	VGA BIOS
B8000-BFFFF	32KB	VGA display memory (not available to ISA bus)
B0000-B7FFF	32KB	VGA & mono display memory (HIMEM with QEMM® not available to the bus)
A0000-AFFFF	64KB	VGA display memory (not available to the ISA bus)
9FC00-9FFFF	1 KB	Extended BIOS data (moveable by QEMM and 386MAX®)
80000-9FBFF	127KB	Extended conventional
00000-7FFFF	512KB	Conventional

System I/O Addresses

Address range (hexadecimal)	Description
0000-000F	SIO-DMA
0020-0021	SIO-interrupt controller 1
0040-0043	SIO-timer 1
0048-0048	SIO-timer 2
0060	Keyboard controller data byte
0061	SIO-NMI, speaker control
0064	Keyboard controller, CMD & STATUS byte
0070, bit 7	SIO-enable NMI
0070, bits 6:0	SIO-RTC, address
0071	SIO-RTC, data
0073	Reserved: board configuration
0075	Reserved: board configuration
0078	SIO-BIOS timer
0080-008F	SIO-DMA
00A0-00A1	SIO-interrupt controller 2
00C0-00DE	SIO-DMA
00F0	Reset numeric error
01F0-01F7	IDE channel 1
0278-027B	Parallel port 3
02E8-02EF	Serial port 4
02F8-02FF	Onboard serial port 3
0378-037F	Parallel port 2
03BC-03BF	Onboard parallel port
03E8-03EF	Serial port 3

System 170 addresses (continued)

Address range (hexadecimal)	Description
03F0-03F5	Floppy channel 1
03F6	IDE channel 1
03F7	Diskette (write) channel 1
03F7, bit 7	Diskette change channel 1
03F7, bits 6:0	IDE status channel 1
03F8-03FF	Onboard serial port 1
0CF8	PCI configuration space enable
0CF9	Deturbo mode enable
C000-C0FF	82434LX configuration registers
C200-C2FF	823781B configuration registers
C300-C3FF	Onboard ATI configuration registers

System Board Interrupts

Interrupt request (IRQ)	System resource
NMI	Parity error
0	Reserved, interval timer
1	Reserved, keyboard buffer full
2	Reserved, cascade interrupt from slave PIC
3	Serial port 2
4	Serial port 1
5	Parallel port 2
6	Diskette
7	Parallel port 1

System board interrupts *(continued)*

Interrupt request (IRQ)	System resource
8	Real-time clock
9	User-available
10	User-available
11	User-available
12	Onboard mouse port if enabled; otherwise user-available
13	Reserved, math coprocessor
14	IDE if enabled; otherwise user-available
15	User-available

DMA Channels

DMA channel	System resource
0	Open
1	Open; normally used for LAN
2	Diskette drive
3	IDE hard disk drive
4	Reserved; cascade channel
5	Open
6	Open
7	Open

Safety Compliance

This equipment meets or exceeds requirements for safety in the US (UL 1950 1st Edition), Canada (CSA 950), and Europe (TUV to EN60950, IEC 950).

Connector Pin Assignments

Parallel port connector (J13C1)

Pin	Signal name	Pin	Signal name
1	Strobe-	14	Ground
2	Auto Feed-	15	Data Bit 6
3	Data Bit 0	16	Ground
4	Error-	17	Data Bit 7
5	Data Bit 1	18	Ground
6	Init-	19	Ack-
7	Data Bit 2	20	Ground
8	Slct In-	21	BUSY
9	Data Bit 3	22	Ground
10	Ground	23	PE (Paper End)
11	Data Bit 4	24	Ground
12	Ground	25	SLCT
13	Data Bit 5	26	NC

Serialport connectors (J13E1, J13F1)

Pin	Signal name	Pin	Signal name
1	DCD	6	CTS
2	DSR	7	DTR
3	Serial In-	8	RI
4	RTS	9	GND
5	Serial Out-	10	NC

Auxiliary (3.3v) power connector (JPH1)

Pin	Name	Function
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	+3.3 V	+3.3 V
5	+3.3 V	+3.3 V
6	+3.3 V	+3.3 V

Primary power connector (J1H1)

Pin	Name	Function
1	PWRGD	Power good
2	+5 V	+5 V Vcc
3	+12 V	+12 V
4	-12 V	-12 V
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	-5 V	-5 V
10	+5 V	+5 V Vcc
11	+5 V	+5 V Vcc
12	+5 V	+5 V Vcc

Diskette drive connector (JB1)

Pin	Signal name	Pin	Signal name
1	Ground	2	FDHDIN
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	Ground	18	DIR-
19	Ground	20	STEP-
21	Ground	22	Write Data-
23	Ground	24	Write Gate-
25	Ground	26	Track 00-
27	Ground	28	Write Protect-
29	Ground	30	Read Data-
31	Ground	32	Side 1 Select-

AT IDE hard disk drive connector (JBJ2)

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	DRQ3	22	Ground
23	I/O Write-	24	Ground
25	I/O Read-	26	Ground
27	IOCHRDY	28	BALE
29	DACK3-	30	Ground
31	IRQ14	32	IOCS16-
33	Addr 1	34	Ground
35	Addr 0	36	Addr 2
37	Chip Select 0-	38	Chip Select 1-
39	Activity	40	Ground

Speaker connector (JIFI)

Pin	Signal name
1	SPKR_DAT
2	Key
3	No Connect
4	+5V Vcc

Auxiliary 2 V front fan connector (J3A1)

Pin	Signal name
1	Ground
2	+12V (fused)
3	Ground

ISA expansion board connectors

Pin	Signal name	Pin	Signal name
B1	GND	A1	IOCHK-
B2	RSTDRV	A2	SD7
B3	Vcc	A3	SD6
B4	IRQ9	A4	SD5
B5	-5V	A5	SD4
B6	DRQ2	A6	SD3
B7	-12V	A7	SD2
B8	OWS-	A8	SD1
B9	+12V	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
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

ISA expansion board connectors (continued)

Pin	Signal name	Pin	Signal name
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	C3	LA22
D4	IRQ11	C4	LA21
D5	IRQ12	C5	LA20
D6	IRQ15	C6	LA19
D7	IRQ14	C7	LA18
D8	DACK0-	C8	LA17
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 expansion board connectors

Pin	Signal name	Pin	Signal name	Pin	Signal name	Pin	Signal name
A1	GND	B1	–12V	A32	AD16	B32	AD17
A2	+12V	B2	No Connect	A33	3.3V	B33	CBE2-
A3	No Connect	B3	GND	A34	FRAME-	B34	GND
A4	No Connect	B4	No Connect	A35	GND	B35	IRDY-
A5	Vcc	B5	Vcc	A36	TRDY-	B36	3.3V
A6	PCIINT3-	B6	Vcc	A37	GND	B37	DEVSEL-
A7	PCIINT1-	B7	PCIINT2-	A38	STOP-	B38	GND
A8	Vcc	B8	PCIINT4-	A39	3.3V	B39	PLOCK-
A9	Reserved	B9	No Connect	A40	SDONE	B40	PERR-
A10	Vcc	B10	Reserved	A41	SBO-	B41	3.3V
A11	Reserved	B11	No Connect	A42	GND	B42	SERR-
A12	GND	B12	GND	A43	PAR	B43	3.3V
A13	GND	B13	GND	A44	AD15	B44	CBE1-
A14	Reserved	B14	Reserved	A45	3.3V	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	3.3V	B21	AD29	A52	CBEO-	B52	AD8
A22	AD28	B22	GND	A53	3.3V	B53	AD7
A23	AD26	B23	AD27	A54	AD6	B54	3.3V
A24	GND	B24	AD25	A55	AD4	B55	AD5
A25	AD24	B25	3.3V	A56	GND	B56	AD3
A26	AD22 (IDSEL)	B26	CBE3-	A57	AD2	B57	GND
A27	3.3V	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	3.3V	A62	Vcc	B62	Vcc

Mouse and keyboard connectors (J13G1 and J13H5)

Pin	Signal name
1	Data
2	No connect
3	Ground
4	Vcc (fused)
5	Clock
6	No connect

Reset connector (J1F2)

Pin	Signal name
1	RESET
2	Ground

Power LED connector (J1F3)

Pin	Signal name
1	LED PWR
2	Key
3	Ground
4	KEY LOCK
5	Ground

Hard disk drive LED connector (J1G1)

Pin	Signal name
1	PULL UP 330
2	HD ACTIVE-
3	Key
4	PULL UP 330

Turbo LED connector (J1H1)

Pin	Signal name
1	PULL UP 330
2	LED TURBO-

video monitor port connector (J13A1)

Pin	Signal name	Pin	Signal name	Pin	Signal name
1	Red	6	Ground	11	No connect
2	Green	7	Ground	12	No connect
3	Blue	8	Ground	13	Horizontal sync
4	No connect	9	No connect	14	Vertical sync
5	Ground	10	Ground	15	No connect

VESA feature connector (J10A1)

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	Blank
23	Vcc	24	Blank
25	Blank	26	Ground

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