EPSON®

User's Guide

EPA POLLUTION PREVENTER

Printed on recycled paper with at least 10% post consumer content

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 it has a 3-prong plug. Also make sure the total Amp rating of the devices plugged into the extension cord does not exceed the cords Amp rating. Make sure the total of all devices plugged into the wall outlet does not exceed 15 Amps.

- 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.

Importances 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 marqués sur l'ordinateur.

ᶻDébrancher l'ordinateur avant de le nettoyer. N'utiliser qu'un chiffon humide. Veiller à ne pas renverser de liquides sur l'appareil.

ᶻNe pas placer l'ordinateur sur une surface instable ni près d'une source de chaleur.

ᶻNe pas bloquer ni couvrir les orifices d' aération de l'appareil. Ne pas introduire d'objets dans les overtures.

ᶻUtiliser seulement le type de source d'alimentation électrique indiqué sur l'étiquette.

ᶻTout l'équipement doit être branché sur des prises de courant avec contact de terre. Ne jamais utiliser une prise sur le même circuit qu'un appareil à photocopies ou un système de contrôle de ventilation avec commutation marche-arrêt automatique.

ᶻS'assurer que le cordon d'alimentation de l'ordinateur n'est pas abîmé ni effiloché.

ᶻDans le cas où on utilise un cordon de rallonge avec l'ordinateur, s'assurer que l'intensité en ampères requise pour tous les appareils branchés sur ce cordon ne soit pas supérieure à la capacité du cordon. S'assurer aussi que cette intensité ne dépasse jamais la somme de 15 ampères pour l'ensemble des appareils.

ᶻSauf dans les cas spécifiques expliqués dans ce manuel de l'usager, ne pas essayer d'entretenir ou de réparer l'ordinateur soi-même.

ᶻDébrancher l'ordinateur et contacter un technician qualifié dans les circonstances suivantes:

Si le cordon ou la prise sent abîmés; si un liquide a pénétré à 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 maniére très différente de l'ordinaire. N'ajuster que les commandes décrites clans les directives.

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

Wichtige Sicherheitshinweise

Bitte lesen Sie diese Sicherheitshinweise, und heben Sie sie zur späteren Verwendung auf. Beachten Sie alle Warnungen und Anweisungen, die auf dem Computer angebracht sind.

- Ziehen Sie das Netzkabel des Computers vor der Reinigung heraus. Verwenden Sie zur Reinigung nur ein feuchtes Tuch. Achten Sie darauf, daß keine Flüssigkeiten auf dem Computer verschüttet werden.

- Stellen Sie den Computer nur auf einer stabilen Arbeitsfläche auf, und halten Sie ihn von Heizkörpern und Warmluftquellen fern.

- Achten Sie darauf, daß die Öffnungen im Computergehäuse nicht blockiert oder verdeckt werden. Führen Sie keine Fremdkörper in die Lüftungsschlitze ein.

- Verwenden Sie nur die auf dem Typenschild des Computers angegebene Stromversorgung.

- Schließen Sie alle Geräte an ordnungsgemäß geerdete Steckdosen an. Verwenden Sie keine Steckdosen, die mit demselben Stromkreis wie Fotokopiergeräte oder Klimaanlagen, die sich regelmäßig ein- und ausschalten, verbunden sind.

- Achten Sie darauf, daß das Netzkabel des Computers stets in einwandfreiem Zustand ist.

- Stellen Sie bei Verwendung eines Verlängerungskabels sicher, daß der gesamte Amperewert aller an das Verlängerungskabel angeschlossenen Geräte den zulässigen Höchstwert des Kabels nicht überschreitet. Stellen Sie ferner sicher, daß der Gesamtwert aller an die Wandsteckdose angeschlossenen Geräte 15 Ampere nicht überschreitet.

- Führen Sie keine Wartungsarbeiten am Computer durch, die über das im *Benutzerhandbuch* beschriebene Ausmaß hinausgehen.

ᵶ Ziehen Sie den Computer heraus, und rufen Sie qualifiziertes Wartungspersonal, wenn eine der folgenden Bedingungen auftritt:

Das Netzkabel oder der Netzstecker ist beschädigt; Flüssigkeit ist in den Computer eingetreten; der Computer wurde fallengelassen oder das Gehäuse ist beschädigt; der Computer funktioniert nicht ordnungsgemäß oder die Leistung hat sich merklich geändert. Stellen Sie nur die Bedienelemente ein, die in der Gebrauchsanweisung beschrieben sind.

ᵶ Nehmen Sie den Computer bei Flugreisen als Handgepäck mit in den Fluggastraum, damit er nicht in einem drucklosen Frachtraum verstaut wird.

ᵶ Beachten Sie den folgenden Hinweis, wenn Sie den Computer in Deutschland in Betrieb nehmen:

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

Introduction

Your new EPSON® computer is a full powered, full featured system that gives you complete access for all your business or home computer needs. And because your computer is plug and play compliant and designed to take advantage of Microsoft® Windows® 95, you'll be able to use all the latest technology and software.

With the computer's high-performance processor and memory you can run a vast array of the latest programs, utilities, and games designed for productivity and fun.

Your system's state-of-the-art PCI (Peripheral Component Interconnect) bus architecture gives you fast and efficient access to both PCI and IDE option cards. It also provides PCI performance for IDE drives and your VGA or high-resolution monitor.

And when you're ready for even more capability, you can install option cards or additional drives, upgrade your processor, and expand your system and video memory.

Computer Features

Your computer offers the following features:

❏ Upgradable 486-class processors

❏ *4* or 8MB of RAM (Random Access Memory), expandable to 132MB using SIMMs

❏ PCI-based system board providing PCI caching, memory, bus control, and video control, as well as EIDE (Enhanced Integrated Drive Electronics) and diskette drive device control

❏ High-speed, PCI video controller with 32-bit DRAM video interface and 32-bit PCI interface

❏ Two PCI ATA-2 compatible IDE interfaces supporting up to four IDE devices, such as hard disk drives and CD-ROM drives (two on each interface)

❏ 8KB of internal cache in the processor

❏ 512KB or lMB of onboard video memory for resolutions from 640 x 480 True Color™ support up to 1280 x 1024 with 16-color support (noninterlaced); memory expandable to 2MB

❏ Three Energy Star compliant power-saving modes for the CPU, video, and hard disk drives in standard configurations

❏ Three 16-bit, ISA (Industry Standard Architecture) option slots and one PCI option slot supporting one PCI bus option card

❏ Space for up to three mass storage devices, two externally accessible and one internal.

Power-saving Feature

In standard configurations, this computer complies with the United States Environmental Protection Agency's Energy Star Program, which promotes the manufacture of energy-efficient printers, computers, and monitors. Your computer's power-saving feature places the CPU, video, and hard disk drives in three different power-saving modes when the mouse and keyboard have been inactive for a specified period of time. You can customize the power-saving feature in SETUP.

ISA and PCI Expansion Buses

Your computer includes expansion buses for two types of
option cards: ISA and PCI. The PCI bus provides extremely fast
data transfer (33 MHz) for a high-performance PCI card, such
as a high-speed video card. PCI cards use plug and play
technology that automatically configures resources used by the
card, such as interrupt requests and memory addresses.

The ISA bus transfers data at 8.33 MHz for up to three 16-bit
ISA option cards. You can use these slots for standard ISA 8-or
16-bit cards such as fax/modem cards, sound cards, and SCSI
(Small Computer System Interface) cards.

SVGA Feature Connector

If you install a high-resolution graphics adapter card or a
full-motion, multimedia card, you can connect it to the
computer's SVGA (Super Video Graphics Array) feature
connector. This allows you to use the adapter's special graphics
features while accessing the standard SVGA signals provided
by your main system board.

System and Video BIOS

The computer's system and video BIOS are contained in a flash
memory device on the main system board, which you can
upgrade using special software, without replacing the chip.

Your computer supports shadowing of the system and video
BIOS to allow BIOS routines to run from fast, 32-bit RAM
instead of from the slower ROM devices.

How to Use This Manual

This manual contains the information you need to get the best results from your computer. You don't have to read everything; see the following chapter summaries to find the sections you need.

Chapter 1 provides instructions for setting up your system and connecting peripheral devices such as the monitor and printer.

Chapter 2 explains how to run the SETUP program to change your computer's configuration and how to install the PCI IDE drivers.

Chapter 3 covers general operating procedures, such as using your power-saving feature and using a password.

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

Chapter 5 explains how to install and remove mass storage devices.

Chapter 6 contains troubleshooting tips.

Appendix A lists the specifications of your computer.

At the end of this manual, you'll find a glossary and an index.

Where to Get Help

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.

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

Electronic Support Services

If you have a modem, the fastest way to access helpful tips, specifications, drivers, application notes, DIP switch or jumper settings, and bulletins for EPSON products is through the online services below.

EPSON bulletin board service

You can call the EPSON bulletin board service (BBS) 24 hours a day at (310) 782-4531. No membership is required. Make sure your communications software is set to 8 data bits with no stop bit, 1 parity bit, and a modem speed up to 28.8 Kbps. See the documentation that came with your communications software for more information.

CompuServe online support

CompuServe® members can call the Epson America Forum on CompuServe. If you are already a member, simply type GO EPSON at the menu prompt to reach the Forum.

If you are not currently a member, 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 (800) 848-8199 in the United States and Canada and ask for representative #529. In other countries, call the following U.S. telephone number: (614) 529-1611, or your local CompuServe access number.

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Setting Up Your System

This chapter briefly describes how to set up your computer. It includes the following information:

❏ Choosing a location

❏ Setting the voltage selector switch

❏ Connecting system components

❏ Turning the computer on and off.

Choosing a Location

Before you set up your system, choose a convenient location that provides a flat, hard surface. Do not place your system too close to any electrical device, such as a radio, that generates an electromagnetic field. Protect your computer from extremes in temperature, humidity, dust, and smoke, and avoid direct sunlight and other sources of heat.

Read the "Important Safety Instructions" at the front of this manual for more information about choosing a suitable environment for your system.

Also read "Working Comfortably" in Chapter 3 for guidelines on creating a comfortable and safe working environment.

Setting the Voltage Selector Switch

Your system is powered by a 145 Watt power supply. The power supply input voltage is controlled by a switch on the computer's back panel that may be set to 115 VAC or 230 VAC.

The computer is shipped with the voltage selector switch set to 115 VAC, which is appropriate for line source voltages between 100 and 120 VAC. This is generally the correct setting if you use the computer in North America, South America, or Japan.

If you plan to operate the computer in the United Kingdom, Europe, or some South American countries, you will almost certainly need to reset the voltage selector switch to 230 VAC. Line source voltages between 200 and 240 VAC are acceptable with the switch set to 230 VAC.

Caution
Before you turn on the power to your system, make sure the voltage selector is set appropriately for the electrical power source in your location or you will seriously damage your system.

To change the voltage selector switch setting, insert the tip of a flat screwdriver into the notch on the switch. Slide the switch to the right to select 115 VAC or to the left to select 230 VAC.
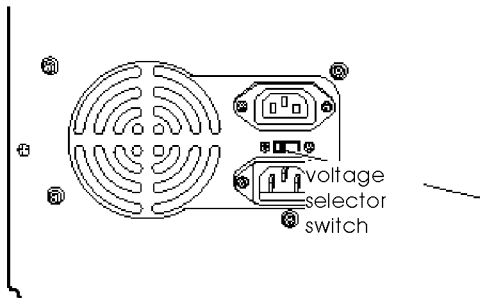
Connecting System Components

Use the illustrations below to locate the ports on the back of
your system as you connect the keyboard, monitor, printer, and
other devices. The icons on the case identify the function of
each port.

Caution
Be sure the power is off before you connect any device to the
computer; otherwise you will damage the system board.

---

keyboard   mouse   serial   serial   printer port   VGA
                     port 1   port 2   (parallel   monitor
                                         device)
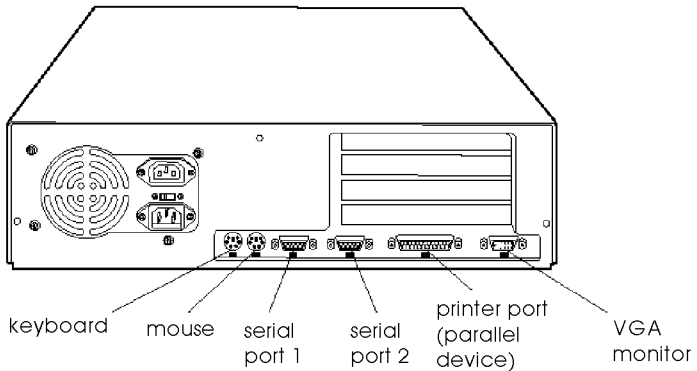
Connecting a Keyboard or Mouse

Refer to the illustration above as you connect your keyboard
and mouse.

To connect the keyboard, hold the cable connector so the
arrow on the connector faces up. Insert it into the
keyboard port, marked with the icon shown at the left.

To connect the mouse, insert the connector into the computer's built-in mouse port so the arrow or mark on the connector faces up. The icon for the mouse is shown at the left.

Caution
Although the connectors and ports for the mouse and keyboard are physically identical, they cannot be used interchangeably. Be sure to plug the connectors into the appropriate ports, or you may damage your system.

Your mouse drivers for Windows applications have been installed for you. If you need to install other mouse drivers, see your mouse manual for instructions.

Connecting a Monitor

Refer to the illustration on page 1-3 as you connect your VGA or SVGA monitor to the computer's built-in monitor port.

Follow these steps to connect your monitor:

1. Place your monitor near the computer. Turn the monitor and computer around so the backs are facing you.

2. There should be two cables provided with your monitor: the monitor cable (to connect it to the computer) and the power cable (to connect it to a power source). On most monitors, the monitor cable is permanently attached to the monitor. If your monitor does not have an attached cable, connect the cable to it now.

3. Examine the connector on the monitor cable and line it up with the monitor port on the computer. Then insert the connector into the port.

⊡ This icon identifies the VGA monitor port.

> **Caution**
> To avoid damaging the connector, be careful not to bend the pins when you insert it.

4. If the connector has retaining screws, tighten them.

5. Plug the monitor's power cord into the power inlet on the back of the monitor.

6. Plug the other end of the power cord into a grounded electrical outlet or into the power outlet on the back of the computer.

> **Caution**
> Before you plug the monitor's power cord into the back of your computer, make sure the monitor's power requirements do not exceed 2 Amps at 115 volts and 1 Amp at 220 volts.

Connecting a Parallel or Serial Device

Your computer has one multimode parallel (printer) port and two serial ports. To connect a printer or other peripheral device, refer to the illustration on page 1-3 as you follow the instructions in this section.

Using the parallel (printer) port

Follow these steps to connect a parallel device to your computer:

1. Place the parallel device and the computer so that the backs are facing you.

2. Align the connector end of the parallel cable with the printer port and plug it in. If the connector has retaining screws, tighten them.

    This icon identifies the printer port.

3. Connect the other end of the cable to the parallel device. To secure the cable, squeeze the clips at each side of the device port and push them into place.

4. Plug the parallel device's power cord into a grounded electrical outlet.

If you want to take advantage of the port's extended capabilities, see "Setting Options for Peripheral Controllers" in Chapter 2.

Note
If you use ECP (Extended Capabilities Port) mode, be sure the parallel device also has ECP capabilities. Check your parallel device software documentation for the correct DMA channel (DRQ) setting. Then set jumpers JP30 and JP31 to match this setting. See "Changing the Jumper Settings" in Chapter 4 for more information.

If you have a printer, a modem, or other device with a serial
interface, you can connect it to one of the serial (RS-232C) ports.
Make sure you have a cable compatible with a DB-9P connector.

To connect a serial device, insert the connector into
either of the two serial ports, which are marked with the
icons shown at the left.

Connecting the Power Cord

Follow these steps to connect the computer's power cord:

1. Plug the power cord into the power inlet on the back of the
   computer.

power outlet

power inlet
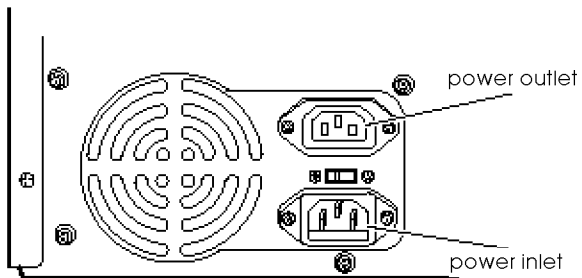
WARNING
To avoid an electric shock, be sure to plug the cord into
the computer before plugging it into the wall outlet.

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2. Plug the other end of the cord into an electrical outlet.

Turning On the Computer

Once you set up your system, you're ready to turn on the power. Refer to the illustration below to locate the POWER button and other features on the front panel.

power
(SPEED) light

hard disk drive
(HDD) light

POWER
button

diskette drive
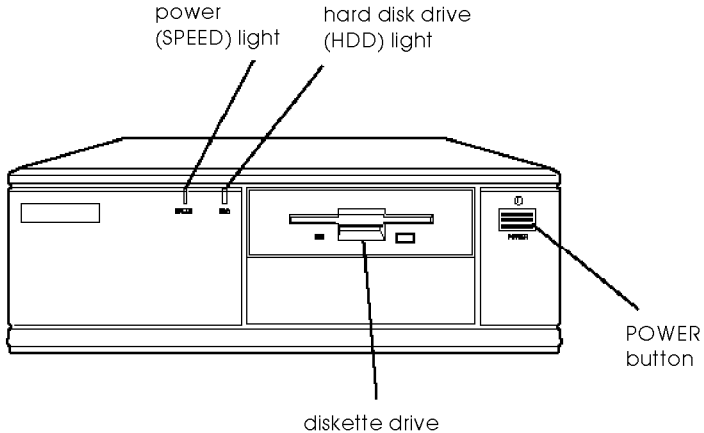
Caution
Before you turn on your system, be sure to read "Important Safety Instructions" at the front of this manual to ensure that you have created a safe working environment.

Follow these steps to turn on your system:

1. Turn on the monitor, printer, and any other devices connected to the computer.

2. Turn on the computer by pressing the POWER button on the right side of the front panel.

The power (SPEED) indicator lights up; then the computer performs its power-on diagnostics, which are a series of checks to make sure everything is working correctly. During diagnostics, if you see a message telling you to press Del to run the SETUP program, ignore this prompt for now.

3. You see the first screen of your operating system.

You're now ready to start enjoying your new system, although you may want to run SETUP to set the time, enable power saving features, or setup a password. See Chapter 2 for instructions.

Turning Off the Computer

Whenever you turn off your system, follow these steps:

1. Save your data and exit any application programs. If you are running Windows 95, select Shut Down.

2. Check the drive lights to make sure they are not on. You can damage the drive or lose data if you turn off the computer when one of these lights is on.

3. Remove any diskettes from the diskette drives.

4. Press the POWER button to turn off the computer.

5. Turn off the monitor, printer, and any other peripheral devices.

Running SETUP and Installing Drivers

If you reconfigure your system or add options, you must use a configuration program called SETUP, which is contained within your system's BIOS. SETUP lets you change the settings for your hardware configuration, security options, and power-saving features. The configuration information you enter is stored in the computer's ROM (read-only memory) and is backed up by a battery, so it is not erased when you turn off or reset your computer.

If you are using Windows 3.1 and need to reconfigure your hard disk drive, you may also need to install video and PCI IDE drivers.

This chapter describes the following SETUP and driver installation procedures:

❏ Starting the SETUP program

❏ Setting standard options

❏ Setting advanced options

❏ Setting advanced IDE drive options

❏ Setting power management options

❏ Setting options for peripheral controllers

❏ Detecting your hard disk drive

❏ Selecting SETUP colors

❏ Setting system security

❏ Using SETUP defaults

❏ Exiting SETUP

❏ Installing system drivers.

Starting the SETUP Program

To start the SETUP program, turn on the computer and immediately press and release the Del key. This interrupts the power-on diagnostics and displays the main SETUP screen.

This screen contains four windows from which you can select icons that allow you to perform SETUP functions.

The Setup window lets you configure the following basic and advanced features:

❏ Standard options, such as date and time and drive configurations (see page 2-4)

❏ Advanced options, such as boot options and display types (see page 2-6)

❏ Advanced Hard Disk Drive options, such as LBA mode and data transfer options for each IDE device (see page 2-8)

❏ Power Management options, including time-out periods for Doze, Sleep, and Suspend modes (see page 2-9)

❏ Peripheral options that enable on-board controllers and identify the memory address each device uses (see page 2-11).

The Utility window provides the following icons:

❏   Detect Master lets you auto detect the parameters of the master hard disk drive (see page 2-12)

❏   DetectSlave lets you auto detect parameters for a slave hard disk drive (see page 2-12)

❏   Color Set lets you choose colors you want to use for your SETUP utility (see page 2-13).

The Security window contains two icons:

❏   Password lets you setup a password for when you either start your system or run SETUP (see page 2-13)

❏   Anti-Virus lets you enable virus protection on your system (see page 2-15).

The Defaults window lets you reset SETUP values for your system according to your needs (see page 2-16).

SETUP Function Keys

You can use the mouse to click on a selection to highlight it and double-click on a selection to open it. You can also use the keys in the following table to perform **SETUP** operations.

SETUP function keys

Press	To
↑↓← →	Move the cursor to the next or previous icon or option setting
Tab	Move the cursor to the next window
Enter	Select the current option or value
Page Up	Go back one page at a time, within a set of data pages
Page Down	Go forward one page at a time, within a set of data pages
Home	Go to the first page within a set of data pages
End	Go to the last page within a set of data pages
Esc	Return to the previous window
Alt H	Display a list of keys and their functions
Alt Space	Exit SETUP

Setting Standard Options

When you select the **Standard** icon from the Setup window, you see the Standard Setup window. Standard Setup lets you set the system time and date, define the diskette drives, and view or select the master and slave hard disk drive parameters.

The following table describes Standard options.

Standard Options

Option	Settings	Description
Date Time	*day, month and date, year* *hh:mm:ss* **	Sets the time and date for the computer's real-time clock; once *set,* you should not need to change them, unless you adjust the time for daylight savings or a different time zone (the computer changes the date for leap years)
Floppy A	Not Installed 360 KB **5¼**" 1.2 MB **5¼**" **720** KB 3½" 1.44 MB 3½"* 2.88 MB 3½"	Defines the type of diskette drive installed as drive A
Floppy B	Not Installed * 360 KB **5¼**" 1.2 MB **5¼**" **720** KB 3½" 1.44 MB 3½" 2.88 MB 3½"	Defines the type of diskette drive installed as drive B
Master Disk	Cyl (cylinders) Hd (heads) WP (write precompensation cylinder) LZ (head landing zone) Sec (sectors) Size (storage capacity)	Displays the parameters read by auto detection for the master hard disk drive; you can override by selecting a different set of parameters or by selecting type 47, which lets you type in your own parameters
Slave Disk	Cyl (cylinders) Hd (heads) WP (write precompensation cylinder) LZ (head landing zone) Sec (sectors) Size (storage capacity)	Displays the parameters read by auto detection for the slave hard disk drive; you can override by selecting a different set of parameters or by selecting type 47, which allows you to type in your own parameters

* Default setting

** Set time or date by highlighting an element and clicking the + (plus) to increase the value or the - (minus) to decrease the value.

Setting Advanced Options

When you select the Advanced icon from the Setup window, the Advanced Setup window appears. Advanced Setup lets you define parameters such as your video display type, mouse support, and system boot sequence.

The following table describes Advanced options.

Advanced options

Option	Settings	Description
Quick Boot	On * Off	Select on to have the system perform a short set of power-on diagnostics; select **off** for the complete power-on diagnostics
Typematic Rate	Disabled 15 20 30 *	Select the rate (in characters per second) at which characters are repeated when you hold down a key
System Keyboard	Absent Present *	Select Absent to prevent error messages when you plan to use your system without a keyboard (as a network server, for instance)
Primary Display	VGA/EGA * CGA 40x25 CGA 80x25 Monochrome	Define the type of display you are using; if you have connected a VGA or SVGA monitor to the built-in monitor **port, Select VGA/EGA**
PS/2 Mouse Support	Disabled Enabled *	**Select Enabled if** you are **Using** a PS/2 type mouse
System Boot Up Num Lock	Off On *	Select **on** if you want the Num Lock function to be activated when the system starts
Floppy Drive Swapping	Disabled * Enabled	Enable this option to map diskette drive A to drive B and vice versa; lets you use the lower diskette drive as drive A

Advanced options (continued)

Option	Settings	Description
System Boot Up Sequence	C:, A: A:, C: *	Lets you select which drive (A or C) the system uses to load the operating system; if it can't load the operating system from the first drive, it loads it from the second drive
System Boot Up CPU Speed	Low High *	Lets you determine the speed of the CPU during system boot
External Cache	Disabled * Enabled	Lets you enable or disable external (secondary) cache memory
Internal Cache	Disabled Enabled *	Lets you enable or disable internal cache memory in the CPU
Password Checking	Setup * Always	Select Always to enable password checking at each system boot; select **Setup** if you want a password only when you run SETUP
Video Shadow C000, 32K	Disabled Enabled *	Lets you enable or disable video memory shadowing; if enabled, the computer copies the video ROM area from C0000h-C7FFFh to RAM for faster execution
Shadow C800,16K	Disabled * Enabled	Lets you enable or disable shadowing of the specified ROM area
Shadow CC00, 16K	Disabled * Enabled	Lets you enable or disable shadowing of the specified ROM area
Shadow D000, 16K	Disabled * Enabled	Lets you enable or disable shadowing of the specified ROM area
Shadow D400, 16K	Disabled * Enabled	Lets you enable or disable shadowing of the specified ROM area
Shadow D800, 16K	Disabled * Enabled	Lets you enable or disable shadowing of the specified ROM area
Shadow DC00, 16K	Disabled * Enabled	Lets you enable or disable shadowing of the specified ROM area

* Default setting

Setting Advanced IDE Drive Options

When you select the Adv HDD icon from the Setup window, you see the Advanced HDD Setup window. Advanced HDD Setup lets you define the types of IDE drives that are connected to the primary and secondary IDE interfaces in your system.

The Advanced HDD Setup window displays the parameters that were detected by auto detection. (See "Detecting Your Hard Disk Drive" on page 2-12 for instructions on using the DetectMaster and DetectSlave functions.) You can override these settings by following the steps below.

Note
Before you select any of these options, be sure that your hard drive supports them.

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1. If you have more than one IDE hard disk drive, identify the master drive connected to the primary IDE interface.

2. For the primary master drive (IDE Pri. Master), you can select any or all of the options described in the following table.

Option	Description
LBA Mode	Select if your drive is larger than 528MB and supports logical block address (LBA) control mode
Block xfer	Select if your drive supports multiple sector reads and writes
32 Bit xfer	Select if your drive supports data transfer in 32-bit units, rather than 16-bit units

3. Repeat steps 1 and 2 for the slave drive **(IDE** Pri. slave) connected to the primary IDE interface, if necessary.

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4. If you have a drive connected to the secondary IDE interface, select the Number of HDD/CD in 2nd connector option.

5. Select one of the following options to correspond to the drives you have connected to the secondary IDE interface.

Option	Description
None	No devices connected to the secondary IDE interface
HDD (+CD)	One hard disk drive and one CD-ROM drive
IDE CD	One CD-ROM drive
2 HDDs	Two hard disk drives

6. If you select something other than None, you can enable the secondary IDE interface (IDE Sec. Master and IDE Sec. Slave) options. Repeat steps 1 and 2 for each drive.

Setting Power Management Options

When you select the Power Mgmt icon from the Setup window, you see the Power Management Setup window. The options in this window let you control the computer's power-saving features.

The following table describes the Power Management options.

Power Management options

Option	Settings	Description
Power Management Mode Select	Disabled Enabled *	Enables or disables the computer's power-saving feature; you must enable this option to set the rest of the options described in this table

Power Management options (continued)

Option	Settings	Description
Doze Mode Timeout	15 See* 30 Sec 1 Min 2 Min 4 Min 8 Min 16 Min 32 Min 64 Min 128 Min 256 Min 512 Mln	Sets the time period of system (CPU) inactivity after which the system enters Doze mode
Sleep Mode Timeout	Disable 2 Min* 4 Min 8 Min 16 Min 32 Min 64 Min 128 Min 256 Min 512 Min	Sets the time period of system (CPU) inactivity (following the Doze period) after which the system enters Sleep mode; or allows you to disable entry into Sleep mode
Suspend Mode Timeout	2 Min* 4 Min 8 Min 16 Min 32 Min 64 Min 128 Min 256 Min Disable 512 Min	Sets the time period of system (CPU) inactivity (following the Doze and Sleep periods) after which the system enters Suspend mode; or allows you to disable entry into Suspend mode
Monitor VGA Activity	Disabled * Enabled	Determines whether the system returns to full power when there is monitor activity during any power-saving mode
IDE Drive Power Down	Disabled Enabled *	Determines whether the system shuts down the IDE drives when it enters Sleep mode

Setting Options for Peripheral Controllers

When you select the Peripheral Setup icon from the Setup window, you see the Peripheral Setup window. Use this window to configure the computer's integrated peripheral devices (such as the parallel and serial ports) and controllers. To avoid possible configuration problems, it is a good idea to leave these options at their default settings.

The following table describes the Peripheral options.

Peripheral options

Option	Settings	Description
Programming Mode	Auto * Manual	Automatically sets or allows you to set the next four options; if you select Manual, you can choose your own settings for the diskette drive controller, serial ports, and parallel port
OnBoard FDC	Enabled * Disabled	Enables or disables the built-in diskette drive controller
Serial Port 1	Disabled 3F8H * 3E8H 2E8H	Assigns the address for serial port 1; select **Disabled** to disable the port
Serial Port2	Disabled 2F8H * 3E8H 2E8H	Assigns the address for serial port 2; select **Disabled** to disable the port
Parallel Port	Disabled 3BCH 378H * 278H	Assigns the address for the built-in parallel **port; Select Disabled** to disable the port
OnBoard PCI IDE	Enabled * Disabled	Enables or disables the IDE controller on the system board

Peripheral options (continued)

Option	Settings	Description
Parallel Port Mode	Normal * Extended	Lets you select normal functioning or extended functioning for the parallel port; you can select the extended mode you want from the Parallel **Extended Mode Option**
Parallel Extended Mode	Bi-dir	Selects PS/2 bidirectional mode
	EPP Mode	Selects Enhanced Parallel Port bidirectional mode
	ECP Mode	Selects Extended Capabilities Port bidirectional mode
	EPP&ECP	Selects both EPP and ECP modes
Internal Speaker Sound	Disabled Enabled *	Enables or disables the computer's internal speaker

* Default setting

Defecting Your Hard Disk Drive

The Utility window lets you run the auto detection function to identify your hard disk drive parameters.

> **Note**
> It should not be necessary to run auto detection when you are setting up your preconfigured computer. If you install one or more new hard disk drives, however, you should use auto detection to identify the drive parameters.

To run auto detection, follow these steps:

1. On the Utility window, select the DetectMaster icon,

   The SETUP program activates auto detection to examine
   your master hard disk drive and record its parameters.
   When the process is complete, the system displays the
   parameters.

2. Select Yes to accept the parameters or No to reject them.
   If you reject them, you can enter your own parameters
   using the Standard options (see page 2-4).

3. If you install a slave disk drive, perform steps 1 and 2 using
   the Detect Slave icon.

Selecting SETUP Colors

The Utility window also lets you choose background colors for
the SETUP program. If you want to change the color scheme of
the SETUP windows, select the Color Set icon and choose
the set of colors you want.

Setting System Security

The Security window lets you establish a system password and
enable virus protection.

Note
The password you establish through SETUP is not related to
any password you may enter through your operating
system.

Determining a Password Type

You have the option of creating either a system password or a
SETUP password.

❑   If you set a system password, the computer prompts you to
    enter it each time you turn on or reset the computer.

❑   If you set a SETUP password, the computer prompts you to
    enter it each time you run the SETUP program.

Use the Password Checking option (on the Advanced
Setup window) to determine the password type. Use the
procedure below to set the password.

Setting a Password

Follow these steps to create a password or change your
password:

1. Select the Password icon.

2. Type a password of up to six characters. (You can also click
   the characters with the mouse.) Be sure to write the
   password down and keep it in a secure place, in case you
   forget it.

   If you are changing your password, you must type the
   current password.

3. Press Enter or select the Enter button on the screen.

4. At the confirmation prompt, retype the password and press
   Enter.

After you enter the same password a second time, you see the following message:

Password is Enabled

5. Press Enter or select OK.

If you forget your password, see "Password Problems" in Chapter 6.

Deleting Your Password

To delete your password, follow these steps:

1. Select the Password icon,

2. Type your current password and press Enter.

3. When the Password window appears, press Enter.

4. Press Enter again to confirm the deletion. The following message appears:

Password is Disabled

5. Press Enter or select OK.

The next time you start your computer, you will not be prompted to enter a password.

Using the Anti-Virus Option

If you enable the anti-virus feature, the system displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive.

To enable the anti-virus feature, follow these steps:

1. Select the Anti-Virus icon.

2. Select Enabled.

The system displays the following message when it detects an attempt to format any cylinder, head, or sector of any hard disk drive:

    Format !!
    Possible VIRUS: Continue (Y/N) ?

The system displays the following message when it detects an attempt to write to the boot sector of the hard disk drive.

    Boot Sector Write ! ! !
    Possible VIRUS: Continue (Y/N) ?

If you do not intend to format the hard disk drive or write to the boot sector, enter Y to prevent the introduction of a computer virus.

Using SETUP Defaults

Use the options in the Default window to reset all the SETUP values to one of the following sets of defaults:

❏ Original—Returns to the original, factory-installed values.

❏ Optimal—Loads the values that should optimize system performance. (If CMOS RAM is corrupted, the optimal settings are loaded automatically.)

❏ Fail-saf e—Loads the most conservative values to produce the most stability. Use this option as a diagnostic aid if the system behaves erratically.

When you select one of these icons from the Default window, a prompt asks you whether or not to load the selected set of values. Select Yes to load the selected values or No to keep your current values.

Exiting SETUP

To leave SETUP, press Esc or select the button in the upper left corner of the main SETUP screen. You see the following choices:

❏ Save changes and Exit

❏ Do not save changes and Exit

❏ Continue.

If you do not want to save the changes you made during this SETUP session, select Do not save changes and Exit. If you want to return to SETUP to make more changes, select Continue.

Installing System Drivers

If you are using Windows 95, you don't need any additional drivers—they are included with the operating system. If you have Windows 3.1, your system has the drivers already installed. The only time you might need to re-install drivers from the drivers diskettes is if you are using Windows 3.1 and have to reconfigure your hard disk drive or if you use an operating system other than Windows. The following sections describe how to install these drivers.

Installing the PCI IDE Drivers

PCI IDE drivers let you take advantage of the high-speed
performance available through your system's IDE interfaces for
hard disk drives and other IDE devices.

The PCI IDE Drivers diskette contains drivers for these
programs:

❏   MS-DOS

❏   Windows 3.1

❏   OS/2® versions 2.0 and higher (2.X)

❏   Novell® NetWare versions 3.1 and higher (3.1X)

❏   Novell NetWare versions 4.0 and higher (4.0X).

Note
Windows must be installed on your system before you
install the Windows drivers.

Before installing the drivers

Before you install the PCI IDE drivers, make sure you back up
your hard disk drive. Then use the installation program on the
PCI IDE Drivers diskette to install the drivers.

Note
Make sure you use the installation program to install the PCI
IDE drivers. If you simply copy the driver files, they won't
work correctly.

The driver files for each of the programs listed above are in their own directory on the diskette. Log onto the directory for each driver you want to install and print out the README file. Read the information in these files for additional instructions on installing and using the PCI IDE drivers.

Running the installation program

Follow these steps to install the PCI IDE drivers:

> **Note**
> If you are using Windows 95, do not install these drivers.

1. Insert the PCI IDE Drivers diskette in drive A.

2. Access the MS-DOS prompt, if you are not there already.

3. Type A: and press Enter to log onto drive A.

4. Type INSTALL4 and press Enter.

5. Follow the instructions on the screen to install the PCI IDE drivers on your hard disk.

> **Note**
> Not all hard disk drives can take full advantage of the PCI IDE interface. To take advantage of this feature, your hard disk drive must support the ATA-2 standard and a 32-bit data path. If you need information on your hard disk drive, see the hardware specifications for the drive or contact the drive manufacturer and request a product specification.

Installing Video Drivers

If you are using Windows 3.1, these video drivers let you take full advantage of the performance your computer's built-in SVGA controller can offer. You do not need these drivers if you are using Windows 95.

If you want to install video drivers for popular MS-DOS-based applications, the Video Drivers diskettes include utilities and video drivers. For instructions on installing them, see the README file included on the Video Drivers diskettes.

> Note
> Be sure that Windows is already installed before you install the video driver for Windows.

To obtain drivers for additional applications or new drivers as they become available, contact the EPSON bulletin board service or access the Epson America Forum on CompuServe.

Chapter 3

Using Your Computer

This chapter describes the following operations:

❏ Working comfortably

❏ Backing up your files

❏ Using energy wisely

❏ Using your power-saving feature

❏ Inserting and removing diskettes

❏ Stopping a command or program

❏ Resetting the computer

❏ Using a password

❏ Changing the processor speed.

Working Comfortably

If you spend a lot of time at your computer, you may experience occasional fatigue or discomfort caused by repetitive motions or too much time spent in one position. If you follow the guidelines in this section, you may avoid these problems and actually increase your productivity.

Take a few minutes to read this section for suggestions about:

❏ Using the right furniture

❏ Positioning your monitor

❏ Lighting your workspace

❏ Using a keyboard and mouse

❏ Maintaining good posture and work habits.

Using the Right Furniture

Selecting a good desk and using the right type of chair can make a big difference in your level of comfort. When you setup your furniture, consider these suggestions:

An L- or U-shaped desk configuration works well because it provides ample space to hold your computer equipment and work materials while keeping everything within easy reach. A split-level desk or one with a pull-out keyboard drawer lets you place the keyboard in a comfortable typing position.

Since you'll usually be sitting when you use your computer, it's important to have a good chair. An adjustable chair allows you to support your body in the correct position. Make sure the chair supports your lower back; the backrest should fit the curvature of your spine. To reduce fatigue, try to use a chair with adjustable, padded armrests so you can occasionally rest your arms while you work.

Make sure the seat and backrest are wide enough so you can sit in a variety of positions throughout the day. Also leave enough room under the work surface so you can vary the position of your legs.

Adjust the height of your chair so when you are using the keyboard or mouse your upper arms are vertical and your forearms and wrists are horizontal. For good circulation, your feet should rest flat on the floor with your lower legs vertical and your knees level with your hips. You may need to use a footrest to maintain the correct alignment for your legs.

Positioning Your Monifor

Place the monitor so it is directly in front of you with the top of the screen slightly below eye level when you are sitting at the computer. You may want to place it on top of the computer or on a stand.

Your line of sight to the screen should be about 10 to 20 degrees below the horizontal. If the monitor has a tilt and swivel base, you can adjust the position of the screen for the best viewing angle.

Sit about an arm's length or more away from the monitor. The most comfortable viewing distance depends on the size of the screen characters and your ability to focus on the display.

Adjust the monitor's brightness and contrast controls to maximize image clarity, and keep the screen clean.

Try placing any source documents you are using on a copy stand and position the stand next to the screen at the same eye level. This reduces neck strain and makes it easier for your eyes to move back and forth between the document and the screen.
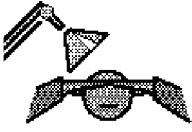
Lighting Your Workspace

Appropriate lighting increases your comfort and productivity, and it's good for your eyes. Arrange your computer and light sources to minimize glare and bright reflections.

Position the monitor so that any windows in the room face the sides of the monitor, not the front or back. This will help reduce glare.

For working at the computer, indirect or shielded lighting is best, and it should light your entire office equally. Make sure the lighting is not too bright, because this can make your eyes tired from continually readjusting between the relative dimness of the screen and the bright surroundings. You can use window blinds, shades, or drapes to control the amount of daylight in the room or reduce overhead lighting by turning off or dimming the lights.

Here is a simple way you can test your lighting. While looking at the screen, use your hand to shield your eyes from the brightest light source in the room (such as a window or overhead light). If you feel a sense of relief, no matter how small, your current lighting is too bright.

Using the Keyboard and Mouse
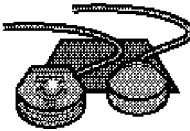
Constant use of a keyboard, mouse, or any pointing device can lead to a variety of aches and strains. To prevent injury, keep your hands relaxed and rest them frequently,

Try to keep your fingers parallel with your forearms to prevent straining your wrists. Adjust the angle of the keyboard so the slope is no more than 25 degrees. (The keyboard has legs on the bottom which allow you to adjust the angle.)

Keep your hands and fingers relaxed when you are typing and try not to press the keys too hard; using too much force creates tension in your hands. Remove your hands from the keyboard when you are not using it and take frequent breaks to stretch your hands and fingers.

When using a mouse, keep your wrist and fingers relaxed. Let goof the mouse frequently and stretch or relax your hand. Leave enough space on your work surface so you can freely move the mouse.
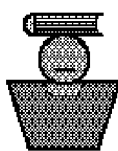
Maintaining Good Posture and Work Habits

Here are suggestions to help you stay fit while using your computer. If you form good work habits, you shouldn't have to spend too much time thinking about it!

❏ Work in a relaxed, natural, upright position and let the chair support you. Your back and neck should be straight with your shoulders down and relaxed. Keep the elbows and hips bent at about a 90 degree angle and your forearms and thighs parallel to the floor.

❏ Try to keep your arms in an easy, natural position with your elbows near your body and level with or slightly lower than the keyboard. Your wrists should be straight, not bent, and your hands should rest lightly on the keys or the mouse.

❏ Rest your eyes occasionally by closing them or focusing on a fixed spot in the distance.

❏ Change your sitting position frequently throughout the day to avoid muscle fatigue. Take periodic breaks; stand up, stretch, and move around.

Backing Up Your Files

To protect your data, you should backup your files often. You should also make backup copies of any diskettes that contain programs and store the copies away from your originals.

Using Energy Wisely

By purchasing this low-power, Energy Star compliant computer, you join a growing number of users concerned about conserving energy. Here are a few additional tips you can use to be even more energy-wise:

❏ If your printer and monitor aren't Energy Star compliant, turn them off when you're not using them.

❏ Use the print preview option on your software before you print something. You'll be able to catch formatting errors before you commit them to paper.

❏ If you have an electronic mail system available to you, send E-mail rather than memos. Not only is this faster, but you'll save paper and storage space too.

❏ Use recycled paper whenever you can and, if possible, reuse or recycle used paper instead of throwing it away.

Using Your Power-saving Feature

Your computer includes a feature that lowers the power usage of the microprocessor and other components when the system has been inactive for a selected period of time. Using the SETUP program, you can set inactivity timers for three power-saving modes: Doze, Sleep, and Suspend. The three modes provide progressively increased levels of power conservation.

See "Setting Power Management Options" in Chapter 2 for information on setting up these options. The power-saving operations performed by your computer in each of the power-saving modes are summarized in the table below.

Power-saving modes

Mode	Power-saving operations
Doze	The processor slows down
Sleep	The processor speed slows further and the monitor screen goes blank (the monitor is placed in a low power consumption mode only if it is Energy Star compliant); also, the hard disk drive shuts down (if you enabled the **IDE Drive Power Down** option)
Suspend	The processor clock stops, the contents of system memory are saved, and power to all system components stops

---

Note
Some processors do not support power-saving modes; in these cases only the hard disk drive and monitor can take advantage of the power-saving feature.

To resume activity when your system is in a power-saving mode, press a key or move the mouse. If your system was in Doze or Sleep mode, you immediately see an image on the monitor, and you can access your system right away.

If your system was in Suspend mode, it takes a few moments for the monitor to display an image and for the hard disk drive to return to active mode. You'll hear it start again. It takes a few seconds for the drive to reach its full operating speed and read or write to the disk.

Note
Some hard disk drives do not support power-saving modes. Also, the delay caused by the hard disk drive returning to active mode may cause errors in some applications. If you have problems, you may want to disable the IDE Drive Power Down option in **SETUP.**

Inserting and Removing Diskettes

To insert a diskette into a 3.5-inch drive, hold the diskette with the label facing up and the shutter leading into the drive, as shown in the following illustrations. Slide the diskette into the drive until it clicks into place.

release button

shutter
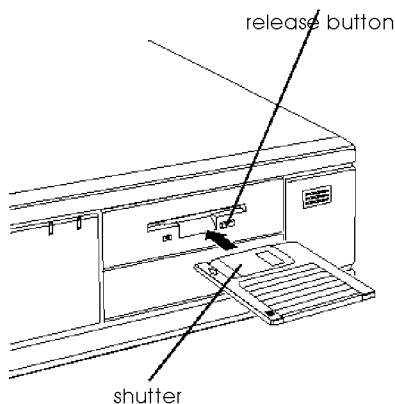
When you want to remove the diskette, make sure the drive light is off; then press the release button. Remove the diskette and store it properly.

> **Caution**
> Never remove a diskette, reset the computer, or turn it off while a diskette drive light is on. You could lose data. Also, remove all diskettes before you turn off the computer.

Stopping a Command or Program

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

❏ Press Pause

❏ Press Ctrl C

❏ Press Ctrl Break.

If you are using another operating system, press Ctrl Alt Del; then follow the instructions on your screen.

If these methods do not work, you may need to reset the computer.

> **Note**
> Do not turn off the computer to exit a program or stop a command unless you have to, because the computer clears any data you did not save.

Resetting the Computer

Occasionally, you may have 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 keyboard entries, 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.

If you are using MS-DOS, you can press Ctrl Alt Del to reset the system. If you are using another operating system, press Ctrl Alt Del; then follow the instructions on your screen.

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; then turn on the computer.

Using a Password

Using **SETUP,** you can define a password. (See "Setting a Password in Chapter 2.) You can also specify whether the password is required when you start the system or only when you start **SETUP.** (See "Setting Advanced Options" in Chapter 2.)

❏ If you entered a password using the Password option in **SETUP,** and you set Password Checking to Always, you must enter the password every time you turn on or reset the computer.

❏ If you entered a password and set Password Checking to **Setup,** you must enter the password only when you start **SETUP.**

When you need to enter your password, you'll see this prompt:

Enter CURRENT password:

When you type the password and press Enter, the computer loads the operating system (or starts SETUP).

If you don't enter the correct password the first time you type it, you can try two more times. If you haven't entered the correct password by the third try, the computer locks up to prevent unauthorized access. You see a flashing happy face on the screen.

If this happens you must reset the computer to start over. See "Resetting the Computer" on page 3-10.

Note
If you want to delete your password, you must run **SETUP** and follow the instructions under "Deleting Your Password" in Chapter 2.

If you do not remember your password, see "Password Problems" in Chapter 6.

Changing the Processor Speed

In MS-DOS, your computer's processor can operate at two speeds: fast (the highest speed of the processor) and slow (8 MHz). At fast speed, the computer performs all tasks faster. The slow speed is available for compatibility with some older programs or copy-protected programs that have specific timing requirements.

Some of these programs require you to leave a key disk—the diskette that contains the copy protection—in the diskette drive. To use a copy-protected program, you can change the speed to slow to access the diskette and return it to fast speed when you are finished.

From MS-DOS, you can change the processor speed temporarily by entering one of the following commands from the numeric keypad on your keyboard:

❏ To select slow speed, press Ctrl Alt -; the SPEED light turns off and the system beeps once.

❏ To select fast speed, press Ctrl Alt +; the SPEED light comes on and the system beeps twice.

> **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 reset your computer or turn it off.

Chapter 4

Installing and Removing Options

You can enhance the performance of your computer by adding optional equipment such as option cards, system modules, and video modules, or by upgrading the processor.

This chapter describes the following

❏ Removing and replacing the computer's cover

❏ Locating internal components

❏ Changing the jumper settings

❏ Installing and removing SIMMs (single inline memory modules)

❏ Installing and removing option cards

❏ Removing and replacing the option card connector board

❏ Adding video memory

❏ Using the SVGA feature connector

❏ Upgrading the processor

❏ Performing post-installation procedures.

> **Caution**
> Never install options or change jumper settings when the computer is turned on or the power cable is connected.

External cache

Your system also supports 128KB or 256KB of external cache memory. If cache memory wasn't installed for you at the factory and you want to increase your system's cache memory, contact your Authorized EPSON Servicer for a referral. Do not attempt to install cache chips yourself.

Removing the Cover

You need to remove the computer's cover to install any of the options described or to install or remove a drive (as described in Chapter 5). Follow these steps:

1. Turn off the computer and then any peripheral devices.

2. Disconnect the computer's power cord from the electrical outlet and from the back panel. Also disconnect any other cables that are connected to the computer, including the keyboard cable.

3. If the monitor is on top of the computer, lift it off and set it to one side.

4. Turn the computer around so the back panel is facing you.

5. Remove the three screws securing the cover, as shown below. Save the screws to secure the cover again when you finish.
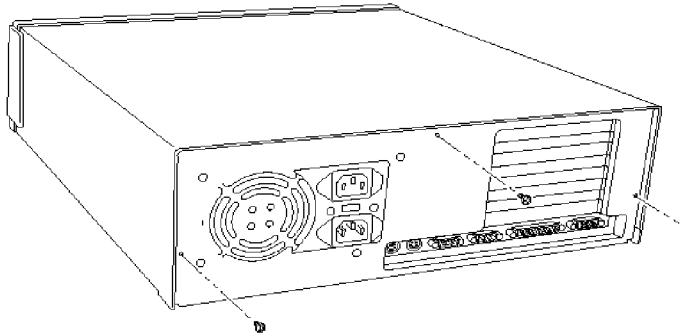
6. From the front of the computer, grasp the sides of the cover and pull it straight toward you until it stops, just before it reaches the front of the computer. Then lift it off at an angle as shown below.
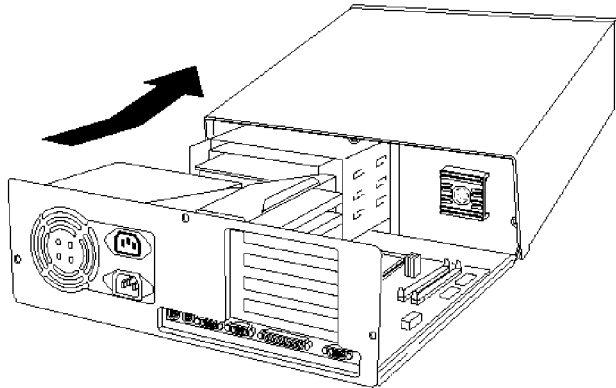
7. Set the cover aside.

8. Ground yourself to the computer by touching the metal surface of the back panel.

WARNING
Be sure to ground yourself by touching the back panel of the computer every time you remove the cover. If you are not properly grounded, you could generate an electric shock that could damage a component when you touch it.

Replacing the Cover

When you are ready to replace the computer's cover, refer to the illustrations above and follow these steps:

1. Make sure all the internal components are installed properly.

2. Check all cable connections, especially those that might have been loosened during your work. Make sure all cables are out of the way so they do not catch on the cover.

3. Facing the front of the computer, position the cover so the lip on its bottom edge slides under the guiderails along both sides of the computer case. See the illustration on page 4-3.

4. Lower the cover and slide it straight back over the computer until it cannot go any farther.

5. Replace the three cover retaining screws.

6. Reconnect the computer to the monitor, printer, keyboard, and any other peripheral devices you have. Then reconnect the power cord to the back of the computer and to an electrical outlet.

Locating the Internal Components

As you follow the instructions in this chapter, refer to the illustration below to locate the major components inside your computer.
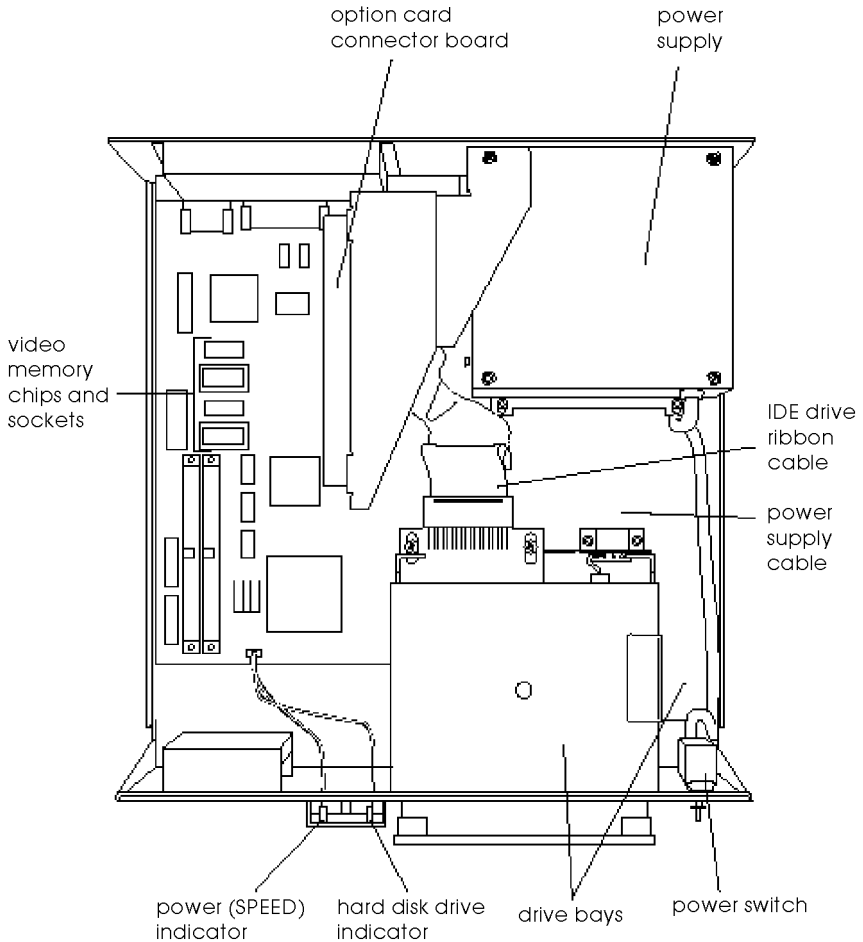
Locating System Board Components

The illustration below shows the system board inside your computer. Use this illustration to locate jumpers and drive connectors.
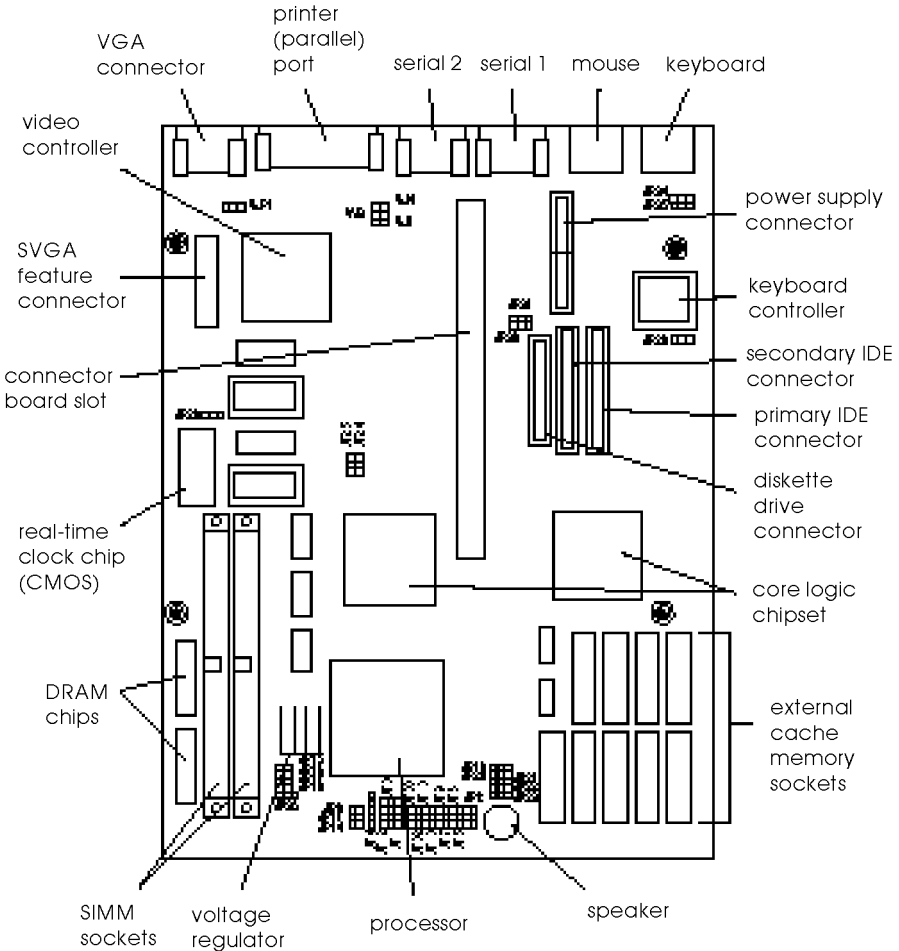
Changing the Jumper Settings

The jumpers on the system board are preset to factory default positions, indicated by an asterisk (*) in the tables below. (See the illustration on page 4-6 to locate jumpers.) Use the information in this section to change jumper settings, if necessary.

Note
Any jumpers not listed in the following tables are for service purposes only. Do not change their settings.

Miscellaneous jumper settings

Jumper number	Jumper setting	Function
JP28	1-2	Clears CMOS memory (resets SETUP values to factory defaults)
	2-3 *	Normal CMOS values
VJP1	1-2	Disables on-board VGA controller
	2-3 *	Enables on-board VGA controller
VJ3	1-2*	Interlaced monitor type
	Open	Noninterlaced monitor type

* Default setting

Parallel port ECP mode DRQ jumper settings

Function	JP30	JP31
DRQ1 (DAK#I)	1-2	1-2
DRQ3 (DAK#3)	2-3 *	2-3 *

* Default setting

CPU type jumper settings

Jumper number	Intel or AMD	Intel				Cyrix	
	486 DX4/100	P24T	486 DX4/75	486DX/sLDX2	486DX2 (P24D L1-WB)	M1sc	486 DX2/66
JP2	3-4	3-4, 5-6	3-4	3-4	3-4	3-4	3-4
JP5	1-2	1-2	1-2	1-2	1-2	1-2	1-2
JP6	2-3	2-3	2-3	2-3	2-3	2-3	2-3
JP7	1-2	1-2	1-2	1-2	1-2	1-2	2-3
JP9	Open	1-2	Open	Open	Open	Open	2-3
JP10	Open	2-3	Open	Open	Open	Open	1-2
JP13	Open	Open	Open	Open	Open	Open	Open
JP32	Open	Open	Open	Open	Open	Open	Open
JP33	Open	Open	Open	Open	Open	1-2	Open
JP1	1-2, 3-4	1-2, 3-4	1-2, 3-4	1-2, 3-4	1-2, 3-4	1-2, 3-4	1-2, 3-4
JP3	Open	1-2	Open	Open	Open	Open	2-3
JP12	3-4	2-3	3-4	3-4	3-4	3-4	3-4
JP4	2-3, 4-5	2-3, 4-5	2-3, 4-5	2-3, 4-5	2-3, 4-5	2-3, 4-5	1-2, 3-4
JP8	Open	Open	Open	Open	1-2	1-2	Open
JP11	Open	Open	Open	Open	1-2	1-2	Open
JP14	Open	Open	Open	Open	1-2	1-2	Open
JP15	Open	1-2	Open	1-2	1-2	Open	Open
JP16	Open	1-2	Open	1-2	1-2	Open	Open
JP17	1-2	Open	1-2	Open	Open	1-2	1-2
JP18	1-2	Open	1-2	Open	Open	1-2	1-2
JP36	1-2	1-2	2-3	1-2	1-2	1-2	1-2
JP22	1-2	1-2	1-2	1-2	1-2	1-2	1-2
JP23	1-2	1-2	1-2	1-2	1-2	2-3	2-3
JP24	1-2	2-3	2-3	1-2	1-2	1-2	1-2
JP25	1-2	2-3	2-3	1-2	1-2	1-2	1-2

CPU voltage jumper settings

CPU voltage	JP15-16 *	JP17-18 *	JP36 *
3.3V	Open	1-2	2-3
3.45V	Open	1-2	1-2
5.0V	1-2	Open	Open

* Default setting depends on installed processor

Cache jumper settings

Cache size	JP19	JP20	JP21
0KB	1-2	1-2	1-2
128KB	2-3	1-2	1-2
256KB	1-3	2-3	2-3

CPU clock jumper settings

CPU clock speed	JP24	JP25
25 MHz	2-3	2-3
33 MHz	1-2 *	1-2 *

* Default setting

Setting the Jumpers

A jumper's setting is determined by where the jumper is placed on the pins. For example, if the desired setting is 1-2, you place the jumper over pins 1 and 2. (The artwork on the system board has a notch next to pin 1 on each set of pins.)

The illustration below shows a 3-pin jumper with a 2-3 setting.

pin 3
pin 2
pin 1
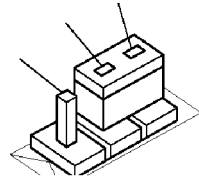
Six-pin jumpers are arranged in 2 columns of 3 pins each. The settings are 1-2, 3-4, and 5-6. Pin 1 is the top left pin. (There is no notch in the artwork for 6-pin jumpers. Use the orientation of the writing on the system board to help you identify the top pins.)

The following illustration shows a 6-pin jumper with a 1-2 setting.

pins
1 and 2

pins
5 and 6

pins
3 and 4
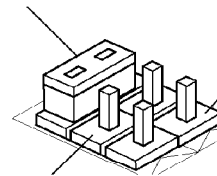
To change a jumper setting, follow these steps:

1. Refer to the illustration under "Locating System Board Components" on page 4-6 to locate the jumpers.

2. If any option cards are installed in your computer, you may need to remove them to access the jumpers. See "Removing an Option Card" on page 4-19 for instructions.

3. Change the jumper settings as needed. To move a jumper from one position to another, use needle-nose pliers or tweezers to pull it off its pins and gently move it to the desired position.

> **Caution**
> Be careful not to bend the jumper pins or damage any components on the system board.

4. Replace any option cards you removed, if necessary. See "Installing an Option Card" on page 4-16 for instructions.

5. Replace the computer's cover as described under "Replacing the Cover" on page 4-4.

Installing Memory Modules (SIMMs)

In addition to 4MB of on-board RAM, your computer may have 4MB of memory on a SIMM (single inline memory module). By installing additional SIMMs, you can increase the amount of memory in your computer up to 132MB.

There are two SIMM sockets on the system board (illustrated on page 4-6). You can install a lMB, 2MB, 4MB, 8MB, 16MB, 32MB, or 64MB SIMM in each socket.

The following table shows the recommended SIMM configurations. Do not install SIMMs in any other configuration.

SIMM configurations

Bank 1 (SIMM1)	Bank 2 (SIMM2)	On-board memory	Total memory
—	—	4MB	4MB
1MB	—	4MB	5MB
1MB	1MB	4MB	6MB
2MB	—	4MB	6MB
2MB	2MB	4MB	8MB
4MB	—	4MB	8MB
4MB	4MB	4MB	12MB
8MB	—	4MB	12MB
8MB	8MB	4MB	20MB
16MB	—	4MB	20MB
16MB	16MB	4MB	36MB
32MB	—	4MN	36MB
32MB	32MB	4MB	68MB
64MB	—	4MB	68MB
64MB	64MB	4MB	132MB

* If you install SIMMs in both Bank 0 and Bank 1, SIMM types must match,

Use only tin-plated, 32-bit, 72-pin, fast-page mode SIMMs that operate at an access speed of 70ns or faster. Be sure all the SIMMs operate at the same speed.

Your SIMM sockets may not look exactly like the ones in the illustrations. If you're not sure how to install SIMMs, contact your Authorized EPSON Servicer for assistance.

Inserting SIMMs

Make sure the computer is turned off and the cover is off. Then follow these steps to install SIMMs:

1. Refer to the illustration under "Locating the Internal Components" on page 4-5 to locate the SIMM sockets.

2. Remove any option cards that may be blocking your access to the SIMM sockets. (See "Removing an Option Card on page 4-19 for instructions.)

3. Position the SIMM at an angle over the empty socket, making sure the notch on the SIMM is toward the rear of the computer.

notch
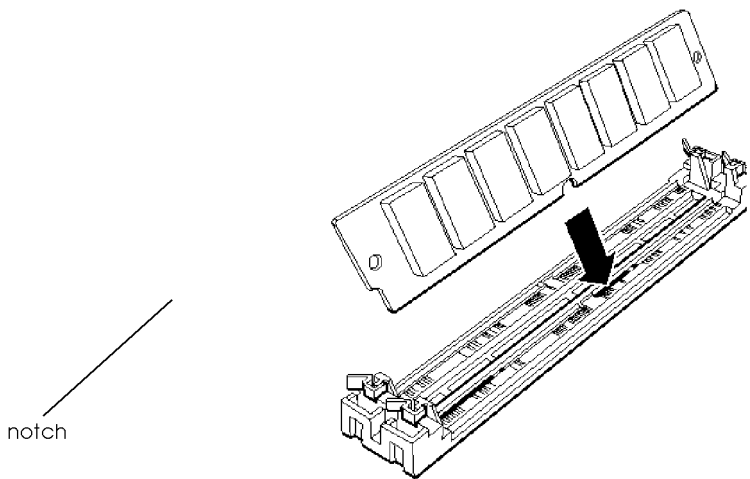
4. Push the SIMM into the socket until it is seated firmly in the slot. Then tilt it upright, as shown below, guiding the hole at each end of the SIMM over the retaining post at each end of the SIMM socket. If it does not go in smoothly, do not force it; pull it all the way out and try again.

retaining posts
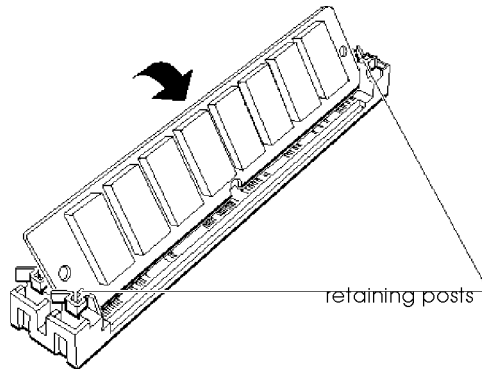
5. Replace any option cards you removed. (See "Installing an Option Card on page 4-16 for instructions.)

6. Replace the computer's cover as described under "Replacing the Cover" on page 4-4. Then see "Post-installation Procedures" on page 4-26 for instructions on configuring your computer with your new memory size.

Removing SIMMs

If you need to remove SIMMs from your computer (to install different ones, for example), follow the steps below:

1. Use the illustration under "Locating the Internal Components" on page 4-5 to locate the SIMM sockets in the corner of the system board.

2. Remove any option cards that may be blocking your access to the SIMM sockets. (See "Removing an Option Card on page 4-19 for instructions.)

3. Use your fingers or a small screwdriver to carefully pull away the tabs that secure the SIMM at each end, as shown below. The SIMM falls to the side; remove it from the socket.
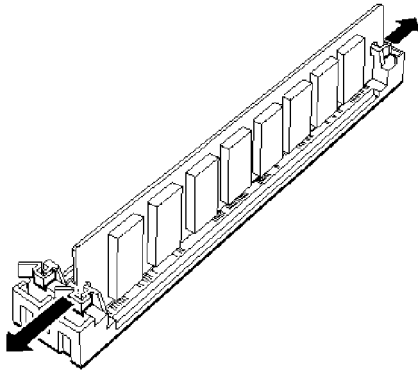
4. Replace any option cards you removed, as described under "Installing an Option Card" below.

5. Replace the computer's cover as described under "Replacing the Cover" on page 4-4. Then see "Post-installation Procedures" on page 4-26 for instructions on configuring your computer with your new memory size.

Installing an Option Card

This section explains how to install option cards in your computer. Your computer has four option slots; the three large slots are ISA compatible, and the smaller slot is PCI compatible.

Follow these guidelines when installing option cards:

❏ Make sure you know whether the card you are installing is an ISA card or a PCI card, so you can install it in the correct type of slot.

❏ If you have an 8-bit ISA card, you can install it in a 16-bit ISA slot, as long as it fits.

❏ Check the components on your card and the system board before deciding which slot to use. Make sure that no components are touching or obstructing other cards or cables.

❏ When you unpack the option card, do not touch the components on the circuit board or the gold-edged connectors. Place the card gently on top of its original packing material with the component side facing up. Keep the packing materials in case you remove it later.

❏ Adjust any switches or jumpers on the card, if necessary, before you install it. (See the option card instructions.) Also, to see if you need to change any jumpers on the system board, check the tables on page 4-7.

❏ If you are installing a high-resolution graphics adapter card, follow the instructions below to install the adapter card; then see "Using the SVGA Feature Connector" on page 4-23 to connect the card to the SVGA feature connector on the system board.

Caution
Before you install any option cards in your system, make sure that all the cards together do not draw more current than the limits listed in Appendix A.

Follow these steps to install an option card:

1. Remove the retaining screw securing the option slot cover to the computer, as shown below. (Keep the screw to secure the option card to the computer.)
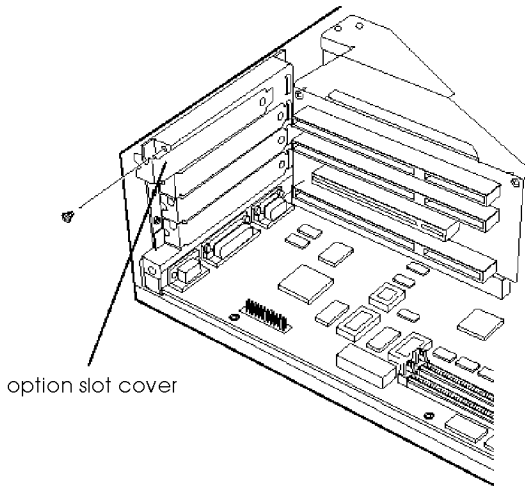
option slot cover

2. Slide out the slot cover and set it aside. (Store it in a safe place in case you remove the option card later.)

3. Hold the card along the top corners and guide it toward the slot, as shown below.
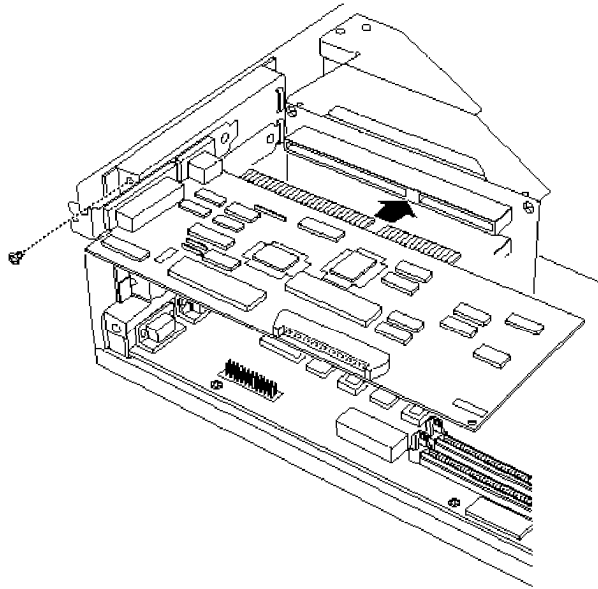
Once the connectors reach the slot, push the card in firmly (but carefully) to insert it fully. You should feel the card fit into place. If it does not go in smoothly, do not force it; pull the card all the way out and try again.

4. Secure the end of the card to the computer with the retaining screw.

5. Replace the computer's cover as described under "Replacing the Cover" on page 4-4. Then see "Post-installation Procedures" on page 4-26 for instructions on configuring your computer with your new option card.

Removing an Option Card

You may need to remove an option card if you no longer need it or if you need to access components on the system board. Refer to the illustrations under "Installing an Option Card on page 4-16 as you follow these steps:

1. Remove the retaining screw securing the option card to the computer. Then pull the card straight out of the slot.

2. Set the card aside with the component side facing up.

3. If you are not installing another option card, replace the option slot cover and retaining screw.

4. Replace the computer's cover as described under "Replacing the Cover" on page 4-4. Then see "Post-installation Procedures" on page 4-26 for instructions on configuring your computer without the option card.

Removing the Option Card Connector Board

You may want to remove the option card connector board to access certain components on the system board, such as the drive connectors. Follow these steps:

1. Remove any option cards. (See the instructions in the previous section.)

2. Remove the retaining screw securing the bracket on the option card connector board to the power supply.
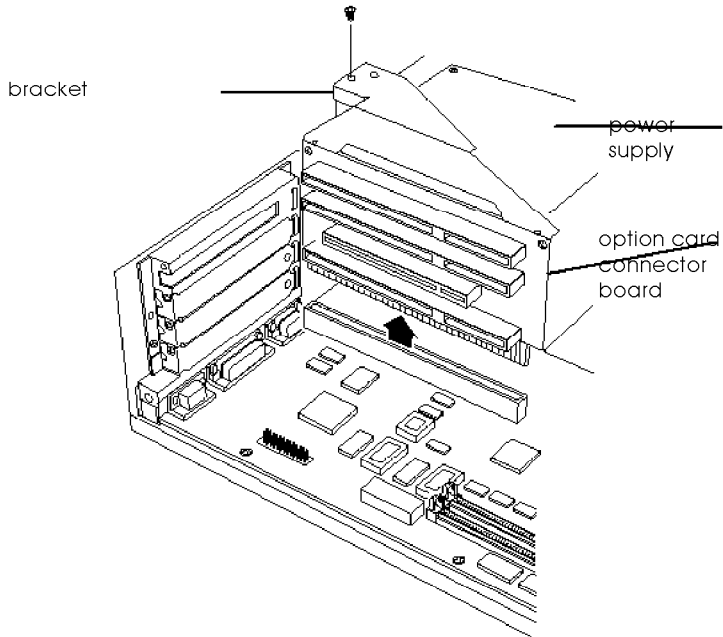
3. Pull the board straight up and out of its socket and set it aside.

Replacing the Option Card Connector Board

When you are ready to replace the option card connector board, refer to the illustration in the previous section as you follow these steps:

1. Position the board above its slot and then firmly push it straight in.

2. Secure the board to the power supply with its retaining
   screw.

Now you can re-install any option cards you removed. See
page 4-16 for instructions.

Adding Video Memory

Your computer comes with 512KB or lMB of video memory.
You can increase your video memory up to 2MB by installing
additional 512KB, 40-pin, SOJ flat pack, video DRAM chips.
Additional video memory is useful for running
graphics-intensive applications or for supporting high
resolutions with many colors.

Note that your video memory sockets may not look exactly like
the ones in the illustration. If you're not sure how to install
video memory chips, contact your Authorized EPSON Servicer
for assistance.

Follow these steps to install video memory:

1. Locate the video memory sockets, shown in "Locating the
   Internal Components" on page 4-5.

2. If there is an option card in your way, remove it. See
   "Removing an Option Card" on page 4-19 for instructions.

> Caution
> To avoid generating static electricity and damaging the
> memory chips, ground yourself by touching the metal
> surface on the inside of the computer's back panel. Then
> remain as stationary as possible while you install them.

3. Position the chip over the socket and align the notch in the chip's corner with the notch in the corner of the socket, as shown below.

notch
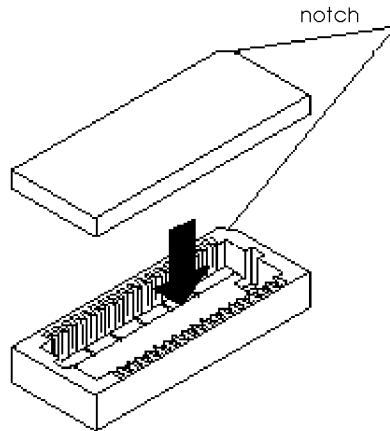
4. Gently press the chip into the socket; then push down firmly on both ends to make sure it is well-seated.

5. Repeat steps 3 and 4 to install another chip.

6. Replace any option cards you removed; see "Installing an Option Card on page 4-16 for instructions.

7. Replace the computer's cover as described under "Replacing the Cover" on page 4-4. Then see "Post-installation Procedures" on page 4-26 for instructions on configuring your computer with the increased video memory.

Using the SVGA Feature Connector

Your computer includes an alternate SVGA interface (feature connector) on the system board. If you install a high-resolution graphics or full-motion, multimedia adapter card in one of the computer's option slots, this connector allows you to access the standard SVGA signals provided by your system circuitry.

To connect the adapter card interface to the SVGA feature connector on your system board, locate the SVGA feature cable included with your option card. Then follow these steps:

1. If you have not already done so, follow the instructions on page 4-16 to install the graphics adapter card in your computer.

2. Attach one end of the feature cable to the alternate SVGA interface on the system board, as shown below. Align the cable so the red wire along one edge is closest to pin 1 on the connector.
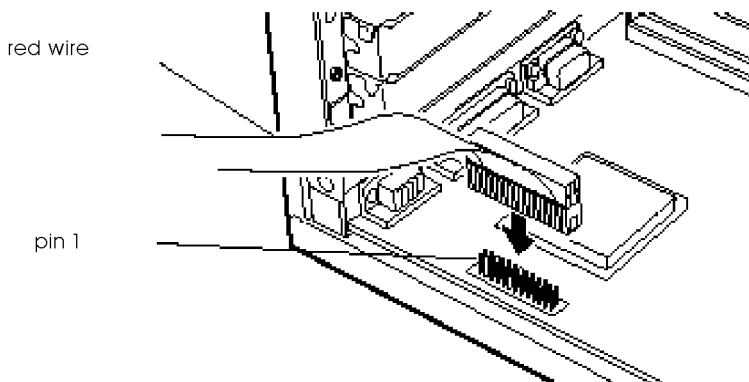
3. Connect the other end of the cable to the appropriate interface on the adapter card. (Check your graphics card manual for instructions.)

Upgrading the Processor

You can upgrade your processor with a faster one to improve system performance; see Appendix A for a list of compatible processors.

If you're not sure how to install a processor, contact your Authorized EPSON Servicer for assistance.

Follow these steps to replace a processor:

1. Use the illustration under "Locating System Board Components" on page 4-6 to locate the processor on the system board. The processor is installed in a ZIF (Zero Insertion Force) socket.

> Caution
> Make sure you ground yourself by touching the metal surface on the inside of the computer's back panel before you touch the processor. Then remain as stationary as possible while you install it. Do not touch the pins on the processor; handle it only by the edges.

2. If there are any option cards in your way, remove them. See "Removing an Option Card" on page 4-19 for instructions.

3. To open the socket, locate the handle at the base of the socket. (The handle rests under a plastic tab.) Press the handle down and away from the tab; then lift it upright to release the chip from the socket. The illustration under step 6 shows this handle in the released position.

4. Gently pull the processor straight up and set it aside. (Store the chip in the packaging included with your new processor, in case you need to reinstall it later.)

5. Remove the replacement processor from its package and inspect the pins. If they are bent, do not install the processor. Contact your vendor for a new one.

6. Position the processor over the socket, aligning the notched corner with the extra hole on the socket, as shown below.
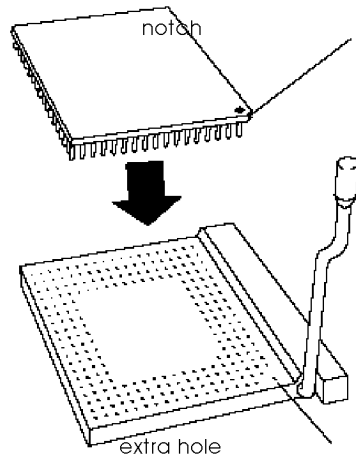
Caution
If you install the processor in the wrong orientation, you may damage it and void your warranty.

---

7. Make sure the pins in the processor are directly over the holes in the socket. Then gently push the processor straight into the socket, pressing evenly on all sides.

   If you are installing a 486 processor rather than an Intel® Pentium™ OverDrive™ processor, you'll see an extra row of holes around the outside of the socket.

8. Secure the processor by pressing the ZIF handle back to the closed position.

9. Change the settings of the jumpers so that they are correct for the type of processor you installed. (See the "CPU type jumper settings" table on page 4-8.) You may also need to change the setting of jumpers JP24 and JP25 to match the processor clock speed.

   If you installed a processor with a different voltage (check the table under "Processor Upgrades" in Appendix A), change the settings of the CPU voltage jumper. See the table on page 4-9.

10. If you are upgrading to a DX, DX2, DX4, or Pentium OverDrive processor, you must also install a heat sink over the processor. Follow the instructions included with the heat sink.

11. Replace any option cards you removed; see "Installing an Option Card on page 4-16 for instructions.

12. Replace the computer's cover as described under "Replacing the Cover" on page 4-4. Then see "Post-installation Procedures" (below) for instructions on configuring your computer with your new processor.

Post-installation   Procedures

After you install or remove options such as memory modules or option cards, you must run SETUP to update the computer's configuration. See Chapter 2 for instructions.

Additionally, you may need to add some commands to your configuration files. See your operating system documentation and the manual that came with your optional equipment.

Chapter 5

Installing and Removing Drives

Your computer can hold up to three drives in two externally accessible drive bays and one internal drive bay. Your system may have drives installed in one or more of these drive bays. You can remove existing drives and install a variety of devices, such as hard disk drives, diskette drives, tape drives, CD-ROM drives, PCMCIA card readers, optical drives, and other mass storage devices.

Although your drive may look different from the ones illustrated here, you should be able to install it the same way. Some of the steps in this chapter may not apply for the drive you are installing. See the documentation that came with your drive for more information.

Use the table below to find the information you need to install your drive.

To	See
Install a hard disk drive in the internal drive bay	Page 5-3
Remove a drive from the internal drive bay	Page 5-10
Install a diskette drive or other device in an externally accessible drive bay	Page 5-12
Remove a drive from an externally accessible drive bay	Page 5-20

Note
Before you attempt to install or remove a drive, turn off the power and detach the cables. Then follow the instructions under "Removing the Cover" in Chapter 4.

Setting the IDE Device Jumpers

Before you install any IDE device, be sure to check its jumper settings. The jumpers indicate the master and slave configuration of devices connected to both of the IDE interfaces. If you have two hard disk drives, the one that contains your operating system must be configured as the master, and the other must be configured as the slave.

A table in Appendix A lists the master and slave jumper settings for some high-capacity, IDE hard disk drives. If you need more information, see the documentation that came with your drive or contact the manufacturer. Every type of drive has **a unique jumper** configuration. Do not use settings from one hard disk drive on a different hard disk drive.

If you are installing another type of IDE device, such as an IDE CD-ROM drive, check the documentation that came with the device for the master and slave jumper settings. You must connect these devices to the secondary IDE interface, as described in this chapter. Use the primary interface only to connect IDE hard disk drives.

Installing a Hard Disk Drive in the Internal Bay

This section contains instructions for installing a hard disk in the internal drive bay. It includes information on installing the hard disk drive and connecting the cables.

Installing the Hard Disk Drive

To install the hard disk drive, you first need to attach it to the mounting plate in the internal drive bay. Follow these steps:

1. Remove the screw securing the mounting plate to the externally accessible drive bays and set it aside. Then slide the mounting plate in the direction of the arrow and lift it out.

externally accessible drive bays

internal bay mounting plate
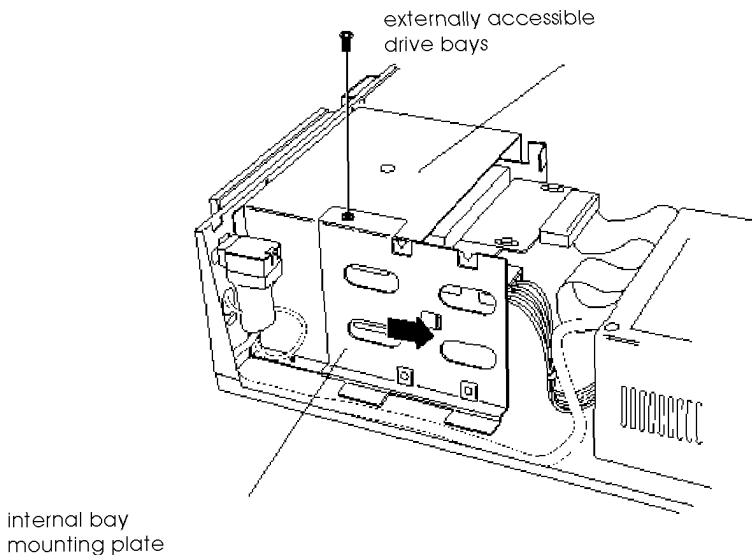
2. Turn the hard disk drive so the components faceup and the connectors face left. Then place the mounting plate on the hard disk drive and align the four holes in the plate with the four holes in the drive, as shown below.
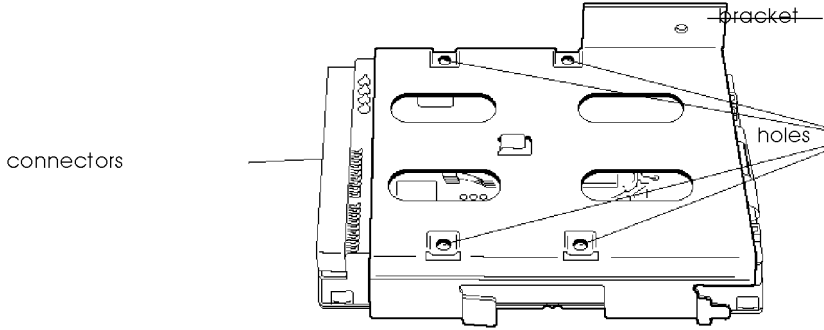
The bracket on the mounting plate should be opposite the drive connectors.

3. Use the four screws that came with the hard disk drive (or with your computer) to secure the mounting plate to the drive.

4. Hold the drive so the mounting plate faces the externally accessible drive bays and the connectors face the back of the computer, as shown below.
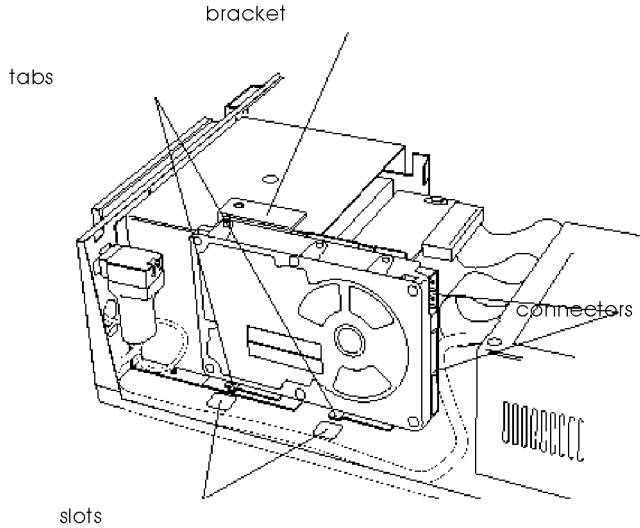
The two tabs at the bottom of the mounting plate should be just above the two slots in the computer case.

5. Lower the tabs into the corresponding slots in the computer case. Slide the drive in the direction of the arrow, until the hole in the bracket is aligned with the hole on top of the externally accessible drive bays.

bracket
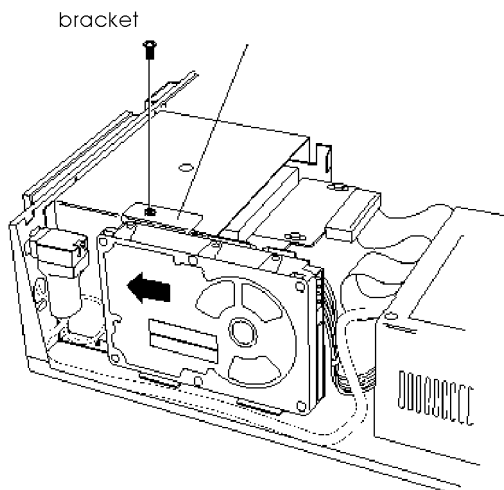
6. Secure the mounting plate with the flathead screw provided.

Connecting the Cables

To connect the hard disk drive to the computer, you need to connect two cables: the IDE drive ribbon cable and a power supply cable. Follow the steps below to connect the cables:

1. Locate one of the IDE drive ribbon cables that are connected to the IDE interfaces on the system board. They are flat cables with a system board connector on one end and two IDE device connectors on the other end. A red wire runs down one edge of the cable, indicating the side of the connector that corresponds to pin 1.

system board connector

IDE device connectors

red wire
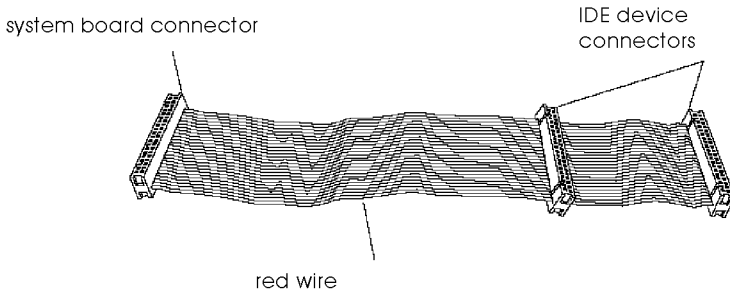
> **Note**
> Be sure to use the primary IDE interface for your hard disk drive(s); use the secondary IDE interface to connect CD-ROM drives and other IDE devices.

2. Locate one of the two connectors on the free end of the cable.

3. Identify pin 1 on the drive (you may need to turn it over so you can see the artwork on the circuit board); then position the connector so the red wire is aligned with pin 1.
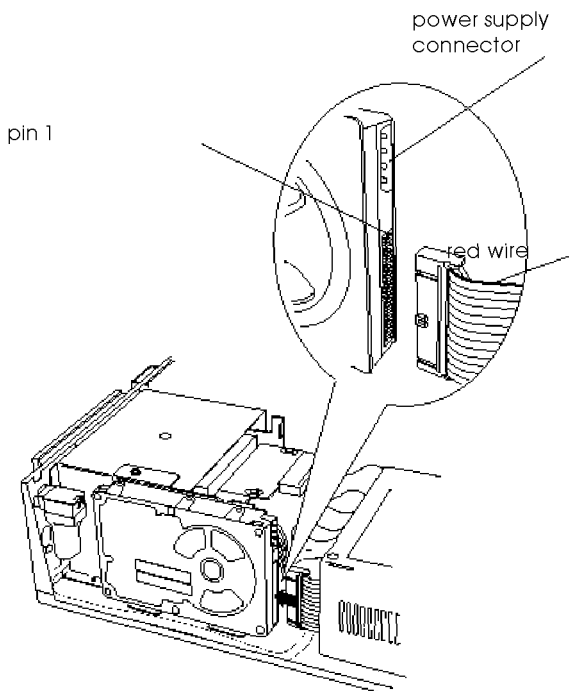
4. Make sure the holes in the cable connector fit over all the pins in the hard disk drive connector; then push in the connector.

> **Caution**
> If you do not correctly align the holes with the pins, you could severely damage your hard disk drive when you push in the cable connector.

5. Locate one of the power supply cables that lead from the power supply. (They have multicolored wires and a plastic connector on the end.)

6. Position the power supply cable connector so that its notched corners line up with the notched corners of the power supply connector on the hard disk drive.
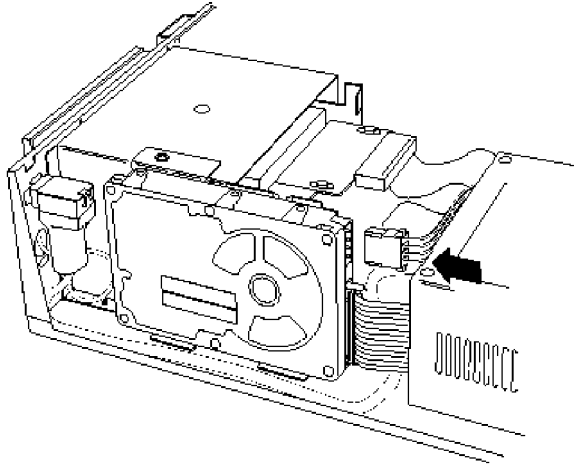
7. Make sure the holes fit over all the pins, and then push in the connector.

Removing a Hard Disk Drive from the Internal Bay

You may need to remove a hard disk drive for service or replacement.

Caution
Before you remove a hard disk drive, make sure you have backup copies of all your files and programs.

Follow these steps to remove a hard disk drive from the internal drive bay:

1. Disconnect the IDE drive ribbon cable and power supply cable from the back of the drive, as shown below. Pull the cable connectors straight out from the connectors on the hard disk drive so you do not bend the pins. Do not pull on the cables.
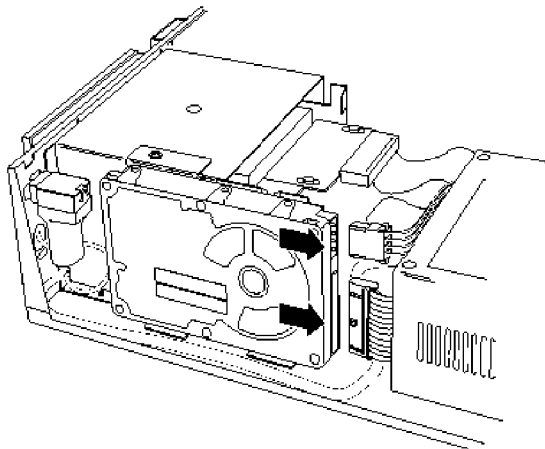
2. Remove the retaining screw securing the hard disk drive and mounting plate to the externally accessible drive bays. Then slide the hard disk drive and mounting plate in the direction of the arrow, shown below, and lift them out of the computer.
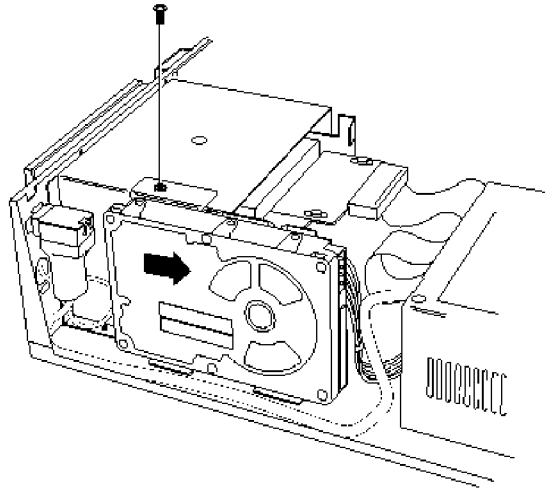
3. Remove the four screws securing the mounting plate to the hard disk drive. You can store the mounting plate and its screw or replace it in the computer and secure it with the screw.

4. Wrap the hard disk drive in its original packing materials and store it along with the four screws.

5. If you have finished installing or removing drives, replace the computer's cover, as described in Chapter 4. Then see Chapter 2 for instructions on defining your new drive configuration.

Installing a Drive in an Externally Accessible Bay

This section explains how to install a drive in an externally accessible drive bay. It includes steps for the following procedures:

❏ Attaching the mounting frames to a 3.5-inch drive

❏ Installing the drive

❏ Connecting the cables.

Note
If you are installing a hard disk drive or another IDE device, be sure its jumper(s) are set correctly for your configuration. A table in Appendix A lists the master and slave jumper settings for high-capacity, EPSON-qualified, IDE hard disk drives. If you need more information, see the documentation that came with your drive or contact the manufacturer.

Attaching Mounting Frames to the Drive

If you are installing a 3.5-inch wide drive, you need to attach mounting frames to it so that the drive fits in a 5.25-inch wide bay. These frames usually come with your drive, but if they didn't, you can purchase them from a computer supply store.

1. Make sure you have two mounting frames and four screws.

2. As shown below, place a mounting frame on one side of the drive and align it so the oval holes in the frame are positioned over the holes in the drive. Then secure the mounting frame to the drive with two screws.
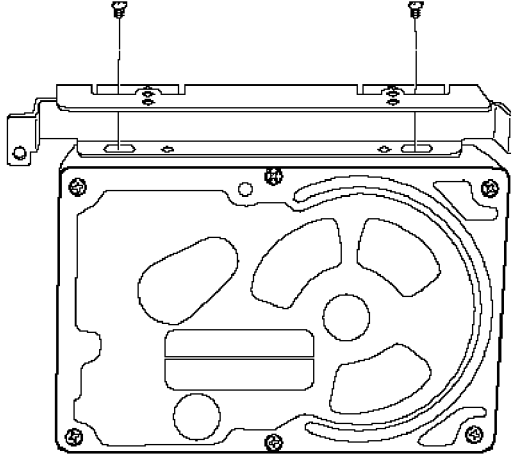
3. Repeat step 2 to attach a mounting frame to the other side of the drive.

Installing the Drive

Follow these steps to install a drive in an externally accessible drive bay:

1. Locate the two metal guiderails and six screws that came with the computer.

2. Attach one guiderail to each side of the drive (or each mounting frame, if attached), as shown below. The bracket on the guiderail should be opposite the drive connectors. Be sure the guiderails align with each other.

mounting frames

bracket

guiderail

connectors
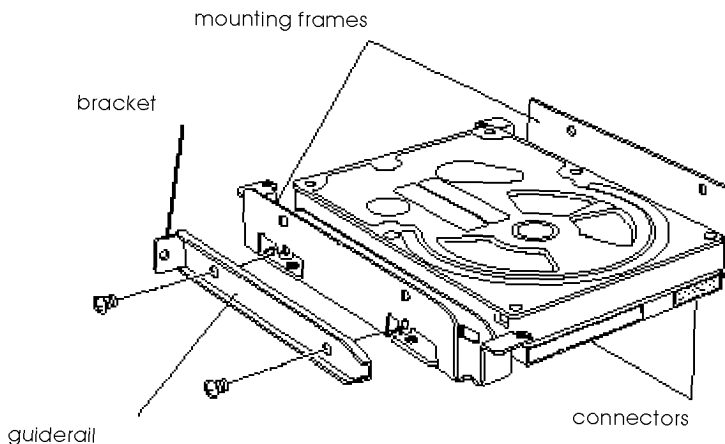
3. If you are installing a drive in a previously unused bay, you must remove the plastic faceplate that covers the bay. Turn the computer's cover so you can see the back of the faceplate. Then remove the screws securing the faceplate to the inside of the cover and remove the faceplate, as shown below.
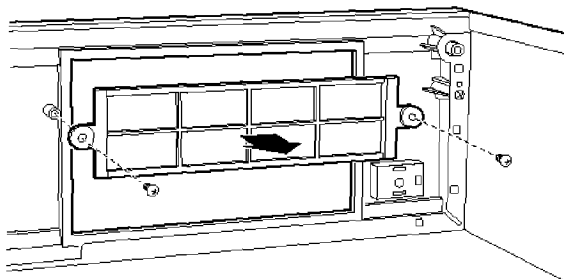
Store the faceplate and screws in a safe place; you may want to install it again later.

4. If you are installing a drive in a previously unused bay, you must remove the metal plate that covers the bay. Remove the two screws securing the plate to the front of the computer and remove the plate. Store the plate in a safe place but use the screws in step 7.
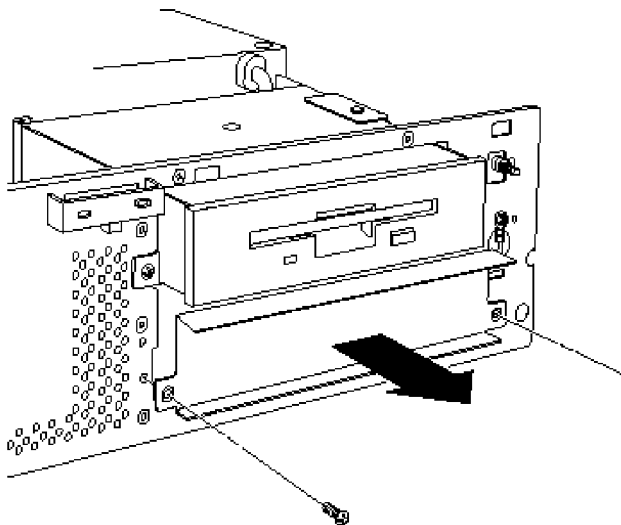
5. Align the guiderails on each side of the drive with the notches on each side of the drive bay, as shown below.

notch
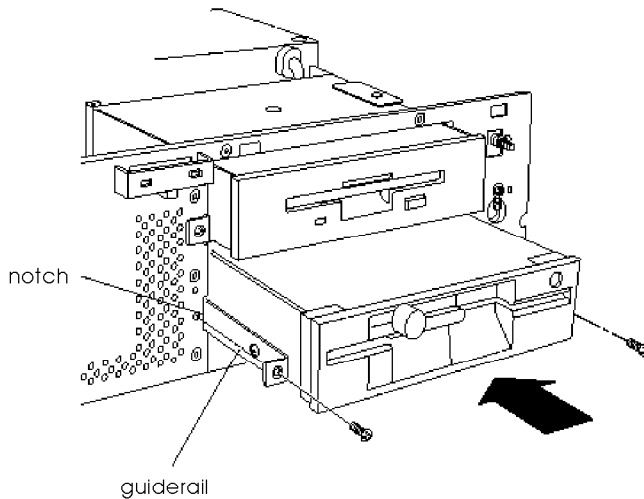
guiderail

6. Slide the drive into the bay as far as it will go.

7. Secure the guiderails to the computer case with the two screws you saved in step 4.

Connecting the Power Cables

Follow these steps to connect the IDE drive ribbon cable and power cable to the drive:

1. Locate the connector at the end of the IDE drive ribbon cable.

> **Note**
> Make sure you connect a CD-ROM drive to the secondary IDE interface; do not use the same cable for a hard disk drive and a CD-ROM drive.

2. Position the connector on the IDE drive ribbon cable so that the red wire aligns with pin 1 on the drive, which is always the pin nearest the 4-pin power connector.

pin 1
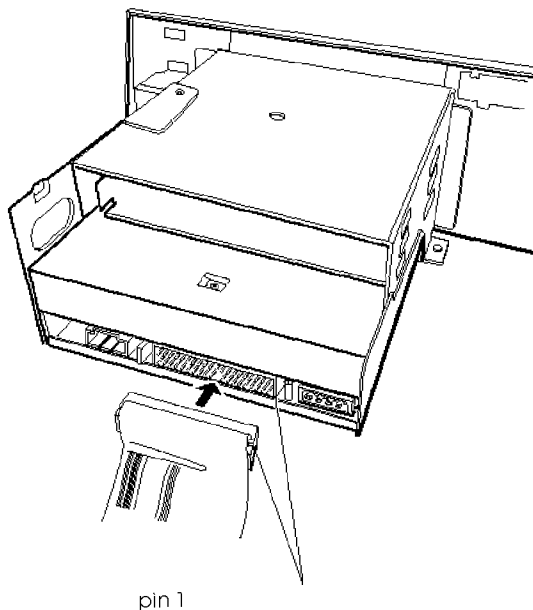
3. Make sure the holes in the cable connector fit over all the pins; then push in the connector.

> **Caution**
> If you do not correctly align the holes with the pins, you could severely damage your hard disk drive when you push in the connector.

4. Locate one of the power supply cables that lead from the power supply. (They have multicolored wires and a plastic connector on the end.)

5. Align the notched corners of the power supply cable connector with the notched corners of the drive's power connector. Make sure the holes fit over all the pins and then push in the connector.
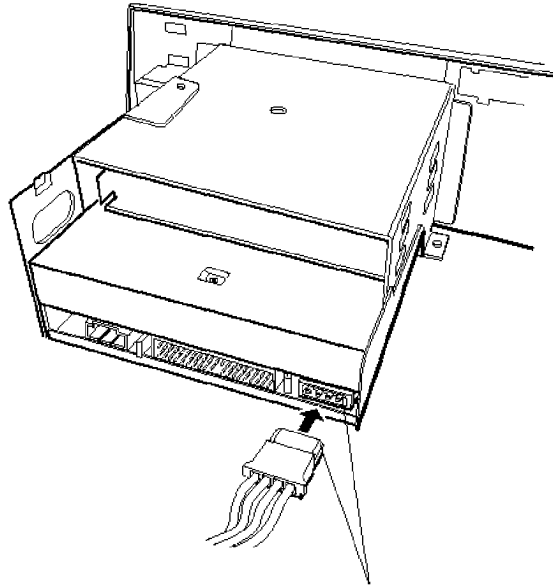
notched corners

6. If you are installing a CD-ROM drive, you need to connect the audio cable. Follow the instructions that came with your sound card to connect the audio cable to the card. If you need to install a sound card first, follow the instructions under "Installing an Option Card" in Chapter 4.

7. Position the audio cable connector so that the tab faces up and aligns with the notch in the CD-ROM drive's audio connector. Then push in the connector.

audio
connector

notch

tab
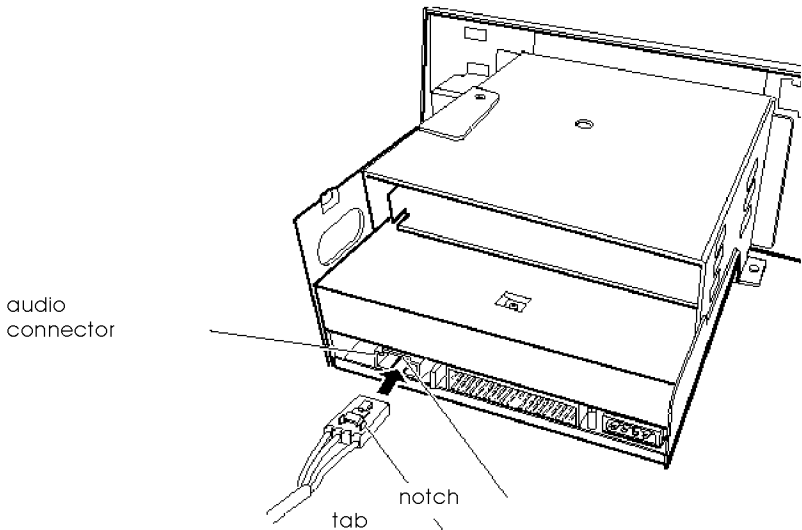
8. If you installed a hard disk drive in one of the externally accessible bays, replace the plastic faceplate, as described on page 5-21, to cover the front of the drive bay.

9. If you have finished installing or removing drives, replace the computer's cover, as described in Chapter 4. Then see Chapter 2 for instructions on defining your new drive configuration.

Removing a Drive From an Externally Accessible Bay

You may need to remove a drive for service or replacement.

Caution
Before you remove a hard disk drive, make sure you have
backup copies of all your files and programs.

To remove a drive from an externally accessible drive bay,
follow these steps:

1. Disconnect the IDE drive ribbon cable and power supply
   cable from the back of the drive. Pull the cable connectors
   straight out from the connectors on the drive so you do not
   bend the pins. Do not pull on the cables.

2. Remove the two retaining screws securing the drive to the
   drive bay. Then grasp the front of the drive and pull it
   completely out of the bay.
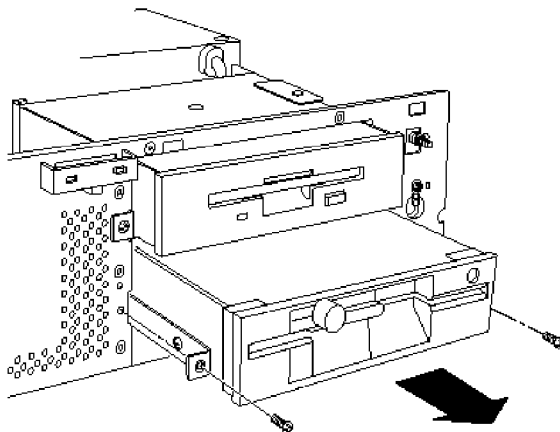
3. If you are not replacing the drive, replace the metal drive bay cover with the two retaining screws, as shown below.
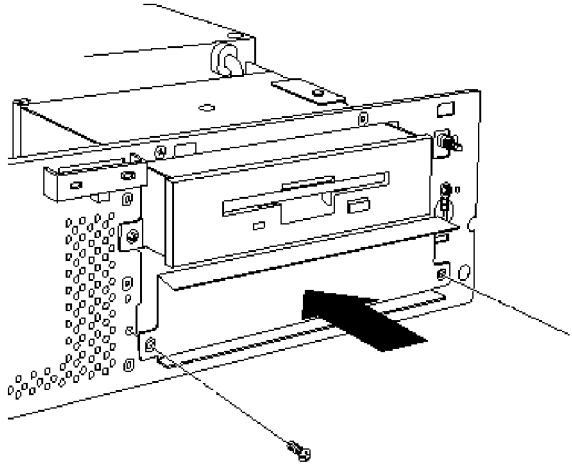
4. If you are not replacing the drive, you must also replace the plastic faceplate that covers the bay. Secure the faceplate to the inside of the computer's cover with its two screws, as shown below.
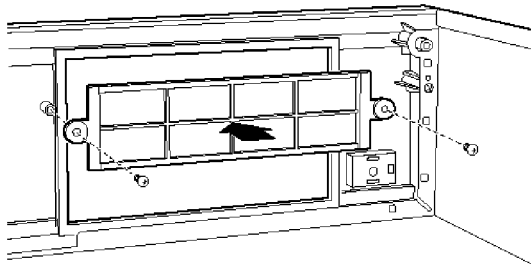
5. If you are replacing the drive you removed with another drive, remove the guiderails and screws from the drive and use them to install the other drive as described in "Installing a Drive in a Externally Accessible Bay" on page 5-12.

6. Wrap the drive in its original packing materials and store it in a safe place.

7. If you have finished installing or removing drives, replace the computer's cover, as described in Chapter 4. Then see Chapter 2 for instructions on defining your new drive configuration.

Chapter 6

Troubleshooting

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

The troubleshooting suggestions in this chapter are organized in general categories, as listed below. Within each category, a more specific problem is described with possible solutions.

The following issues are included:

❏ Identifying your system's configuration

❏ Computer will not start

❏ Computer does not respond

❏ Keyboard problems

❏ Mouse problems

❏ Monitor problems

❏ Diskette problems

❏ Diskette drive problems

❏ Hard disk drive problems

❏ CD-ROM problems

❏ Password problems

❏ Software problems

❏ Printer or scanner problems

❏ Option card problems

❏ Memory module problems

❏ Controller problems

❏ External cache problems.

If the suggestions here do not solve the problem, contact your Authorized EPSON Servicer for help.

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 option cards), and the names and version numbers of any software programs you are using.

Use these guidelines to locate information about your system.

Serial number and "A" code:	Look on the back panel of the computer to find the serial number. The "A" code label is on the side of the case.
System BIOS version:	Restart your system. You'll see the system BIOS version number displayed on the screen during power-on diagnostics.
System configuration:	Start SETUP and make a note of all your configuration option settings, especially the hard disk drive settings.

MS-DOS version:	At the MS-DOS prompt, type VER and press Enter.
Software versions:	In 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 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 system startup commands.

The Computer Will Not Start

The power light is on, but the computer does not start.

Place a bootable diskette in drive A and turn on the computer again.

> Caution
> If you turn off the computer, always wait at least 20 seconds before turning it back on to prevent damage to its circuitry.

If your computer is set to boot from drive C, make sure that the IDE hard drive is formatted, and that the **OnBoard PCI IDE** option in SETUP is enabled.

The computer does not start and the power light is not lit.

Make sure the power cord is securely connected to both the AC inlet on the back panel and an electrical outlet.

The power cord is securely connected, but the computer still does not start.

Check the electrical outlet for power. Plug a lamp into the outlet and turn it on to see if it works.

If the outlet works, try another power cord. For example, if your monitor works, disconnect its power cord and connect it to the computer.

You installed or removed system components, and now your computer does not start.

Check to make sure you have reconnected all the internal and external cables correctly.

If you replace the processor, make sure the new processor is installed correctly, and that the notch on the processor is aligned correctly on the system board. If you did not align it correctly, the system won't start. Also make sure the jumpers are set correctly for your processor.

If these steps don't work, replace the original components and see if the system works.

For more information, see "Upgrading the Processor" and "Changing the Jumper Settings" in Chapter 4.

You may have installed option cards or drives that exceed the system's power limits. Check the power limits listed under "Option Slot Power Limits" in Appendix A.

The Computer Does Not Respond

The computer locks up.

Wait a few moments; if your computer does not respond after a reasonable length of time, press Ctrl Alt Del and follow the instructions on your screen. If that doesn't work, turn the computer off and back on.

> **Note**
> If you press Ctrl Alt Del or restart the computer, you will lose any data you did not save.

You may have installed memory using SIMMs that work at the wrong speed. Install the correct SIMMs. (See "Installing Memory Modules [SIMMs]" in Chapter 4.) If this doesn't work, restore the system to the original configuration, then see if it works.

Your system may have overheated. Make sure you have an adequate heat sink installed.

Run the SETUP program and select the fail-safe default values. (See Chapter 2.) Save your settings and reset the computer.

Your system suddenly stops operating.

You may have overloaded the power supply. See your option card manuals for the power requirements of your cards. Then check "Option Slot Power Limits" in Appendix A to see if they exceed the option slot power limits of your computer.

Keyboard Problems

The screen displays a keyboard error message when you turn on the computer.

Make sure the keyboard is securely connected to the keyboard port and not the mouse port. Although these ports look alike, they cannot be used interchangeably.

The cursor keys on the numeric keypad do not work properly.

If the Num Lock light in the upper right corner of the keyboard is lit, press **Num** Lock to turn off the function.

Mouse Problems

Your mouse isn't working properly or you see an auxiliary device error message.

Make sure the mouse cable is securely connected to the mouse port and not the keyboard port. See "Connecting a Keyboard or Mouse" in Chapter 1 for instructions. Also make sure your mouse ball is clean.

Monitor Problems

There is no display on the screen.

Check that the monitor's power switch is on and that its power light is on.

Also, the computer may be in a power-saving mode. When you press a mouse button or a key on the keyboard, see if the monitor displays an image.

Disconnect the monitor from the back of the computer. If a white raster screen appears on the monitor, the problem is not in the monitor.

The power light is on, but you still do not see anything on the screen.

Press a mouse button or a key on the keyboard to see if the monitor or computer is in a power-saving mode. Also, check the brightness and contrast controls.

If you still do not see anything on the screen, make sure the monitor is securely connected to the computer.

If you installed a display adapter card, make sure your monitor type matches the card type. Also be sure you set the correct display type for the Primary Display option in SETUP. (See "Setting Advanced Options" in Chapter 2.)

If you are running an application program, see if you need to set up the program for the type of monitor and display adapter you have. Also make sure you are using the appropriate monitor and display adapter for your software.

The power switch is on but the power light is not on.

If the monitor is Energy Star compliant, it may be in a power-saving mode. Press a mouse button or a key on the keyboard to activate the monitor.

Turn off the monitor's power, wait five seconds, and turn it back on.

If the light still does not come on, check the electrical outlet for power. Turn off your monitor and unplug it from the outlet. Then plug a lamp into the wall outlet and turn it on. If the light turns on, your monitor may be faulty.

Appendix A
Specifications

This appendix describes the following

❏ Computer specifications

❏ Video resolutions and colors

❏ Processor upgrades

❏ Drive option information

❏ DMA assignments

❏ Hardware interrupts

❏ System memory map

❏ System I / O address map

❏ Connector pin assignments

❏ Tested operating environments

❏ Options available from EPSON.

CPU and Memory

32-bit CPU	Upgradable 486-class processors, including Pentium OverDrive
Power-saving **modes**	Energy Star compliant, low-power doze, sleep, and suspend modes for the CPU, hard disk drive, and video signals sent by the computer to the monitor; select time-out periods in SETUP; in a standard configuration of one hard disk drive and one diskette drive, system consumes less than 30 Watts in sleep mode
System speed	Fast and slow processor speeds available; fast is the speed of the processor, and slow is 8 MHz; from MS-DOS applications, speed selectable by keyboard command
Memory	4 or 8MB RAM (4MB on system board); expandable to 132MB; two SIMM sockets; SIMMs must be tin-plated, 72-pin, 32-bit, fast-page mode type with access speed of 70ns or faster
ROM	lMB system BIOS, video BIOS, and SETUP code located in flash ROM on system board; 128KB subsystem ROM
Video RAM	512KB or lMB DRAM on system board; expandable to 2MB using additional 512KB, 40-pin, SOJ flat pack video DRAM chips
Shadow RAM	Supports shadowing of system and video BIOS ROM into RAM; video shadowing selectable in SETUP program

Cache	At least 8KB of internal cache in the processor; supports 128 or 256KB of external cache with 32K x 8, 20ns or faster SRAM DIP chips and a 32K x 8 15ns tag chip
Math coprocessor	Math coprocessor built into the processor on all DX and Intel Pentium OverDrive processors
Clock/ calendar	Real-time clock, calendar, and CMOS RAM socketed on system board with integrated Lithium battery

Controllers

PCI Chipset	Provides PCI caching, memory and control for the PCI bus, and the two-channel PCI IDE interface; integrated PCI bridge translates CPU bus cycles to PCI bus cycles and CPU-to-PCI memory write cycles to PCI burst cycles
Video	Trident 9440AGI high-performance PCI local bus GUI accelerator controller supports resolutions up to 1024 x 768 in 256 colors with lMB of DRAM; 1280 x 1024 with 2MB of DRAM
Diskette	Controller on system board supports up to two diskette drives or one diskette/ combo diskette and one tape drive

Hard disk	Two PCI, ATA-2 compatible two-channel, PCI local bus IDE interfaces on system board support up to four IDE devices (two on each channel); CD-ROM drives cannot be connected to the same channel as hard disk drives; BIOS provides hard disk auto-detection and enhanced IDE functions, and supports PIO modes 0-4

Interfaces

Monitor	Energy Star compliant video interface for fixed or multifrequency monitor built into system board; 15-pin, D-shell connector
Parallel	One standard, multimode parallel interface built into system board; supports 8-bit unidirectional, 16-bit bidirectional, and EPP/ECP (Enhanced Parallel Port /Extended Capability Port) modes; 25-pin, D-shell connector; operation controllable by SETUP program and jumpers
Serial	Two high-speed RS-232C, programmable, asynchronous interfaces built into system board; 16550-compatible; 9-pin, D-shell connectors
Keyboard	PS/2™ compatible keyboard interface built into system board; 6-pin, mini DIN connector
Mouse	PS/2 compatible mouse interface built into system board; 6-pin, mini DIN connector

Option slots	Connector card with four 16-bit I/O expansion slots (two are shared); three ISA compatible (8.33 MHz bus speed), one PCI compatible (25/33 MHz bus speed)
Speaker	Internal

Mass Storage	**Internal mount:** One 3.5-inch wide, one-inch high drive Externally accessible mounts: Two 5.25-inch wide, half-height drives
Diskette drive types	*3.5-inch* diskette drive, 720KB, 1.44MB, or 2.88MB storage capacity; 5.25-inch diskette drive, 360KB or 1.2MB storage capacity; or combination 3.5-inch/5.25-inch or 3.5-inch/PCMCIA diskette drive
Hard disk drive types	5.25-inch or 3.5-inch form factor hard disk drive(s), up to half-height size; maximum of three drives
Other devices	Half-height tape drive, CD-ROM drive, optical drive, PCMCIA card reader, or other storage device; 5.25-inch, or 3.5-inch with mounting frames

Keyboard	Detachable, two-position height; 101, 102, or 104 sculpted keys; country-dependent main typewriter keyboard; numeric/cursor control keypad; four-key cursor control keypad; 12 function keys
Mouse	Detachable, two-button, PS/2 compatible

SETUP Program	Stored in ROM; accessible by pressing Del during boot
System security	Password available for system boot or for access to SETUP program
Virus protection	Detects when an attempt is made to write to the boot sector of a hard disk drive or to format a cylinder, head, or sector of a hard disk drive

Power Supply

Type	145 Watt, UL/TUV/CSA listed, fan-cooled
Input ranges	*115VAC* or 230VAC; switch-selectable
Maximum output	*+5 VDC* at 18 Amps, −5 VDC at 0.3 Amp *+12 VDC* at 4 Amps, −12 VDC at 0.3 Amp
Frequency	*47* to *63* Hz
Cables	Two to system board, five to mass storage devices; for more than five devices, Y cables can be installed on the existing cables

Option Slot Power Limits

Output voltage (VDC)	+5 Volts	−5 Volts	+12 Volts	−12 Volts
For all slots	14 Amps	0.3 Amp	3.8 Amps	0.3 Amp

Physical Characteristics

Dimension	Measurement
Width	14.8 inches (370 mm)
Depth	16.5 inches (412 mm)
Height	4.8 inches (120 mm)
Weight	16.7 lb (7.5 kg) with one diskette drive, without keyboard

Environmental Requirements

Condition	Operating range	Storage range
Temperature	41° to 95° F (5° to 35° C)	−4° to 140° F (−20° to 60° C)
Humidity (non-condensing)	20% to 80%	10% to 95%
Altitude	−330 to 9,900 ft (−100 to 3,000 m)	−330 to 39,600 ft (−100 to 12,000 m)

Video Resolutions and Colors

Resolution	Memory requirements	Color	Refresh rates (Hz)	Remarks
640 × 480	1MB	16	60	8 bits/pixel*
	1MB	256	60/72/75/85	8 bits/pixel
	1MB	65K	60/72/75/85	16 bits/pixel
	1MB	16.8M (True Color)	60	24 bits/pixel
800 × 600	1MB	16	60/75	8 bits/pixel*
	1MB	256	60/75	8 bits/pixel
	1MB	65K	56/60	16 bits/pixel
1024 × 768	1MB	16	43.5/60/70/75	8 bits/pixel*
	1MB	256	43.5/60/70/75	8 bits/pixel*
1280 × 1024	1MB	16	43.5/60	4 bit planes**
	2MB	256	43.5	8 bits/pixel

* Non-interlaced and interlaced

** Interlaced

Processor Upgrades

The computer's processor can be upgraded by replacing the existing processor with a faster one. The following table lists supported processors and voltages.

Supported processors

Processor	Voltage	Processor	Voltage
AMD DX4/100	3.45	Intel DX4/75	3.3
Cyrix DX2/66	3.45	Intel DX/SLDX2	5.0
Cyrix M1sc	3.45	Intel DX2 (P24D)	5.0
Intel DX4/100	3.45	Intel P24T	5.0

When you replace the processor, you need to check the settings of a number of jumpers. See "Changing the Jumper Settings" in Chapter 4.

Information for Qualified Hard Disk Drives

The following table lists parameters for hard disk drives qualified for use in your computer.

Hard disk drive parameters

Parameters	Conner®					Western Digital®				
	CFS1275A	CFS850A	CFA540A	CFS425A	CFS420A	AC2700	AC2540	AC2420	AC2340	AC2250
Formatted capacity (MB)	1275	850	540	425	420	730	540	425	341	256
Size, width × height (in)	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1
Weight (lb)	1.25	1.25	1.2	1.1	1.16	1.2	1.2	1.12	1.12	1.12
Cylinders	3687	3687	2805	839	2388	1416	1048	2720	2233	2233
Disks	3	2	2	1	2	2	2	2	2	2
Heads	6	4	4	2	4	4	4	4	4	3
Sectors per track	78 - 144	78 - 144	79 - 119	78 - 144	63 - 100	63	63	55 - 99	56 - 96	56 - 96
Rotational speed (RPM)	3600	3600	3600	3600	3600	4500	4500	3314	3322	3322
Buffer size (KB)	64	64	64	64	32	64	128	128	128	64
Average seek time (ms)	<15	<15	14	14	14	<10	11	<13	<13	<13
Encoding method	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7	RLL 1,7
Power dissipation (seek)	5.6 W	5.6 W	4.3 W	3.9 W	5-12 W	7.0 W	7.0 W	5.2 W	5.2 W	5.2 W

Logical parameters
  Cylinders
  Heads
  Precomp zone
  Landing zone
  Sectors
	2479
	16
	0
	2479
	63
		1652
		16
		0
		1652
		63
			1050
			16
			0
			1050
			63
				826
				16
				0
				826
				63
					826
					16
					0
					826
					63
						1416
						16
						1416
						1416
						63
							1048
							16
							1048
							1048
							63
								989
								15
								989
								989
								56
									1010
									12
									1011
									1011
									55
										1010
										9
										1011
										1011
										55

IDE hard disk drive jumper settings

Model number	Single drive	Master drive	Slave drive
Conner CFS1275A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS850A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS540A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS425A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS420A	C/D jumpered	C/D jumpered	No jumpers
Conner CFS270A	C/D jumpered	C/D jumpered	No jumpers
Western Digital AC2700	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2540	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2420	No Jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2340	No jumpers	5-6 jumpered	3-4 jumpered
Western Digital AC2250	No jumpers	5-6 jumpered	3-4 jumpered

DMA   Assignments

Level	Assigned device
DMA0	Reserved
DMA1	Available/parallel
DMA2	Diskette drive controller
DMA3	Available/parallel
DMA4	Cascade from DMA1 to DMA2
DMA5	Spare
DMA6	Spare
DMA7	Spare

Hardware Interrupts

IRQ no.	Function
IRQ0	Timer output 0
IRQ1	Keyboard
IRQ2	Cascade to IRQ9
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Available/LPT2
IRQ6	Diskette drive controller
IRQ7	Parallel port 1 (LPT1)
IRQ8	Real-time clock
IRQ9	Available
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 mouse
IRQ13	Math coprocessor
IRQ14	Primary IDE controller
IRQ15	Secondary IDE controller

System Memory Map

Address range	Function
FE0000h-FFFFFFh	Shadowed system ROM BIOS
100000h-FDFFFFh	System extended memory (128MB maximum)
0E0000h-0FFFFFh	System ROM or adapter ROM
0C8000h-0DFFFFh	I/O
0C0000h-0C7FFFh	Shadowed video ROM BIOS
0A0000h-0BFFFFh	Graphics display buffer
000000h-09FFFFh	640KB base memory

System I/O Address Map

Hex address	Assigned device
000 - 01F	DMA controller 1, 8237
020 - 03F	Interrupt controller 1, 8259
022 - 024	Reserved
040 - 05F	Timer, 8254
060 - 06F	Keyboard controller, 8042
070 - 07F	Real-time clock NMI (non-maskable interrupt)
080 - 09F	DMA page register, 74LS612
0A0 - 0BF	Interrupt controller 2, 8259
0C0 - 0DF	DMA controller 2, 8237
0F0	Clear math coprocessor
0F1	Reset math coprocessor
0F8 - 0FF	Math coprocessor
1F0 - 1F8	Primary hard disk interface
1E0 - 1E7	Secondary hard disk interface
200 - 207	Game I/O
278 - 27F	Parallel printer port 2
2B0 - 2DF	Alternate enhanced graphics adapter
2E1	GPIB (adapter 0)
2E2, 2E3	Data acquisition (adapter 0)
2F8 - 2FF	Serial port 2
300 - 31F	Prototype card
360 - 363	Available
368 - 36B	Available
378 - 37F	Parallel printer port 1
380 - 38F	Available
390 - 393	Available
3A0 - 3AF	Available
3B0 - 3BF	Available
3C0 - 3CF	Available
3D0 - 3DF	Available
3F0 - 3F7	Diskette drive controller
3F8 - 3FF	Serial port 1

System I/O address map (continued)

Hex address	Assigned device
6E2, 6E3	Available
790 - 793	Available
AE2, AE3	Available
B90, B93	Available
EE2, EE3	Available
1390 - 1393	Available
22E1	Available
2390 - 2393	Available
42E1	Available
63E1	Available
82E1	Available
A2E1	Available
C2E1	Available
E2E1	Available

Connector Pin Assignments

Parallel port connector pin assignments (CN1 3)

Pin	Signal	Pin	Signal	Pin	Signal
1	Strobe *	10	ACK *	19	Signal ground
2	Data 0	11	Busy	20	Signal ground
3	Data 1	12	Paper out	21	Signal ground
4	Data 2	13	Select	22	Signal ground
5	Data 3	14	Auto feed *	23	Signal ground
6	Data 4	15	Error *	24	Signal ground
7	Data 5	16	Init *	25	Signal ground
8	Data 6	17	Selectin *		
9	Data 7	18	Signal ground		

* Active low logic

Serial port connector pin assignments (CN11 and CN12)

Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground reference		

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 3.3 and later
Novell NetWare* 3.12 and 4.1
Novell Personal NetWare
IBM® OS/2 version 3.0 (Warp)
SCO UNIX
SCO Open Desktop
Microsoft Windows 3.1 and later
Microsoft Windows for WorkGroups
Microsoft Windows NT version 3.5 and later
Microsoft Windows 95

* Certified as workstation; tested as file server

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

Options Available from EPSON

Many options for enhancing and supplementing this product are available from EPSON. Call your nearest marketing location for more information about specific options.

Glossary

Address

The location where information is stored in a computer's memory.

ATA-2

AT Attachment. A drive interface that provides high speed and high capacity data transfer.

BIOS

Basic Input/Output System. Routines in ROM (Read Only Memory) that handle the transfer of information in your operating system.

Boot

The process a computer performs to load the operating system into memory.

Cache

A high-speed memory buffer that stores frequently used data where your processor can access it faster. Your computer includes at least 8KB of internal cache built into the processor and may include external cache installed on the system board.

CMOS

Complimentary Metal-Oxide Semiconductor. A low-power silicon chip used for RAM and switching operations. CMOS is backed up by a battery.

Controller

A processor, interface, port, or adapter that translates data between the CPU and a peripheral device, such as a hard disk, diskette drive, keyboard, or video monitor. Controllers convert data from one format to another, match speeds between devices that operate at different speeds, and isolate peripheral hardware from software.

CPU

Central Processing Unit. The primary device that interprets instructions, performs tasks, keeps track of stored data, and controls input and output operations. See also *Processor.*

Device

A piece of computer equipment that performs a specific task, such as a disk drive, a monitor, a printer, or a scanner. Also called a peripheral.

Device driver

A file containing instructions that allow your computer to recognize and communicate with a device. The device may be a printer, monitor, or other type of device.

DMA

Direct Memory Access channel. A channel for transferring data from your computer to or from peripherals without involving CPU resources.

DRAM

Dynamic Random Access Memory. A type of memory that stores large amounts of information.

ECP

Extended Capabilities Port. The parallel port mode in your computer that provides bidirectional signals for the parallel port and includes other enhanced functions.

EPP

Enhanced Parallel Port. The parallel port mode in your computer that provides bidirectional signals for the parallel port and includes other enhanced functions.

Expansion bus

An internal bus that provides a data path between the CPU, memory, and peripherals.

Extended memory

Memory above lMB that is accessed by 386,486, and 586 processors when they are operating in protected or virtual mode.

Flash RAM

Non-volatile read/write RAM. Flash RAM can be erased and reprogrammed using the normal voltages inside your computer. This capability allows the computer and its peripherals a means of storing data without the need for a constant supply of electricity.

GUI

Graphical User Interface. A type of screen display that allows you to select items and operations by pointing to icons.

IDE

Integrated Drive Electronics. A type of interface in which the controller is on the drive instead of on a controller card.

Interface

A physical or software connection used to transmit data between equipment or programs so they can work with each other.

Interlaced

A method of scanning a video screen which appears to double the refresh rate of the image on the screen.

Interrupt

A signal that a device uses when the device is ready to accept or send information.

I/O base address

The location within the input/output space of your computer that a computer device (such as a printer or modem) uses to communicate with software.

IRQ

Interrupt Request. Hardware channel over which devices can send interrupts. Typically, each device connected to the computer uses a separate IRQ.

ISA

Industry Standard Architecture. The 8-or 16-bit standard developed for IBM compatible computers.

Jumper

A small movable plug that connects two pins on a device's circuit board. Jumpers alter the operation of a particular function.

LBA

Logical Block Address. A method of accessing large-capacity hard disk drives, which lets you transfer data in blocks instead of individual sectors or clusters.

Local bus

An internal bus that controls the connections from the processor to the VGA and IDE interfaces. Local bus provides increased performance and speed.

Math coprocessor

A device that enables the computer to process mathematical calculations faster by using floating point numbers instead of whole numbers for calculations.

Memory module

A small circuit board, commonly called a SIMM (single inline memory module), that contains surface-mounted memory chips. You can add memory modules to the system board to expand your computer's memory.

Modem

Modulator/Demodulator. A device that allows a computer to transfer data to and from another computer by transmitting signals over telephone lines.

Option card

A circuit board you can install inside the computer to provide additional capabilities, such as a modem or an additional I/O port. Option cards plug directly into option slots so you don't have to alter a computer's circuitry to enhance your system.

Parallel

An interface that transmits data simultaneously over separate wires in a cable. See also *Serial.*

PCI

Peripheral Component Interconnect. The standard developed by Intel Corporation for expansion design. PCI allows high-speed data transfer and was designed for the current generation of processors, but its circuitry design is not tied to the requirements of a specific processor or family.

PCMCIA card

Personal Computer Memory Card International Association card. A credit-card-sized device that can be used for data storage, memory expansion, or other purposes. PCMCIA cards are often used in notebook computers.

Port

A physical socket on a computer to which you can connect a peripheral device.

Power-on diagnostics

Tests stored in ROM that check the computer's internal circuitry, peripheral device configuration, and operating status each time you turn it on or reset it.

Processor

A small CPU on one semiconductor chip. See also *CPU.*

RAM

Random Access Memory. The area of the computer's memory used to run programs and store data while you work. All data in RAM is erased when you turn off or reset the computer.

Real-time clock

A battery-powered clock inside the computer that tracks the time and date, even when the computer is turned off.

Refresh rate

The frequency with which a monitor can redraw a screen image. The faster the refresh rate, the less the screen will flicker.

Reset

To restart a computer without turning it off. You can reset your computer by pressing Ctrl Alt Del. Resetting erases all data stored in RAM and reloads the computer's operating system.

ROM

Read Only Memory. Memory that can only be read and cannot be modified. ROM retains its contents even when you turn off the computer by using power from a backup battery.

Serial

The type of communication that transmits data from a serial interface to a serial device over a single wire, one bit at a time. See also *Parallel.*

Shadow RAM

The system's ability to copy the contents of the system, video, and external BIOS ROMs into RAM to speed up processing.

SIMM

Single Inline Memory Module. A small circuit board that contains surface-mounted memory chips. You can add memory modules to the system board to expand your computer's memory.

SRAM

Static Random Access Memory. A type of fast memory used in cache.

SVGA

Super VGA (Video Graphics Array). In addition to supporting standard VGA modes, your computer's built-in SVGA controller supports resolutions up to 1280 x 1024 in 256 colors with 2MB of video memory and a compatible monitor.

True Color

A VGA feature that supports 24-bits-per-pixel color, which lets your VGA interface display 16.8 million colors. The screen image looks more like a photograph than a traditional computer image.

VGA

Video Graphics Array. A high-resolution (up to 640 x 480) display adapter that provides a variety of video modes.

Video adapter card

A circuit board that can be installed in one of the computer's option slots to control the way a monitor displays text and graphics.

Write-protect

To protect the data on a diskette from being changed by setting the write-protect switch on a 3.5-inch diskette or by placing a write-protect tab over the notch on a 5.25-inch diskette. You cannot change data on a write-protected diskette.

ZIF socket

Zero Insertion Force. The type of socket on your computer's system board that holds the processor. With this type of socket, it's easy to remove and install processor chips.

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