EPSON

ACTION PC 2000

USER'S GUIDE

EPSON®

User's Guide

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Important Safety Instructions

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

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

  If the power cord or plug is damaged; if liquid has entered the computer; if the computer has been dropped or the cabinet damaged; if the computer does not operate normally or exhibits a distinct change in performance. Adjust only those controls that are covered by the operating instructions.
- If you plan to use the computer in Germany, observe the following:

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

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

Importantes instructions de sécurité

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

- Debrancher l'ordinateur avant de le nettoyer. N'utiliser qu'un chiffon humide. Veiller a ne pas renverser de liquides sur l'appareil.
- Ne pas placer l'ordinateur sur une surface instable ni près d'une source de chaleur.
- Ne pas bloquer ni couvrir les orifices d'aération de l'appareil. Ne pas introduire d'objets dans les ouvertures.
- Utiliser seulement le type de source d'alimentation Clectrique indiqué sur l'étiquette.
- Tout l'équipement doit Ctre branché sur des prises de courant avec contact de terre. Ne jamais utiliser une prise sur le même circuit qu'un appareil a photocopies ou un système de contrôle de ventilation avec commutation marche-arrêt automatique.
- S'assurer que le cordon d'alimentation de l'ordinateur n'est pas abîmé ni effiloché.
- Dans le cas où on utilise un cordon de rallonge avec l'ordinateur, s'assurer que l'intensité en amperes requise pour tous les appareils branches sur ce cordon ne soit pas supérieure a la capacité du cordon. S'assurer aussi que cette intensté ne dépasse jamais la somme de 15 amperes pour l'ensemble des appareils.
- Sauf dans les cas spécifiques expliqués dans ce manuel de l'usager, ne pas essayer d'entretenir ou de réparer l'ordinateur soi-même.
- Debrancher l'ordinateur et contacter un technicien qualifié dans les circonstances suivantes:

  Si le cordon ou la prise sont abîmés; si un liquide a pénétré a l'intérieur de l'appareil; si on a laissé tomber l'appareil ou si le boîtier est endommagé; si l'ordinateur ne fonctionne pas normalement ou fonctionne d'une manière très differente de l'ordinaire. N'ajuster que les commandes décrites dans les directives.
- Pour utiliser l'ordinateur en Allemagne, il est nécessaire que le bâtiment soit muni d'un disjoncteur de 16 amperes pour protéger l'ordinateur contre les courts-circuits et le survoltage.

Introduction

Your new EPSON® computer provides the following features:

- Cyrix® 486SLC2-50 microprocessor
- Energy Star compliant, low-power standby mode for the hard disk drive and video display
- 4MB of internal memory, expandable to 16MB
- System and video BIOS shadow RAM
- 512KB of on-board video memory, expandable to 1MB
- Built-in local bus SVGA video port
- Two built-in serial ports and one built-in bi-directional parallel port
- One built-in PS/2™ compatible keyboard port and one built-in PS/2 compatible mouse port
- 1KB of internal cache
- Support for relocation of 128KB of memory
- High-speed local bus video controller, providing TrueColor support and resolutions up to 1280 x 1024 in 16 colors with 1MB of video memory
- Socket for optional math coprocessor
- Five 16-bit, ISA-compatible option slots: three full-length, and two half-length
- Space for up to four mass storage devices (three externally accessible and one internal)

- On-board support for up to two IDE hard disk drives and two diskette drives (or one diskette drive and one tape drive)

- Real-time clock and calendar on main system board with built-in rechargeable battery backup.

The 486SLC microprocessor in this computer is *i486SX* instruction set compatible. It features a 32-bit internal/ 16-bit external data path.

The shadow RAM feature speeds up processing by moving the system and video BIOS into the RAM area of memory.

Using the built-in interfaces, you can connect most of your peripheral devices directly to the computer so you do not have to install option cards. You can use the option slots to enhance your system with extra functions such as a modem card, a network controller card, or additional interface ports.

The local bus video interface provides data transfer at the full speed of the processor, rather than at the standard 8.33 MHz ISA bus speed.

VGA Drivers

Your computer comes with VGA drivers and utilities for use with the integrated video interface. With these drivers, you can take advantage of the extended VGA features such as higher resolutions and 132-column text mode when you run popular applications. If your system was configured for you, these drivers and utilities may be installed on your hard disk. If you need to install them yourself, see the instructions in Chapter 1. To obtain drivers for additional applications, call the EPSON Connection℠ or access the Epson America Forum on CompuServe®.

Energy Savings

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 "Green PC" feature places the hard disk drive in a low-power standby mode when the mouse or keyboard has been inactive for a specified period of time.

> **Note**
> If you have an Energy Star compliant monitor, it also goes into a low-power standby mode because it isn't receiving video signals from your computer. (Screens on non-compliant monitors go blank, but do not enter a low-power standby mode.)

Optional Equipment

You can easily upgrade your computer by installing additional memory and a wide variety of options, as described in Chapters 3 and 4.

Memory

By adding 1MB or 4MB SIMMs (single inline memory modules) to the main system board, you can expand the computer's memory up to 16MB.

Video Memory

You can increase the video memory in your system to 1MB, which allows you to use higher resolutions with more colors.

Drives

Your system supports up to four mass storage devices, including hard disk drives, diskette drives, a tape drive, a CD-ROM drive, or an optical drive. As your storage needs expand, you can install additional drives.

Math Coprocessor

You may want to install an optional math coprocessor, which allows your computer to perform mathematical calculations and process graphics more quickly.

How to Use This Manual

This manual contains the information you need to get the best results from your computer. You do not have to read everything; check the following chapter summaries.

Chapter 1 provides simple instructions for setting up your system, turning it on and off, and connecting peripheral devices such as the monitor and printer. It also describes running the SETUP program to define your computer's configuration.

Chapter 2 covers general operating procedures, such as using diskettes, resetting the computer, and changing the processor speed.

Chapter 3 describes how to remove and replace the computer's cover, change jumper settings, and install optional equipment such as option cards and memory modules.

Chapter 4 explains how to install and remove drives.

Chapter 5 contains troubleshooting tips.

Appendix A lists the specifications of your computer.

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

Where to Get Help

If you purchased your computer in the United States or Canada, EPSON provides customer support and service through a network of Authorized EPSON Customer Care Centers. EPSON also provides support services through the EPSON Connection. In the United States, dial (800) 922-8911. In Canada, dial (800) GO-EPSON.

Call the EPSON Connection for the following:

- ☐ Technical assistance with the installation, configuration, and operation of EPSON products
- ☐ Assistance in locating your nearest Authorized EPSON Reseller or Customer Care Center
- ☐ Customer Relations
- ☐ EPSON technical information library fax service
- ☐ Product literature on current and new products.

You can purchase accessories, manuals, or parts for EPSON products from EPSON Accessories at (800) 873-7766 (U.S. sales only). In Canada, call (800) **GO-EPSON** for sales locations.

When you call for technical assistance, be ready to identify your system and its configuration, and provide any error messages to the support staff. See Chapter 5 for more information.

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

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

CompuServe On-line Support

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

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

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

To take advantage of this offer, call (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.

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

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Chapter 1

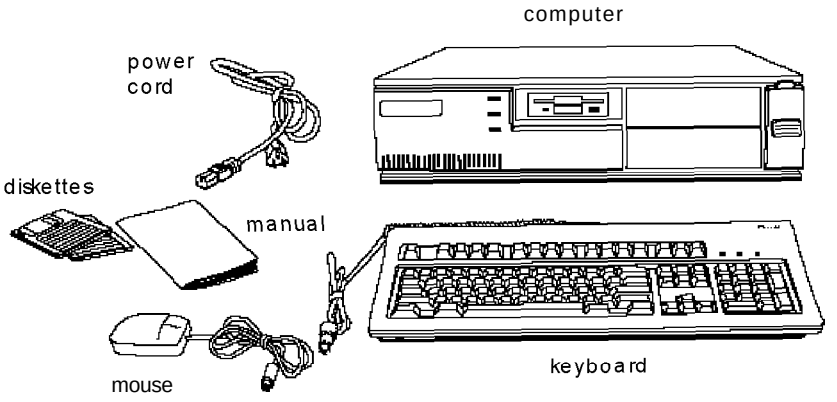
Setting Up Your System

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

- Unpacking your computer
- Setting the voltage selector switch
- Connecting system components
- Turning the computer on and off
- Running the SETUP program
- Post-SETUP procedures.

Unpacking Your Computer

When you unpack your system, be sure you have these items:



If you purchased any optional equipment that goes inside the computer-such as option cards, memory modules, or drives-you should install these devices before you connect your computer. See Chapters 3 and 4 for instructions.

Setting the Voltage Selector Switch

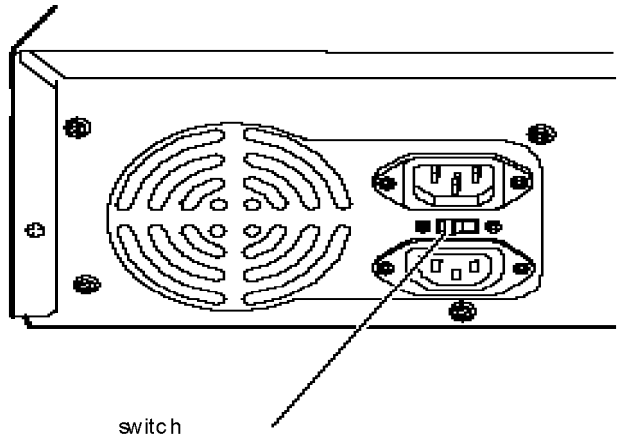
Your system is powered by a 200 watt power supply. The power supply voltage is controlled by a voltage selector switch on the computer's back panel. You can set this switch to 110 VAC or 220 VAC.

EPSON ships the computer with the voltage selector switch set to 110 VAC. This setting is appropriate for line source voltages between 100 and 120 VAC, and is generally the appropriate setting to select if you plan to use your 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 probably need to reset the voltage selector switch to 220 VAC. Doing so allows your computer to handle line source voltages between 200 and 240 VAC, which are standard in Europe.

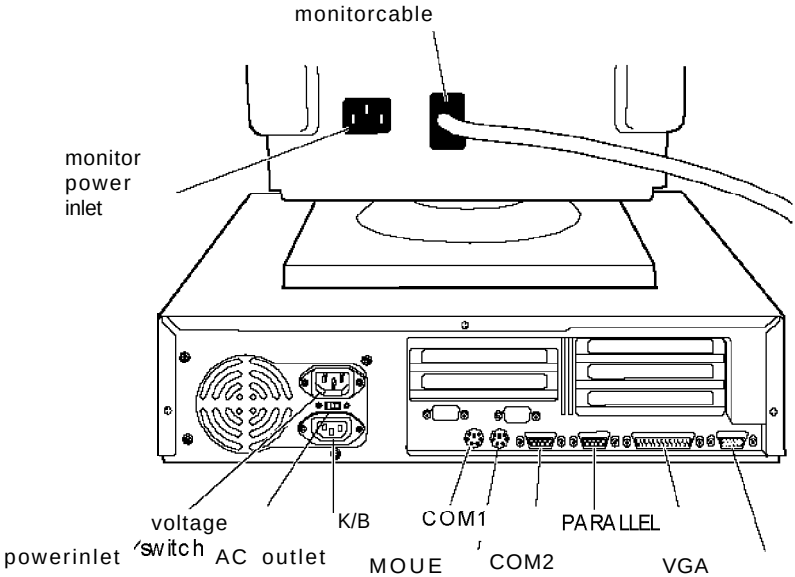
Caution
Before you turn on the power to your system, make sure the voltage selector is set to the appropriate setting for the electrical power source in your location or you will seriously damage your system.

To change the voltage selector switch setting, slide the switch to the right to select 220 VAC, or to the left to select 110 VAC, as shown below.



Connecting System Components

Use the following illustration to locate the ports on the back of your system as you connect the keyboard, monitor, printer, and other devices.



Your system also includes two removable panels above the mouse and keyboard ports providing access to the game port on the main system board and to an optional port.

Connecting a Keyboard and Mouse

To connect a keyboard, hold the cable connector so the arrow on the connector faces up. Insert it into the port marked K/B.

If you have a PS/2 compatible mouse, insert the connector into the port marked MOUSE.

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

You must install a mouse driver if your system has not been preconfigured. See your mouse manual for instructions. (If you are using Microsoft® Windows™ the installation program automatically loads a mouse driver for Windows applications.)

Connecting a Monitor

If you have a VGA or SVGA monitor (or a multifrequency monitor), follow these steps to connect it to the computer's built-in VGA port:

1. 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 the power source). On some monitors, the monitor cable is permanently attached. If your monitor does not have an attached cable, connect the cable to it now.

2. Insert the monitor interface cable connector into the VGA port on the computer.

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

4. Plug the monitor's power cord into the power inlet on the back of the monitor. 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 1 Amp for 110 VAC or 0.5 Amp for 220 VAC.

Connecting a Printer or Other Device

Your computer has one bi-directional parallel and two serial ports. To connect a printer or other peripheral device, follow the appropriate instructions below.

Using the parallel port

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

1. Plug the connector end of the printer cable into the computer's PARALLEL port. If the connector has retaining screws, tighten them.

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

3. Plug the printer's power cord into a grounded electrical outlet.

Using the serial ports

If you have a printer, 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 one of the ports marked COM1 and COM2. If you are connecting only one serial device, use the COM1 port. If you want to assign COM1 as COM3 or COM2 as COM4, see Chapter 3 for information on jumper settings.

Connecting the Power Cord

Follow these steps to connect the power cord:

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

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

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

After you connect the components of your system, you are ready to turn on the power.

Turning On the Computer

Before you turn on your computer, be sure to read the Important Safety Instructions at the beginning of this manual.

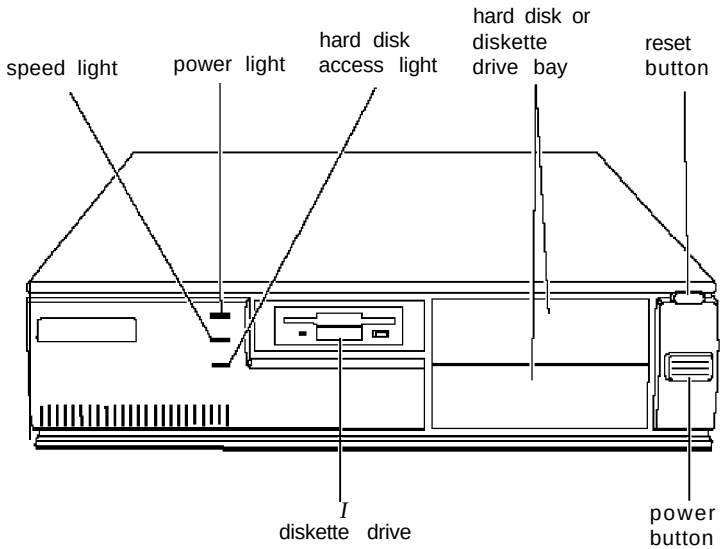
Follow these steps to turn on your system :

1. If there is a protective card in the diskette drive, remove it now.

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

3. If you do not have a hard disk with an operating system loaded on it, insert your main operating system diskette in drive A.

4. To turn on the computer, press the power button located on the right side of the front panel, as shown below.



The power indicator lights up. After a few seconds, the computer displays a count of its system memory, and then performs its power-on diagnostics. This is a series of checks the computer runs each time you turn it on to make sure everything is working correctly.

5. If necessary, use the controls on your monitor to adjust the brightness and contrast until you can easily see the characters on the screen.

6. When the system has successfully completed its diagnostics, MS-DOS® prompts you to verify the correct date and time. If they are correct, press **Enter.** Otherwise, enter the current date and time.

If your system is configured to automatically start Microsoft Windows or a word processing program, or has a different operating system, you will see the first menu or screen of that program displayed at this point. If your system is not configured to start like this, you will see the MS-DOS operating prompt, such as *C:\>* or A:\>, each time you turn on the computer.

Now follow the instructions below to configure your system using the SETUP program.

Turning Off the Computer

Whenever you turn off your system, follow these steps:

1. Save your data and exit any application program you are using.

2. Check the hard disk drive light and the diskette drive light(s) to make sure they are not on. Do not turn off the computer if a drive light is on, because you can damage the drive or lose data.

3. Remove any diskette(s) from the diskette drive(s).

4. Press the power button to turn off the computer and then turn off the monitor, printer, and any other peripheral devices.

Running the SETUP Program

Be sure to run SETUP the first time you use your computer, so you can verify or update the configuration information. You also may need to run SETUP again later if you change your configuration.

SETUP lets you verify or change the following:

- ☐ Current date and time
- ☐ Type of diskette drive(s) and hard disk drive(s)
- ☐ System memory
- ☐ Video display type
- ☐ Keyboard options
- ☐ Processor speed
- ☐ Internal cache function
- ☐ Shadow options
- ☐ Processor chip features
- ☐ Green PC features.

SETUP is stored in the computer's ROM BIOS, so you can run it any time. The configuration information is stored in an area of memory called CMOS RAM. This memory is backed up by a battery so it is not erased when you turn off or reset the computer.

Starting the SETUP Program

You can run SETUP whenever you turn on or reset your computer. After performing power-on diagnostics, your computer displays the following prompt:

```
Press F2 to run the setup utility
```

To start SETUP, press F2

If the system detects an error in its configuration when you turn it on, you will see the following message:

> Press the F1 key to continue, F2 to run the setup utility

If you see this message, press F2 to run SETUP to correct your configuration.

The table below lists the keys you can use to perform SETUP operations.

SETUP function keys

Key	**Function**
↑↓← →	Moves the cursor to the next or previous modifiable option
+ -	Changesthe values in the field
PgDn PgUp	Displaysthe next or the previousmenu
F1	Displays a help screen describing the option currently selected
F2	Displaysthe system information screen
F4	From the exit menu, saves the changesyou have made and restarts your computer
F5	From the exit menu, restores the factory default values for all SETUP options
F6	From the exit menu, leavesthe SETUP program without saving any changes
Esc	Displaysthe exit menu

Whenever you are in SETUP, the bottom of the screen lists the keys you can press to perform specific functions.

Displaying System Information

When you press F2 from either of the SETUP screens, you will see a list of the following:

- Processor type
- Coprocessor type (if one is installed)
- Reserved memory
- BIOS version number
- Addresses for video mode, serial ports, and printer ports.

Press any key to return to the SETUP screen.

Setting the Date and Time

The real-time clock in your computer continuously tracks the date and time-even when the computer is turned off. Once you set the date and time using SETUP, you should not need to change them, unless you adjust the time for daylight savings or a different time zone. (The computer automatically changes the date for leap years.)

Use ↑, ↓, ←, or → to move the cursor to the value you want to change. Then press + or - until you see the value you want.

Setting the Diskette Drive(s)

On your system, diskette drive A is the 3.5-inch, high-density drive installed in the computer. You may also have another drive of a different size or capacity; this is drive B. Check the settings for both drives and correct them if necessary.

Setting the Hard Disk Drive(s)

Your system comes with a hard disk auto-sensing feature that automatically detects the type of hard disk drive(s) installed in your computer. (See Appendix A for a list of hard disk drive types and their parameters.) The SETUP program allows you to view or change the parameters for your hard disk drive.

If you are using an older drive or a preformatted drive, it may not support the auto-sensing feature. If the SETUP program displays drive parameters that do not match your drive, you need to select a different drive type or define your own drive type or reformat the disk. See the instructions below on defining your own drive type.

Using the auto-sensing feature

To allow the computer to automatically detect your hard disk drive, follow these steps:

1. Move the cursor to Hard Disk 1 or 2 and press + or - until you see AUTO DETECT 1 or AUTO DETECT 2. Select AUTO DETECT 1 for your first hard disk drive and AUTO DETECT 2 for your second hard disk drive.

2. Press **Esc** to return to the SETUP menu and press F4 to save your settings. The computer restarts and automatically detects the hard disk drive. The next time you run SETUP, you'll see the parameters detected by the auto-sensing feature.

Defining your own drive type

If the parameters for your hard disk do not match the parameters detected by the auto-sensing feature, or if you want to use your drive with parameters other than the defaults, follow these steps to define your own type:

1. Move the cursor to Hard Disk 1 or *2* and press + or -until you see User Def 1 or User Def 2.

2. Press → to move the cursor to the Cy1 field.

3. Type the appropriate cylinder value for your hard disk. The documentation that came with your hard disk drive will provide the parameter information you need.

4. Continue pressing → to move the cursor to the next field and type in the appropriate values.

Checking System Memory

Your computer comes with 4MB of random access memory (RAM) on SIMMs. When you boot your computer, the system BIOS detects the type of RAM and updates the base memory size and the extended memory size automatically. You see the memory configuration displayed on this SETUP screen.

Setting the Video Display Type

The Video Card option lets you define the type of adapter you are using for your primary display. If you connected your monitor to the computer's built-in VGA port, select VGA/EGA.

If you installed an optional video card, follow the guidelines below to select the correct adapter type.

Video display type options

Select	If
EGA/VGA	You connected your monitor to the built-in VGA port or you installed a VGA or enhanced graphics adapter (EGA) card
CGA40*	You installed an optional color graphics adapter set to 40-column color graphics adapter (CGA) mode
CGA80*	You installed a CGA or a multi-mode graphicsadapter (MGA) attached to a color monitor
MONO*	You installed a monochrome display adapter or an MGA attached to a monochrome monitor

* For these options, you must change jumpers J1 and J2 on the system board to the OFF position. See Chapter 3 for information on setting jumpers

Setting Keyboard Options

Two options in SETUP allow you to control keyboard settings. The Keyboard option allows you to disable the built-in keyboard connector.

The NumLock on at boot option determines the initial state of the Num Lock function when you turn on or reset your system. When Num Lock is off, the keypad controls cursor movement. If Num Lock is on, the keypad types numbers.

Select YES to set the Num Lock function on when the system starts or NO to leave it off.

Setting the Processor Speed

The CPU Speed option sets the processor speed to fast or slow. At fast speed, your processor operates at its highest speed. At the slow speed setting, the processor operates at 8 MHz to provide compatibility with older application programs. Leave it set to fast speed unless you know your application program requires the slow setting.

Cyrix Cache Option

The 486SLC2-50 microprocessor includes a 1KB internal cache Leave this option set to Enabled.

Setting Chip Set Feature Control Options

The second screen of SETUP contains options which control certain chip functions on your system board. Press PgUp or PgDn to display this screen.

Relocating memory

The Relocate Memory option relocates the memory between A0000h to BFFFFh and D0000h to EFFFFh for use as extended memory. If you enable shadowing between D0000h and EFFFFh, however, relocation is automatically disabled.

Shadow RAM options

Your computer can access RAM (random access memory) faster than ROM (read only memory).

The Shadow BIOS ROM (always enabled) and Shadow Video ROM options allow your system to copy the contents of its system and/ or video ROM into RAM so it can perform certain operations faster.

You can also shadow 32KB or 64KB of memory that starts at the indicated addresses to RAM. If you enable these options, you cannot use the Relocate Memory feature between 640KB and 1024KB.

Additional options

Two additional chip set feature options allow you to slow down your system in case you need compatibility with slower option cards or diskette drives.

If you enable the ISA 1 wait state option, the system inserts one wait state in a 16-bit ISA cycle rather than providing the fastest processing at zero wait states.

The Slow Refresh option, when enabled, improves system performance because it lengthens the time needed for each refresh cycle.

Printer port control

This option lets you change your parallel port from the default AT mode (for unidirectional operation) to PS2 mode (for bidirectional operation). Select PS2 mode if you connected a scanner or a parallel port network adapter to your parallel port.

Using the Green PC Features

The Green PC options allow you to define how the energy-saving features of this Energy Star compliant system will work for you. The options on the Green PC Features screen allow you to disable the energy-saving feature or set time-out periods to put the system and hard disk drive in a low-energy standby mode.

The Inactivity Timer1 option sets the time-out period for video signals to your monitor. When the mouse or keyboard has been inactive for the time period you select here, your computer stops sending video signals to your monitor. If your monitor is also Energy Star compliant, it goes into a low-power standby mode because it isn't receiving video signals from your computer. Screens on monitors that aren't Energy Star compliant will go blank when your system is in standby mode.

If you select a time period for the Lockout Timer as well as the Inactivity Timer1 option, the system won't accept your keyboard input for the specified period of time after your system has returned to an active mode. This allows time for your monitor to return to full power also.

The Fixed Disk Timeout option determines the time-out period for your hard disk drive. The hard disk drive goes into a low-power standby mode when the mouse and keyboard have been inactive for the period of time you've indicated.

Note

Some hard disk drives do not support a low-power standby mode. 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 Fixed Disk Timeout option.

Exiting SETUP

When you leave SETUP, you can save your settings and reboot your system, or exit SETUP without saving your settings. You can also return all values to the factory defaults.

To leave SETUP, press **Esc** from any SETUP screen. From the Exiting SETUP menu, you can press these keys:

Esc	Returns to SETUP
F4	Saves the changes you have made to your configuration and restarts your computer
F5	Supplies the factory default values for all options
F6	Exits SETUP and returns to the system prompt without saving any changes.

Post-SETUP Procedures

After you run SETUP for the first time, you may need to install the operating system if your system is not preconfigured. Make sure your hard disk drive is partitioned and formatted for the operating system you plan to install. See your operating system manual for instructions.

Once you have installed your operating system, install any software you plan to use. See your application program manuals for instructions.

You may also want to install the optional extended video drivers and utilities. (If your computer was configured for you, these drivers are already installed.) For more information on installing video drivers and utilities, see the README.TXT files included on your Drivers diskettes. To read one of these files, insert the Drivers diskette in drive A, type the following, and press **Enter:**

```
A:\README
```

To print the file to your printer, type the following and press **Enter:**

```
A:\READMEP
```

Make sure Windows is installed before you install video drivers for Windows applications.

To obtain drivers for additional applications or new drivers which may become available, call the EPSON Connection or access the Epson America Forum on CompuServe.

Chapter 2

Using Your Computer

This chapter briefly describes the following operations:

- Working comfortably
- Inserting and removing diskettes
- Stopping a command or program
- Resetting the computer
- Changing the processor speed.

Working Comfortably

This section provides some tips for creating a comfortable work environment.

- Use good posture. Keep your elbows, hips, and knees bent at approximately 90 degree angles and keep your wrists as close to horizontal as possible.
- Vary your posture often and take frequent breaks. Stand up, stretch, and move around.
- Use a good chair. Make sure your chair supports your lower back. A chair with padded armrests lets you rest your arms as you work.
- Keep your copy stand at the same eye level as your screen. This reduces eye and neck strain. Also, rest your eyes occasionally by closing them or focusing on a fixed spot in the distance.

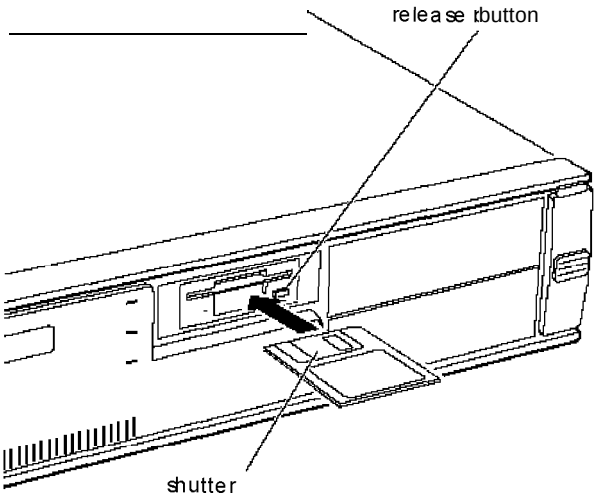
- Be gentle with your keyboard. Too much force creates tension in your hands. Also, make sure your work surface has enough room for you to move the mouse or other pointing device freely.

- Use good lighting that isn't too bright. Try to keep bright light sources out of your field of vision when you are looking at the screen.

- Place your monitor directly in front of you and sit about an arm's length away from it. The top of the screen should be slightly below your eye level so you look down at the screen. Position the monitor so that no light is reflected from the screen.

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 illustration. Slide the diskette into the drive until it clicks into place.



Note
The 3.5-inch drive installed in your computer is drive A. If you install another diskette drive, it is drive B. You can change the drive assignments through SETUP.

To insert a diskette into a 5.25-inch drive, hold the diskette with the label facing up and the read/ write slot leading into the drive. Slide the diskette into the drive and then turn down the latch to secure it.

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

Caution
Never remove a diskette or reset or turn off the computer 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 have entered an MS-DOS® or application program command that you want to stop, try one of the following:

- ☐ Press Pause
- ☐ Hold down Ctrl and press C
- ☐ Hold down Ctrl and press Break.

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

Resetting the Computer

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

For example, if an error occurs and the computer does not respond to your 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 normally. If you reset the computer without properly exiting a program, you may lose data.

To reset the computer, the operating system must be either on the hard disk or on a diskette in drive A, so if you do not have a hard disk, insert the system diskette in drive A. If you are using MS-DOS, you can hold down Ctrl and Alt and press Del. The screen displays nothing for a moment and then the computer reloads your operating system.

You can also press the RESET button located on the front right side of your computer.

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

Changing the Processor Speed

Your computer's processor can operate at two speeds: fast or slow (8 MHz). The slow speed is available to provide compatibility with older application programs.

When your computer is operating at fast speed, the SPEED light on the front panel is on. When the computer is operating at slow speed, the light is off.

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

Some copy-protected programs require the computer to run at slow speed while accessing the program on a diskette. These programs also usually require you to leave a key disk-the diskette that contains the copy protection-in the diskette drive.

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 --. (Hold down the Ctrl key and the Alt key simultaneously and then press the -- key on the numeric keypad.)

- To select fast speed, hold down the Ctrl and Alt keys and press + on the numeric keypad.

> **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. You can, however, change the processor speed through SETUP.

The speed setting remains in effect until you reset your computer or turn it off.

Chapter 3

Installing and Removing Options

You can enhance the performance of your computer by adding optional equipment such as memory modules, option cards, video memory, or a math coprocessor.

This chapter first describes how to remove your computer's cover to install options and how to replace the cover when you are finished. It then describes the following:

- ☐ Locating the internal components
- ☐ Changing the jumper settings
- ☐ Installing and removing memory modules
- ☐ Installing and removing option cards
- ☐ Adding video memory
- ☐ Installing the math coprocessor.

Caution
Never install options or change jumper settings with the computer turned on or the power cord connected to the computer.

Once you have installed your option, see "Post-installation Procedures" on page 3-20.

Removing the Cover

You need to remove the computer's cover to install any of the options described in this chapter or to install or remove a disk drive (as described in Chapter 4). Follow these steps to remove the cover:

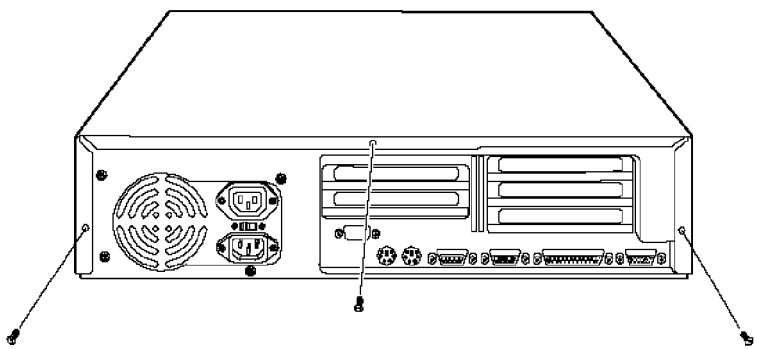
1. Turn off the computer and then any peripheral devices (including the monitor and printer).

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

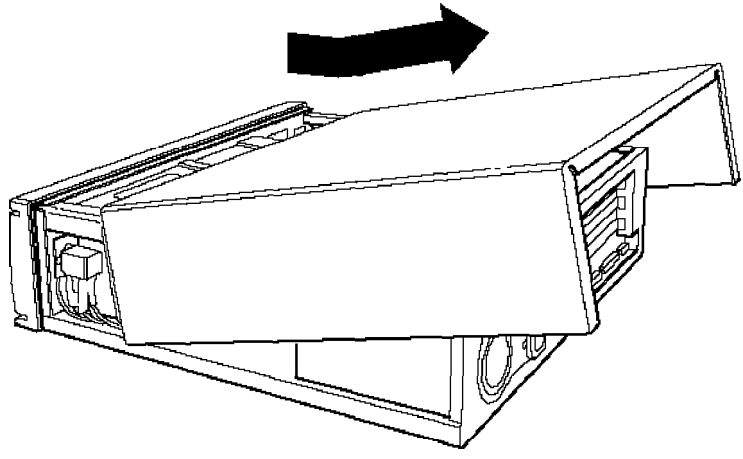
3. If the monitor is on top of the computer, lift it off and set it to one side.

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

5. Remove the three screws securing the back panel, as shown below.



6. Grasping the sides of the cover, lift it up at an angle and pull it off, 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, 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.

3. Make sure all cables are out of the way so they do not catch on the cover.

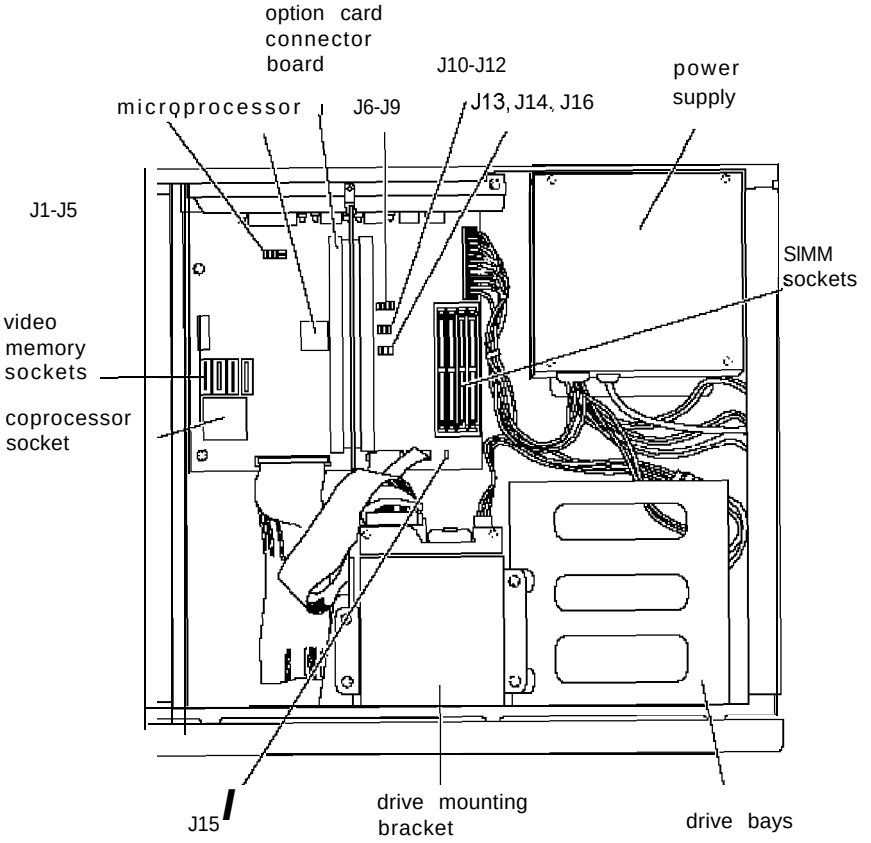
4. Insert the lip at the front of the cover between the front bezel and the chassis of the computer and guide it straight down. (See the illustration on page 3-3.)

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 cable 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 following illustration to locate the major components inside your computer.



Changing the Jumper Settings

The jumpers on the main system board control certain functions and are preset at the factory to default positions; however, you can use the information in the following tables to change their settings, if necessary.

Jumpersettings

Jumper number	Jumper setting	Function
J3	1-2 OFF*	Enables VGA IRQ Disables VGA IRQ
J6	1-2 * 2-3	Enables COM1 Disables COM1
J7	1-2* 2-3	Assigns COM1 serial port as COM1 (3F8H-3FFH)** Assigns COM1 serial port as COM3 (3E8H-3EFH)**
J8	1-2 * 2-3	Enables COM2 Disables COM2
J9	1-2* 2-3	Assigns COM2 serial port as COM2 (2F8H-2FFH)** Assigns COM2 serial port as COM4 (2E8H-2EFH)**
J10	1-2 * 2-3	Enables parallel port Disablesparallel port
J11	1-2* 2-3	Assigns parallel port as LPT1 (378H-37FH)** Assigns parallel port as LPT2 (278H-27FH)**
J12	1-2 2-3*	Enablesgame port Disablesgame port
J13	1-2 * 2-3	Enables diskette drive controller Disables diskette drive controller
J14	1-2 * 2-3	Enables the IDE hard disk drive controller Disablesthe IDE hard disk drive controller
J15	1-4 2-3 * 3-4	Selectsexternal battery Selects the system board battery Discharges CMOS memory (this resets the SETUP values to their factory defaults)

Jumper settings (continued)

Jumper number	Jumper setting	Function
J16	1-2 * 2-3	Enables the IDE hard disk drive controller Disablesthe IDE hard disk drive controller

* Factory setting

** MS-DOS automatically reassigns parallel and serial ports. Checkyour MS-DOS manual for more information.

Built-in VGA jumper settings

Built-in VGA	J1	J2
Enable	1-2*	1-2*
Disable	Off	Off

* Factory setting

Note
To use an external display adapter in an expansion slot, you must disable the built-in VGA adapter.

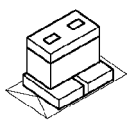
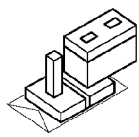
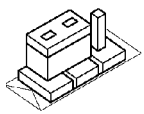
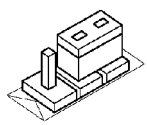
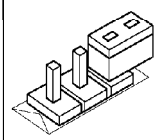
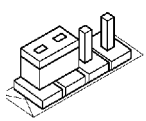
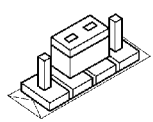
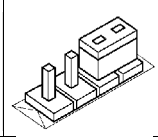
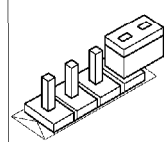
The jumpers listed in the preceding tables are the only jumpers you may need to change. Other jumpers on the system board are for service purposes only.

Setting the Jumpers

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

1. Refer to the illustration on page 3-5 to locate the jumpers.
2. If there are any option cards installed in your computer, you need to remove them to access the jumpers. See page 3-16.

3. A jumper's setting is determined by where the jumper is placed on the pins. Use the following table to identify the pin settings for 2-pin, 3-pin, and 4-pin jumpers. To locate pin 1, look at the system board under the jumper; a triangle is traced on the board at pin 1.

Jumper type	Position			
2-pin	On 	Off 		
3-pin	1-2 	2-3 	Off 	
4-pin	1-2 	2-3 	3-4 	Off 

To move a jumper from one position to the other, 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 surrounding components on the main system board.

4. Replace any option cards you removed. See page 3-13 for instructions.

Installing Memory Modules

Your computer comes with 4MB of memory on memory modules-also called SIMMs (single in line memory modules). By installing additional SIMMs, you can increase the amount of memory in your computer up to 16MB.

There are four SIMM sockets on the main system board, and each can contain one SIMM. You can use 1MB and 4MB SIMMs.

The following table shows the possible SIMM configurations; do not install memory in any other configuration. The label on the system board for each SIMM socket *(RAM1* through RAM4) identifies the bank of sockets where you should install SIMMs.

SIMM configurations

BANK 0 (RAM1 and RAM2)	BANK 1 (RAM3 and RAM4)	Total memory
1MB	1MB	4MB
4MB	x	8MB
4MB	4MB	16MB

Before you install SIMMs, check the following guidelines to ensure that they will work properly:

- ☐ Use only tin-plated, 30-pin, 8-bit or 9-bit, fast-page mode SIMMs that operate at an access speed of 70ns (nanoseconds) or faster. Be sure all the SIMMs operate at the same speed.

- ☐ Use the correct SIMM configuration to add the amount of memory you want. See the table above.

- ☐ Your SIMM sockets may not look exactly like the ones in the illustrations. If you're not sure how to install SIMMS, contact the EPSON Connection or ask for assistance.

Inserting SiMMs

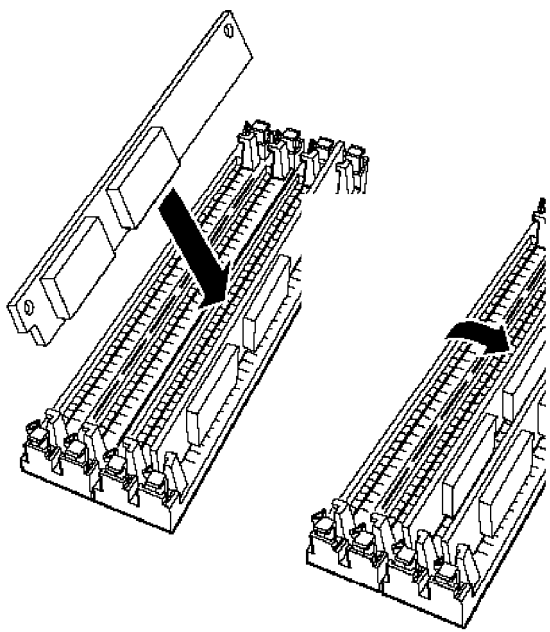
Follow these steps to install SIMMs:

1. Refer to the illustration on page 3-5 to locate the SIMM sockets.

2. Remove any option cards that may be blocking your access to the SIMM sockets. (See page 3-16 for instructions.)

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

4. Position the first SIMM at an angle over the first empty socket in the bank you are filling, as shown below. The components on the SIMM should face the inside of the computer.



5. Push the SIMM into the socket until it is seated firmly in the slot. Then tilt it upright, as shown above, 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.

6. Repeat steps 4 and 5 for each additional SIMM.

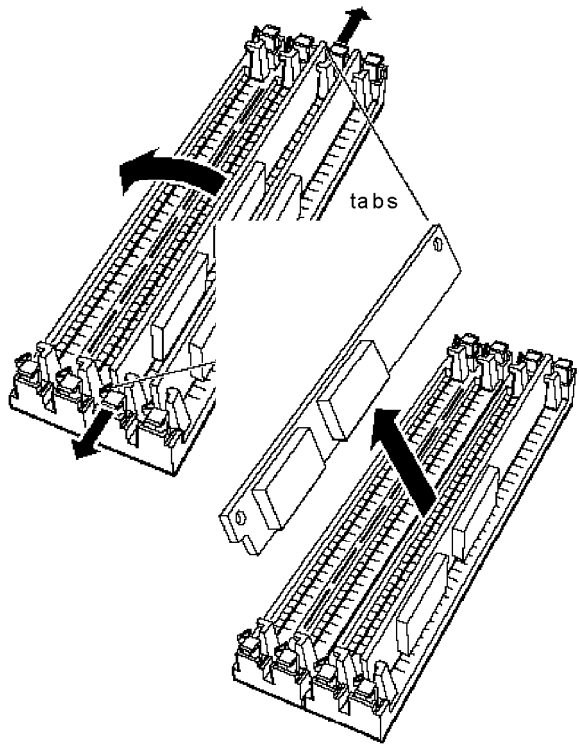
7. Replace any option cards you removed. (See page 3-13 for instructions.)

Removing SIMMs

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

1. Remove any option cards that may be blocking your access to the SIMM sockets. (See page 3-16 for instructions.)

2. Use your fingers or a small screwdriver to carefully pull away the tabs that secure the SIMM at each end, as shown below. As you pull away the tabs, the SIMM falls to the side. Remove it from the socket.



3. If necessary, follow the same procedure to remove other SIMMs.

4. Replace any option cards you removed, as described below.

Installing an Option Card

This section explains how to install option cards in your computer. Your computer has five 16-bit, ISA slots; three full length and two half-length.

As you install option cards, keep these guidelines in mind:

- 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, be careful not to touch any of the components on the circuit board or the gold-edged connectors. If you need to set it down before you install it, place it gently on top of its original packing material with the component side facing up. Keep the packing materials in case you remove the card later.

- Before you install the card, adjust any switches or jumpers on the card, if necessary. (See the instructions that came with the option card.) Also, see if you need to change any jumper settings on the system board. For example, if you install a video card, you need to disable the built-in VGA adapter. See page 3-6 for more information on jumpers.

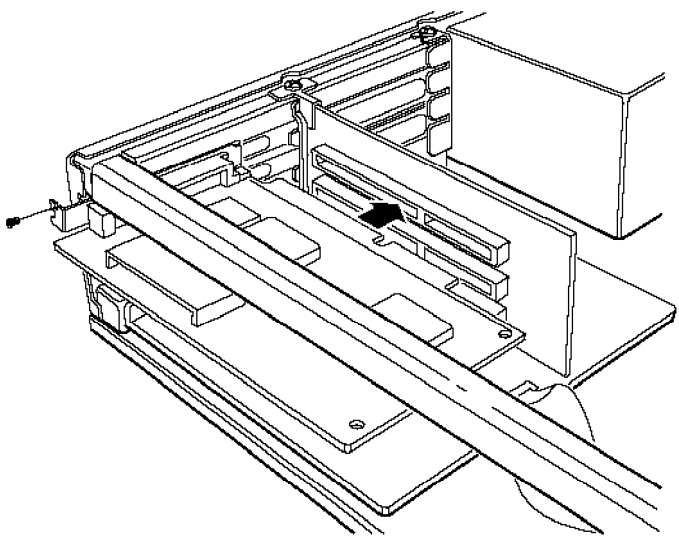
Installing a Card in a Full-length Sot

Follow these steps to install an option card in one of the full-length slots:

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.)

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 into the slot, as shown below. (If you are installing a full-length card, insert the front edge of the card into the corresponding guide inside the computer's front panel.)



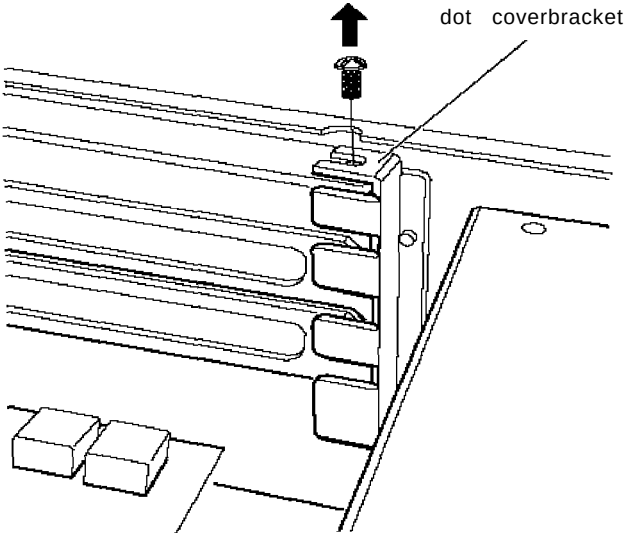
Once the connectors reach the slot, push the card in firmly (but carefully) to insert it fully. You should feel it fit into place. If the card does not go in smoothly, do not force it; pull it all the way out and try again.

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

Installing a Card in a Half-length Sot

Follow these instructions to install a card in one of the half-length slots:

1. Remove the retaining screw securing the slot cover bracket. Remove the bracket by lifting it straight up and out of the small metal holder at the bottom.



2. Remove the slot cover.

3. Hold the card along the top corners with the components facing down and guide it into the slot.

   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. Replace the slot cover bracket by inserting it into the small metal holder below the option slots.

5. Secure the slot cover bracket to the computer with the retaining screw.

Removing an Option Card

You may need to remove an option card installed in your computer to access components on the main system board-to change a jumper setting, for example. You may also want to remove a card if you no longer need it. Refer to the illustrations on pages 3-14 and 3-15 as you follow these steps:

1. If you are removing a card from one of the full-length slots, first remove the retaining screw securing the option card to the computer. Then pull the card straight out of the slot.

2. If you are removing a card from one of the half-length slots, first remove the slot cover bracket. Then pull the card straight out of the slot.

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

Adding Video Memory

Your computer comes with 512KB of video memory. You can increase your video memory to 1MB by installing four video DRAM DIP (Dual Inline Package) chips. The chips must be 20-pin, 256KB, 70ns. Additional video memory is useful for running graphics-intensive applications or for supporting resolutions up to 1280 x 1024 in 16 colors (interlaced) on your monitor. See Appendix A for a table identifying supported colors and resolutions for each amount of video memory.

For the memory to work properly, you must install one chip in each empty video RAM socket on the system board.

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 the EPSON Connection or ask for assistance.

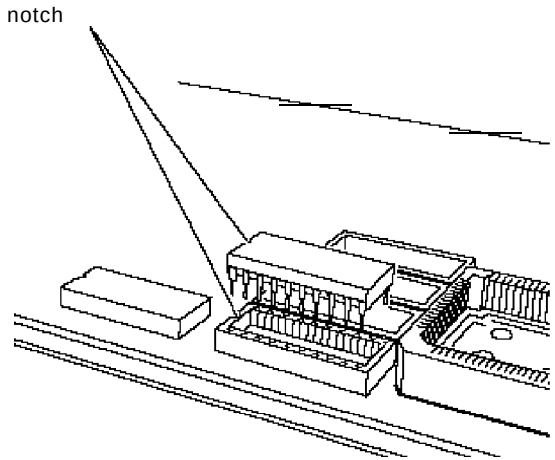
1. Locate the video memory sockets on the main system board, shown on page 3-5.

2. If there is an option card in your way, remove it. See page 3-16 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. Remove the memory chips from their package and inspect each one. The pins should point inward at slightly less than a 90° angle. If any of the pins are not in this position, use your fingers or small tweezers to gently align them with the other pins. Be careful; the pins are fragile and can break off easily.

4. Position one of the memory chips over the socket as shown below, aligning the pins on the chip with the holes in the socket. Make sure the small notch on the end of the chip aligns with the corresponding notch in the socket.



5. Gently press the chip halfway into the socket (to make sure it is correctly aligned). If the chip does not go in smoothly, remove it and try again.

6. When the chip is properly positioned, push down firmly on both ends to make sure it is well-seated.

7. Repeat steps 4 through 6 for each of the remaining chips.

8. Replace any option cards you removed. See page 3-13 for instructions.

Installing the Math Coprocessor

You can enhance your system's performance for some applications by installing a Cyrix 83S87-25 math coprocessor.

Note that your coprocessor socket may not look exactly like the one in the illustration. If you're not sure how to install a math coprocessor, contact the EPSON Connection or ask for assistance.

To install the math coprocessor, follow the instructions in the manual that came with it, or follow these steps:

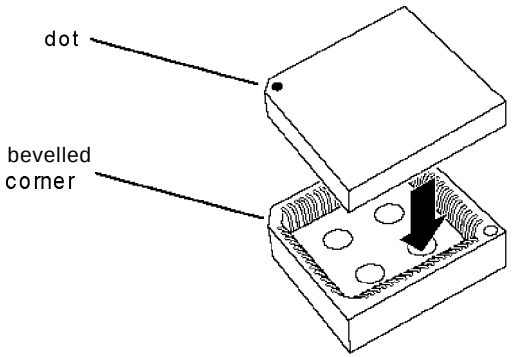
1. Locate the socket for the math coprocessor. See page 3-5.

2. If there is an option card in your way, remove it. See page 3-16 for instructions.

> **Caution**
> Before you remove the math coprocessor from its anti-static packaging, touch a metal surface on the computer chassis. Do not touch the pins on the coprocessor.

3. Remove the coprocessor from its package and inspect it. If the pins appear bent, do not install the coprocessor. You may need to replace it.

4. Position the coprocessor over the socket as shown below. Align the notched corner of the coprocessor (marked with a dot) over the bevelled corner in the socket. Then gently push it straight into the socket, pressing evenly on all sides.



5. Replace any option cards you removed. See page 3-13.

Caution
Removing a coprocessor chip requires a special tool. To remove a chip, take your computer to an Authorized EPSON Servicer.

Post-installation Procedures

After you install or remove options such as memory modules or a math coprocessor, you must run SETUP to update the computer's configuration. See Chapter 1 for instructions. Additionally, you may need to add some commands to your configuration files. See your operating system manual and the manual that came with your optional equipment.

Chapter 4

Installing and Removing Drives

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

Your computer can hold up to four mass storage devices. You can install one hard disk drive using the internal mounting bracket below the diskette drive. In the externally accessible bays, you can install a second diskette drive or hard disk drive, a tape drive, a CD-ROM drive, or an optical drive.

To install or remove a drive, first remove the computer's cover as described in Chapter 3. Then remove any option cards to access the drive bracket. Once you have installed the drive, replace any option cards you removed. See Chapter 3 for instructions.

Follow the appropriate instructions in this chapter to install and remove drives:

- ☐ Removing the diskette drive and mounting bracket
- ☐ Installing a hard disk drive using the mounting bracket
- ☐ Removing a hard disk drive from the mounting bracket
- ☐ Installing a drive in one of the externally accessible drive bays
- ☐ Removing a drive from one of the externally accessible drive bays

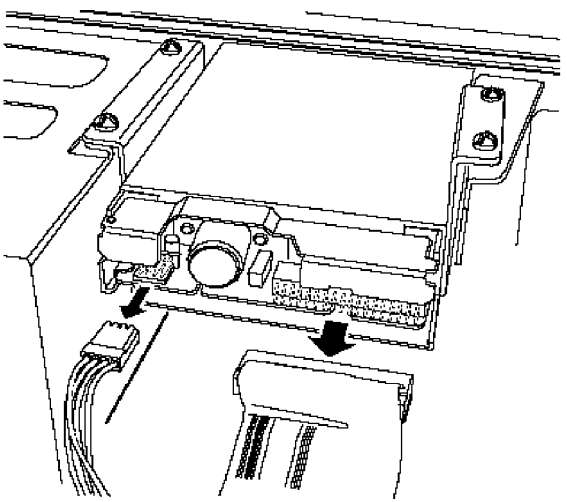
- ☐ Post-installation procedures

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.

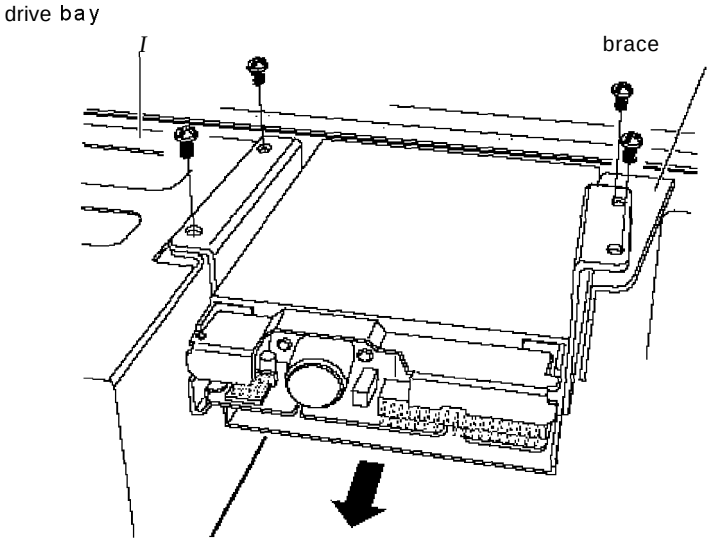
Removing the Diskette Drive and Mounting Bracket

Your computer has a 3.5-inch diskette drive installed in a mounting bracket. (You may also have a hard disk drive installed in the bracket.) In order to install a hard disk drive, additional diskette drive, or any other type of drive, you must first remove the drive(s) and mounting bracket. Refer to the illustrations below and follow these steps:

1. Remove the two cables from the diskette drive. Grasp the connectors and pull them straight out so you do not bend the pins; do not pull on the cables. (If necessary, remove the cables from the hard disk drive also.)



2. Remove the screws securing the bracket to the drive bay and brace.



3. Slide the bracket and drive(s) away from the front of the computer and lift them out.

Installing a Hard Disk Drive Using the Mounting Bracket

You can install a hard disk drive below the diskette drive in the mounting bracket, once you have removed the bracket and drive from the computer. In order to fit in this space, your hard disk drive must be 1 inch high by 3½ inches wide. If you have a larger hard disk drive, you can install it in one of the drive bays (see page 4-15).

This section includes steps for the following procedures:

- ☐ Removing the mounting frames from the hard disk drive (if necessary)
- ☐ Installing the hard disk drive below the diskette drive in the mounting bracket
- ☐ Replacing the mounting bracket and drives in the computer
- ☐ Connecting the drive cables.

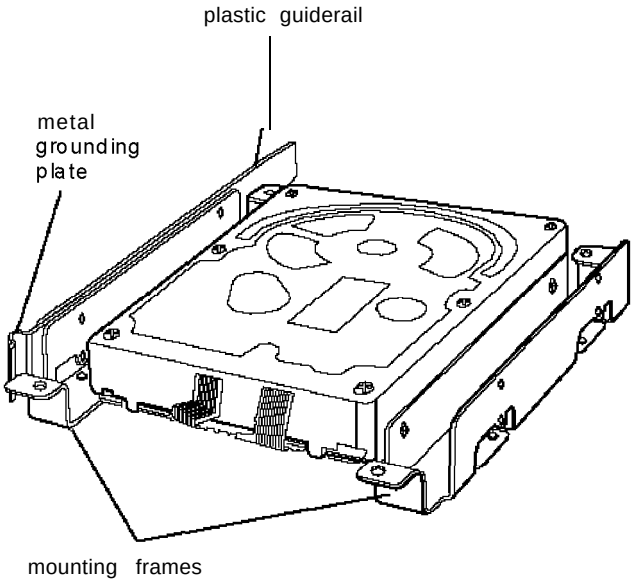
If you have two hard disk drives, one must be configured as the master (which contains your operating system), and the other as the slave. Be sure to check the jumper settings on the hard disk drive before you install it.

Also, you may need to know the number of cylinders, heads, sectors, etc., if the hard disk drive auto-sensing feature in SETUP is unable to correctly identify your drive. The hard disk drive table used in the SETUP program is included in Appendix A, along with a table of jumper settings for high-capacity EPSON drives. If your drive is not listed or you need more information, see the documentation that came with your drive or contact the manufacturer.

Removing the Mounting Fames

If there are mounting frames attached to your hard disk drive, remove them before you install the drive. Follow these steps:

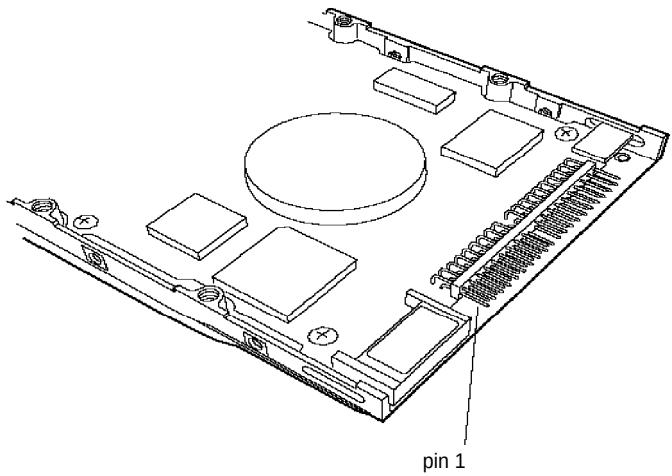
1. On your drive, there may be a plastic guiderail and metal grounding plate attached to one of the mounting frames. If so, remove the screws securing them to the mounting frame and remove the guiderail and grounding plate.



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

Note

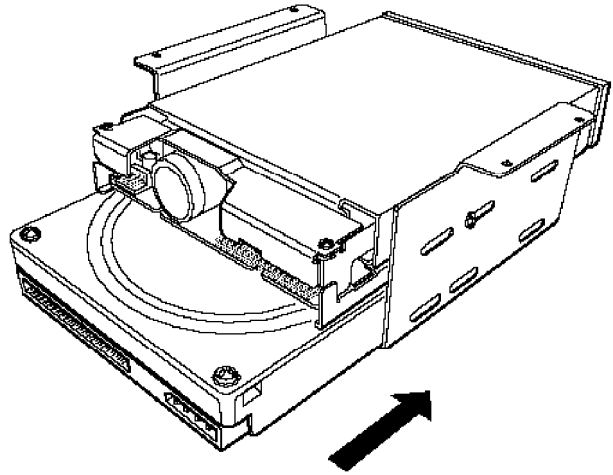
Before you install the hard disk drive, turn it over so you can see the circuit board, as shown below. Locate the side of the drive connector containing pin 1, indicated by a "1" or "2" printed on the board. You will need to know the location of pin 1 when you connect the hard drive cable.



Installing the Hard Disk Drive Below the Diskette Drive

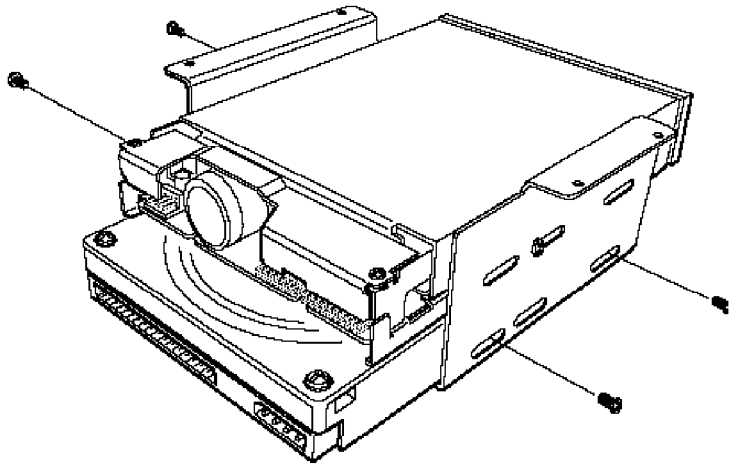
Follow these steps to install the hard disk drive in the bracket below the diskette drive:

1. With the drive components facing down, slide the drive into the bracket until the front of the drive is nearly flush with the edge of the bracket.



2. Align the holes in the drive with the oval-shaped holes in the bracket.

3. Secure the drive with two or four screws, depending on the location of the holes.

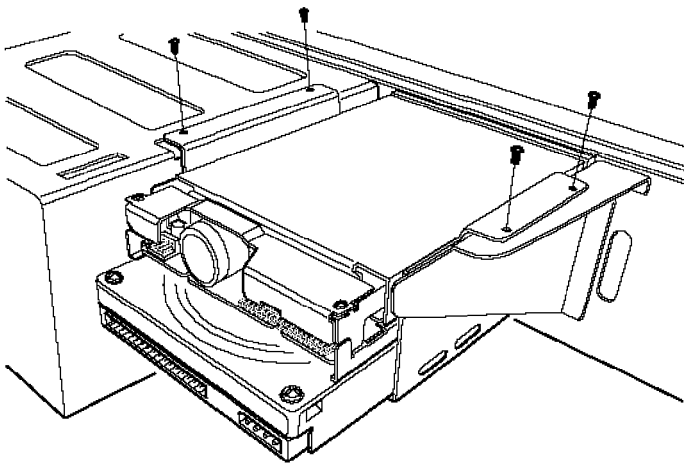


Replacing the bracket and drives in the computer

Follow these steps to replace the bracket and drives in your computer:

1. Lower the bracket with the drives into the mounting area and slide it forward, inserting the front of the diskette drive through the drive slot in the front panel of the computer.

2. Make sure the holes in the bracket are aligned with the holes in the drive bay and brace. Then secure the bracket with the screws you removed previously.



Connecting the Drive Cables

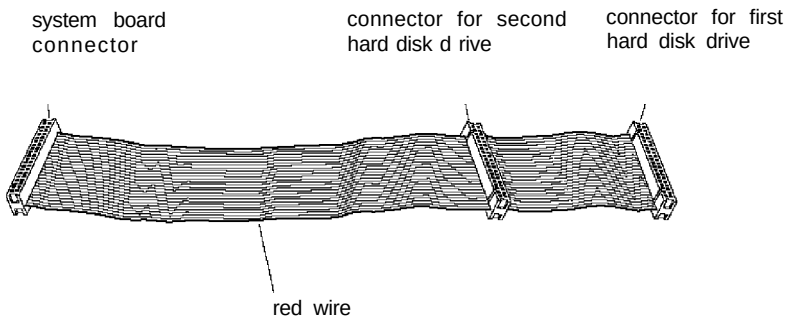
After you replace the bracket, you need to connect the cables for both the hard disk drive and the diskette drive. This section includes steps for the following procedures:

- ☐ Connecting the drive ribbon cable to the system board
- ☐ Connecting the cables to the hard disk drive
- ☐ Reconnecting the cables to the diskette drive.

Connecting the drive cable to the system board

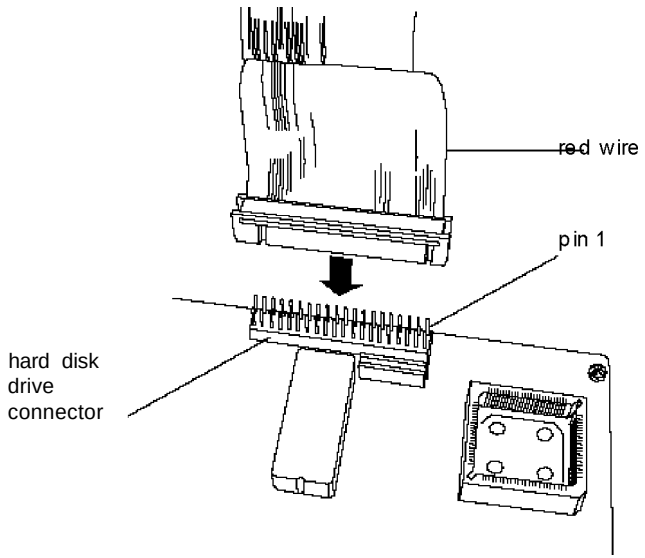
Follow the steps below to connect the hard drive ribbon cable to the system board, if it is not already connected.

1. Locate the hard disk drive ribbon cable; it is a flat cable with a connector on each end and an additional connector on the ribbon cable. All the connectors on this cable look the same.



2. Locate the hard disk drive connector on the system board.

3. Position the system board connector end of the cable so that the red wire aligns with pin 1 of the connector on the system board. There is a "1" printed on the system board to identify pin 1.



4. Make sure the holes in the connector fit over the pins; then push in the cable connector.

Caution
If you do not correctly align the holes with the pins, you could severely damage your system board when you push in the cable connector.

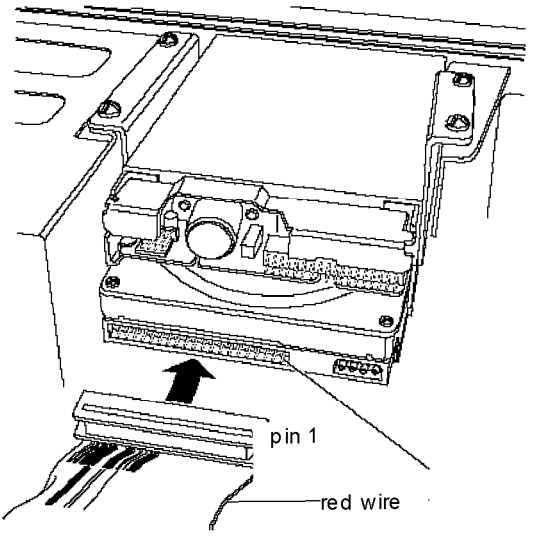
Connecting the ribbon and power cables to the drive

Follow the steps below to connect the hard disk drive ribbon cable and a power supply cable to the drive:

1. Locate the hard disk drive connector on the end of the hard disk drive ribbon cable.

2. Locate pin 1 on the drive connector. If you do not see it on the connector casing and you did not locate it before you replaced the drive bracket, you may have to remove the drive and turn it over to check the circuit board. See page 4-14 for instructions on removing the drive and page 4-6 for instructions on locating pin 1 on the drive connector.

3. Position the connector on the cable so that the red wire aligns with pin 1 on the drive.



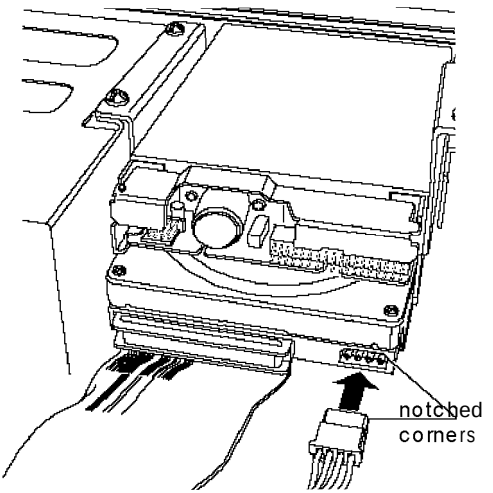
4. Make sure the holes in the cable connector fit over all the pins; then push in the connector.

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 cable connector.

5. Locate one of the power supply cables that lead from the power supply. (They have multi-colored 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.



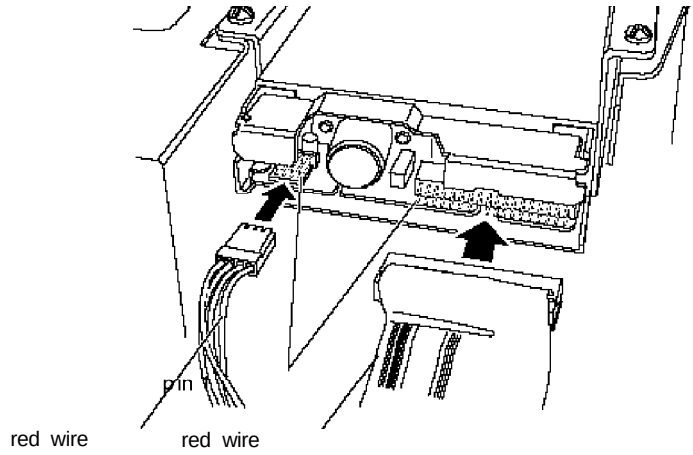
7. Make sure the holes fit over all the pins and then push in the connector.

Caution

If you do not align the cable connector correctly, you could severely damage your hard disk drive when you push it in.

Reconnecting the Cables to the Diskette Drive

After you replace the drive bracket and connect the hard drive cables, you need to reconnect the diskette drive cables.



Refer to the illustration above while you follow these steps:

1. Locate the connector on the diskette drive ribbon cable.

2. Identify pin 1 on the drive and align the connector so that the red wire is at pin 1. Push in the connector.

3. Locate the power supply cable with the small connector.

4. Position the power supply cable connector so that the holes fit over all the pins. The red wire on the cable will align with pin 1 identified at the power connector on the circuit board of the drive. Push in the connector.

Caution

If you do not align the cable connector correctly, you could severely damage your diskette drive when you push it in.

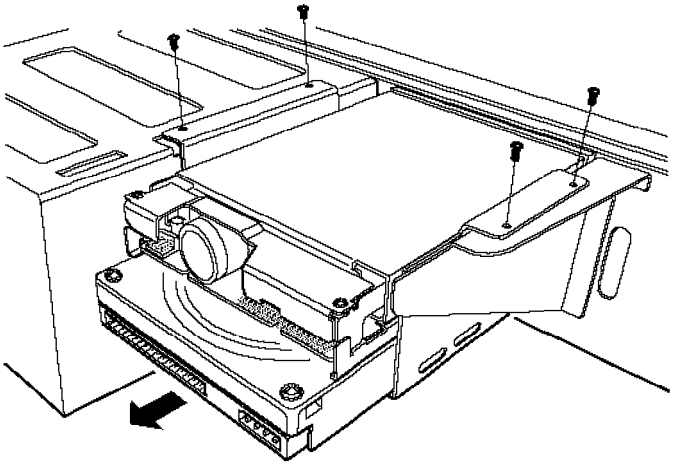
Removing *a Hard Disk Drive From the Mounting Bracket*

Follow these steps if you need to remove the hard disk drive from the bracket:

1. Disconnect the cables from the back of the hard disk drive and diskette drive in the bracket. Grasp the connectors and pull them straight out so you do not bend the pins; do not pull on the cables.

2. Remove the screws securing the bracket to the drive bay and brace.

3. Slide the bracket and drive away from the front of the computer and lift them out.



4. Remove the screws securing the hard disk drive to the bracket and slide the drive out of the bracket.

5. Replace the diskette drive and bracket following the instructions on page 4-8.

Installing a Drive in a n Edema l Drive Bay

Your system comes with two externally accessible drive bays. You can use these bays to install any combination of the following: a second diskette drive, hard disk drive, CD-ROM drive, tape drive, or optical drive.

If you are installing a diskette drive or a tape drive with a standard 5.25-inch diskette drive connector, you can connect it using the diskette drive cable that came with your system. If you are installing a hard disk drive or drive with a different type of connector, you may need to purchase a different cable.

If you are installing a second hard disk drive, be sure its jumper(s) are set to configure it as the slave drive; the master drive is the first one, which contains your operating system. A table of jumper settings for high-capacity EPSON drives is included in Appendix A. If your drive is not listed or you need more information, see the documentation that came with your drive or contact the manufacturer.

If you are installing a hard disk or other type of drive with a 3½-inch form factor, you will need to attach mounting frames to the drive. If you are installing a drive that already has mounting frames on it, see if it also has a plastic guiderail and metal grounding plate attached to it. If so, follow step 1 on page 4-5 to remove the guiderail and grounding plate. Then go to “Installing the Drive” on page 4-17.

This section includes steps for the following procedures:

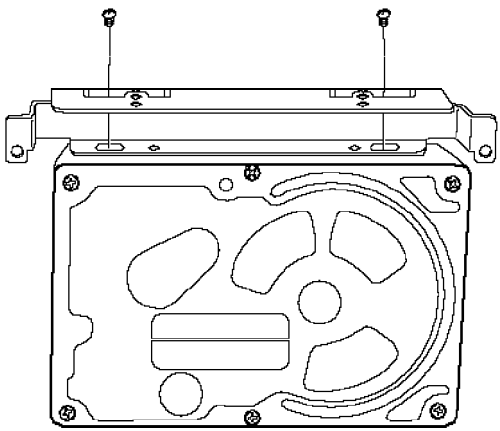
- ☐ Attaching mounting frames to the drive (if necessary)
- ☐ Installing the drive in the bay
- ☐ Connecting the drive cables

Attaching Mounting Fames to the Drive

Follow these steps to attach mounting frames to a drive:

1. Locate the two mounting frames and four screws that came with the drive.

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

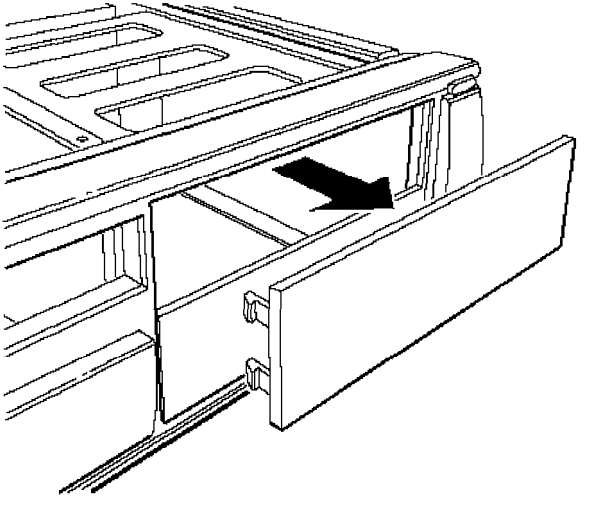


3. Repeat step 2 to attach a mounting frame to the other side of the drive.

Installing the Drive

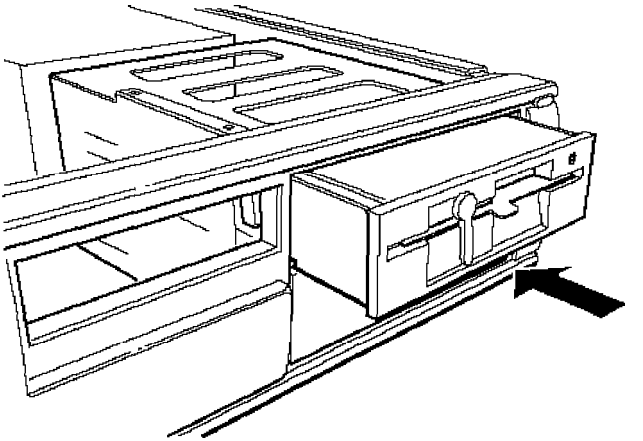
Before you can install a drive in one of the external bays, you must first remove the mounting bracket with the diskette drive (and possibly a hard disk drive). See page 4-2 for instructions. Then follow these steps to install a drive in the upper or lower drive bay:

1. Remove the faceplate from the bay by pushing it out from the inside of the computer.

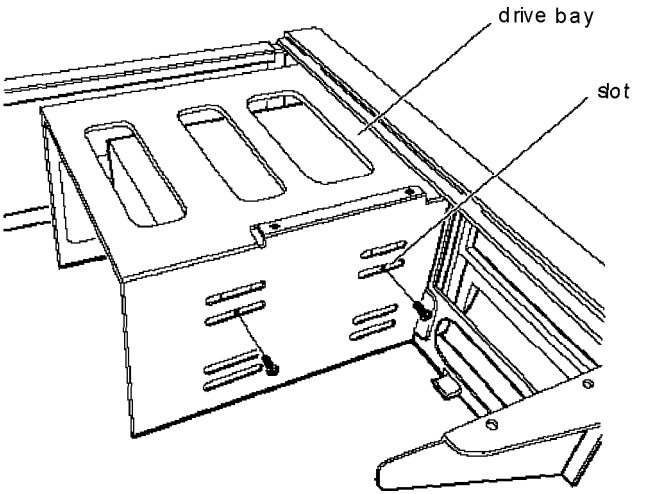


Keep the faceplate in a safe place in case you remove a drive later (or you are installing a hard disk drive).

2. Slide the drive through the slot into the bay until it is flush with the front of the computer.



3. Align the slots at the side of the drive bay with the mounting holes in the drive or mounting frames. Then secure both sides of the drive to the bay using the retaining screws.

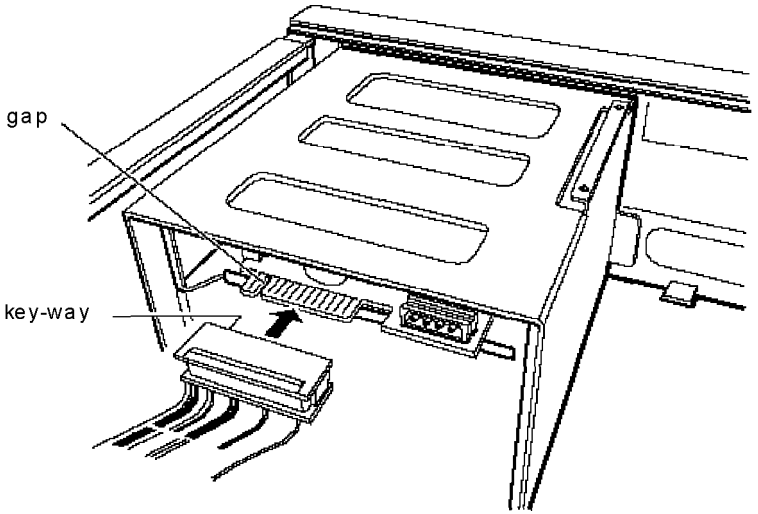


Connecting the Drive and Power Cables

To connect the drive to the computer, you need to connect both the drive ribbon cable and a power supply cable. If you are installing a hard disk drive, follow the instructions on pages 4-9 through 4-12. Then go to step 5. If you are installing a diskette or tape drive, follow the steps below.

1. If you are installing a diskette drive, locate the diskette drive ribbon cable. (The connector in the middle of the cable is already connected to the system board.)

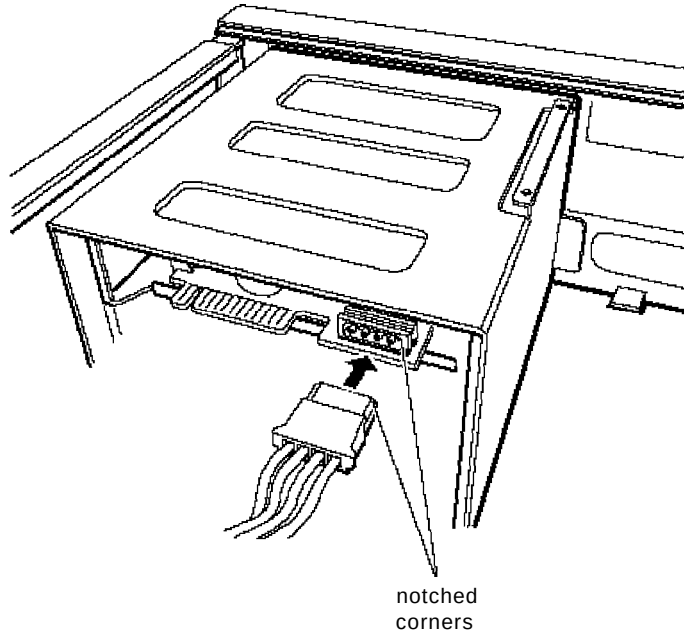
2. If you are installing a drive with a card-edge connector, make sure you align the key-way (the plastic divider) with the gap in the drive connector, as shown below.



If you are installing a 3.5inch diskette drive with a header connector, see page 4-13 for instructions on connecting the cable.

3. Locate one of the power supply cables that lead from the power supply. (They have multi-colored wires and a plastic connector on the end.)

4. Align the notched corners of the power supply cable connector with the notched corners of the drive's power supply connector (such as the one shown below). Make sure the holes fit over all the pins and then push in the connector.



> **Caution**
> If you do not align the cable connectors correctly, you could severely damage your drive when you push them in.

5. If you installed a hard disk drive in one of the external bays, replace the faceplate. Insert one side of the plate, then gently press on the other side until it snaps into place.

If you installed a diskette drive in the bay, it is drive B; the drive installed in the mounting bracket is A. You can change the drive assignments through SETUP.

If you have one hard disk drive installed in the bracket below the diskette drive and a second hard disk drive in the bay, you will need to purchase a new hard disk drive cable that can reach both drives.

After you have completed installation of the drive in the external bay, you must replace the mounting bracket which contains the diskette drive (and possibly a hard disk drive) and reconnect the cables. See page 4-8 for instructions.

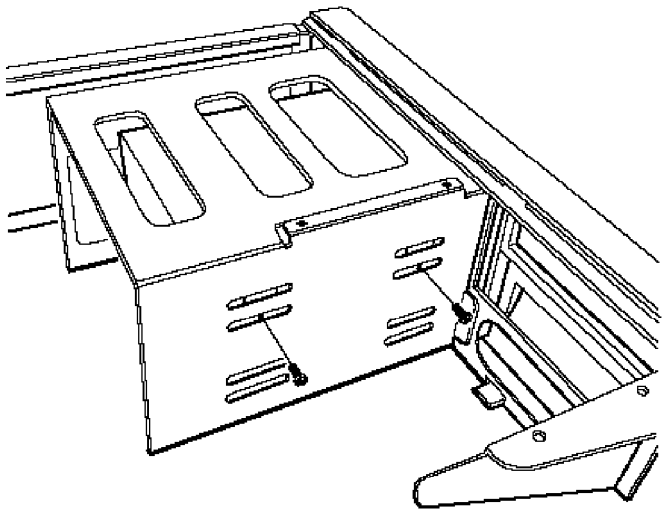
Removing a Drive from an External Bay

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

1. Remove the bracket and its drives. See page 4-2 for instructions.

2. Remove both the ribbon cable connector and the power cable connector from the drive to be removed from the external bay.

3. Remove the two screws securing the drive on each side.



4. Reach behind the drive and gently push it to the front of the bay; then pull it out of the slot.

5. Once you have removed the drive, replace the faceplate by inserting one side of the plate, then gently pressing on the other side until it snaps into place.

6. Replace the diskette drive and mounting bracket and reconnect the cables. See page 4-8 for instructions.

Post-installation Procedures

After you install or remove your drive(s) and replace the cover on your computer, you need to run the SETUP program to define the correct configuration for your newly installed drive. See Chapter 1 for instructions.

Chapter 5

Troubleshooting

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

The troubleshooting suggestions in this chapter are organized in general categories, such as "The computer will not start." Within each category, a more specific problem is described with possible solutions.

If the suggestions here do not solve the problem, contact your Authorized EPSON Servicer or the EPSON Connection. See "Where to Get Help" in the Introduction of this manual for instructions.

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: Look on the label on the bottom of the computer to find the serial number.

System BIOS version: Restart your system. You'll see the system BIOS version number displayed on the screen when your system performs power-on diagnostics.

System configuration: Start SETUP and select the System Summary option to see your system's configuration.

MS-DOS version: At the MS-DOS prompt, type **VER** and press Enter to see the MS-DOS version number.

Software versions: In Windows 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 your 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. This prevents damage to the computer's electrical circuitry.

The computer does not start and the powerlight 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. Turn off your computer and unplug the power cord. Plug a lamp into the outlet and turn it on.

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.

You may have installed a SIMM incorrectly. If the system doesn't detect memory, it won't start. Check that your SIMM(s) are securely installed in their sockets.

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. If that doesn't work, press the RESET button.

You may have installed memory using SIMMs that work at the wrong speed. You can try using the SETUP program to insert a wait state (see Chapter 1) or you can install the correct SIMMs (see Chapter 3).

Your system may have overheated because its physical environment is too warm. Allow the system to cool and relocate it, if necessary.

You reset the computer, but it still does not respond.

Try turning the computer off, wait 20 seconds, and turn it on again.

Keyboard Problems

The screen displaysa keyboard error message when you turn on or reset 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.

Nothing happens when you type on the keyboard.

The Lockout Timer may be set in SETUP. This option inactivates the keyboard for a specified period of time after the system returns to an active mode from a low-power standby mode. This delay gives Energy Star compliant monitors the time they need to return to an active mode. Wait a few seconds and try again.

See "The Computer Does Not Respond," above

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 NumLock to turn off the function.

If you want to change the initial settings of the num lock function, see "Setting Keyboard Options" in Chapter 1.

Mouse Problems

Yourmouse 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 K/Bport. Also make sure you installed the mouse driver correctly (if necessary). See the documentation that came with your mouse and Chapter 1 for instructions. (The Windows installation program automatically installs a mouse driver for Windows applications.)

Monitor Problems

There is no display on the screen.

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

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

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 computer is in low-power standby 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 and display adapter match. Also check to see if the card's switches or jumpers and the jumpers on the system board are set properly. See Chapter 3 for system board jumper information.

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 powerswitch is on but the powerlight is not on.

If the monitor is Energy Star compliant, it may be in low-power standby 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.

Diskette Problems

You see a diskette error message.

Reinsert the diskette, making sure you insert it all the way. If the drive has a latch, turn it down to secure the diskette.

Also, check to see that you have inserted the right type of diskette in the drive. For example, make sure you are not inserting a high-density diskette in a double-density drive.

If reinserting the diskette does not solve the problem, insert the diskette in another diskette drive of the same type. If you can read the diskette in a different drive, your drive may be faulty.

The diskette is the tight type, but you still see an error

Check that the diskette is not write-protected, preventing the drive from writing to the diskette.

Make sure the diskette is formatted. See your operating system documentation for instructions on formatting diskettes.

You may have a defective diskette. Try copying the files from the bad diskette to a new diskette.

Something is wrong with the data in the files

If you are using MS-DOS, use CHKDSK to repair the files. You may also be able to use special utilities or diagnostics to solve this problem.

Diskette Drive Problems

A newly installed diskette drive is not working properly.

Make sure you have installed the drive correctly and check all the cable connections.

You see a diskette drive error when you start your computer.

Run the SETUP program and configure your system for the correct type of diskette drive. Also check the jumper setting of J13 to make sure the diskette drive controller is enabled.

The diskette drive is making loud or unusual noises

Contact your Authorized EPSON Servicer or the EPSON Connection.

Hard Disk Drive Problems

A newly installed hard disk drive is not working properly.

Make sure you have installed the drive correctly and check all cable connections. Also, check the jumper settings on your drive.

Some hard disk drives do not support the Energy Star features on your system. You may need to disable these features in SETUP.

You see a hard disk drive error when you start your system.

Run SETUP and check that your system's auto-sensing feature is detecting the correct drive type. If auto-sensing is enabled and SETUP displays information that does not match your drive, you may need to define your own drive type. See Chapter 1.

Make sure the jumpers on the system board are set correctly. Jumpers J14 and J16 enable or disable the IDE hard disk drive controller. See Chapter 3 for jumper information.

Make sure the jumpers on the hard disk drive are set correctly. See the documentation that came with the drive for more information.

You ate unable to store data on the hard disk drive.

If the hard disk drive has been in low-power standby mode, make sure the drive has had time to achieve its full operating speed before you try to write data to it.

If your drive was not configured, make sure you have partitioned and formatted the drive correctly for your operating system. See your operating system manual for instructions.

Also, make sure your hard disk drive has been physically formatted by the manufacturer. (All EPSON-supplied drives are physically formatted at the factory.) If it has not been physically formatted, use the format utility that came with the drive to format it before you partition it or install the operating system.

Note that a physical format is different from the action of commands such as MS-DOS FORMAT.

You have been using your hard disk drive successfully for some time but notice a reduction in performance.

The data on the disk may have become fragmented. Back up all your data and use a disk compaction utility to reorganize the files on your disk.

If you cannot access data on your hard disk or you are seeing read/ write errors, the disk may have a physical problem. Contact your Authorized EPSON Servicer or the EPSON Connection.

Software Problems

The application program does not start

Check that you are following the correct procedure for starting the program and that it is installed correctly. If you do not have a hard disk, make sure the correct diskette is in the diskette drive. If you need help, contact your software manufacturer.

The application program is having trouble reading a key disk.

You may be running an application that requires a slower operating speed. You need to change the system speed using a simple keyboard command. See Chapter 2 for information on setting the processor speed.

The application program is having trouble reading from or writing to the hard disk drive.

If you have enabled the Fixed Disk Timeout option in SETUP, your application may be timing out during the few second delay when the hard disk drive returns to its operating speed after being in standby mode. Disable this option in SETUP (see Chapter 1).

Yourapplication haslocked the computer, making it unresponsive to keyboard commands

Reset the computer and try again. If resetting the computer does not help, turn it off, wait 20 seconds, then turn it on again.

Some software, like OS/2®, UNIX,® or NetWare,® needs a minimum of 8MB to 16MB of RAM to work correctly. Check your software documentation for the minimum memory requirements. If necessary, add memory modules using the instructions in Chapter 3.

Printer or Scanner Problems

The printer or scanner does not work at all.

Check that the printer or scanner has power and is properly connected to the computer. Also, make sure your printer has paper in it. If you are using more than one serial port and one is for your printer, check the primary and secondary port settings (COM1 and COM2) in your application program.

Make sure the computer's jumpers are set correctly. Also, make sure your operating system is assigning ports correctly.

If you connected a scanner or a parallel port network adapter to the parallel port, make sure you set the port for bidirectional operation (PS2 mode) in the SETUP program, as described on page 1-17.

The printer prints garbled information.

Check the printer manual for the printer's correct DIP switch or control panel settings.

Also, make sure you have the proper drivers installed for your printer and you've selected the correct printer within your software application.

Option Card Problems

A newly installed option card is not working correctly.

Make sure the option card is installed correctly and is well-seated in its slot. Run the SETUP program to update your computer's configuration after you install the card. Also, perform setup procedures for any software you are using with the option card.

See the documentation that came with the option card to set any necessary DIP switches or jumpers on the card.

The main system board of your computer may also have some jumpers that must be set for the option card to work properly. See Chapter 3 for system jumper information.

Your system may need to operate at the slower processor speed to access the device. Try reducing the processor speed (see Chapter 2) or inserting a wait state through the SETUP program (see Chapter 1).

Make sure the option card is not touching any other card

An external device connected to the option card is not working correctly.

Make sure you are using the proper cable to connect the device to the card.

Memory Module Problems

The memory count displayed by the power-on diagnostics program is incorrect.

You may have installed the SIMMs incorrectly. They may be the wrong type or speed, or they may not be inserted all the way. See Chapter 3 for information on installing SIMMs.

Controller Problems

You see a controller error for the drive controllers, the video controller, or the I/O port controllers when you start your system.

The indicated controller on your system board may be faulty. If you have an option card with a controller that will work with your device, you can install it and change the jumper settings on the system board to disable the built-in controller. You can then continue to use your system until it is convenient for you to have it serviced.

If the error message refers to your diskette drive or hard disk drive controllers, make sure the jumpers for these devices are set to enabled. See Chapter 3.

Internal Battery Problems

The screen displaysan error message prompting you to run SETUP when you start your system, or your system displays as incorrect time and date.

If your system has not been used for an extended period of time, your internal NiCad backup battery may be discharged. First, run SETUP to enter the correct time and date. (You may also need to re-enter your computer's configuration information.) See Chapter 1 for instructions. Then, keep your system running for several hours to recharge the NiCad battery.

Appendix A
Specifications

CPU and Memory

32-bit CPU	Cyrix 486SLC2-50 microprocessor
Green PC energy saver	Energy Star compliant, low-power standby mode for the hard disk drive and video signals sent by the computer to the monitor; select timeout periods in SETUP; in a standard configuration of one hard disk drive and one diskette drive, system consumes less than 30 Watts in standby mode
System speed	Fast and slow speeds available; fast speed is the speed of the microprocessor, slow speed is 8 MHz Press Ctrl Alt - to select slow speed or Ctrl Alt + to select fast speed (use the - or + key on the numeric keypad); default system speed selectable through SETUP
Memory	4MB RAM standard on SIMMs; expandable to 16MB using 1MB or 4MB SIMMs; SIMMs must be tin-plated, 30-pin, 8-bit or 9-bit, fast-page mode type with access speed of 70ns
ROM	128KB Phoenix® system BIOS, video BIOS, and SETUP code located in EPROM on main system board

Video RAM	512KB DRAM on main system board; expandable to 1MB using four 4 x 256 DIP-type DRAM chips
Shadow RAM	Supports shadowing of system and video BIOS ROM into RAM
Memory relocation	Supports relocation of 128KB of memory from A0000h to BFFFFh
Cache	1KB of internal cache on processor
Math coprocessor	Cyrix 83S87-25
Clock/ calendar	Real-time clock, calendar, and 114 bytes of CMOS RAM socketed on main system board with built-in rechargeable NiCad battery backup

Controllers

Video	Cirrus Logic® GD5426 high speed super VGA local bus controller; provides TrueColor support and resolutions up to 1280 x 1024 in 16 colors (interlaced) with 1MB of video RAM
Diskette	Controller on main system board supports two diskette drives or one diskette drive and one tape drive
Hard disk	IDE interface on main system board supports up to two IDE hard disk drives with built-in controller; BIOS provides hard disk auto-sensing function

Interfaces

Monitor	Video interface for fixed or multi-frequency monitor built into system board; 15-pin, D-shell connector
Parallel	One standard parallel, unidirectional or bidirectional interface built into main system board; 25-pin, D-shell connector; operation controllable by SETUP option
Serial	Two RS-232C, programmable, asynchronous interfaces built into main system board; 9-pin, D-shell connectors
Keyboard	PSI 2 compatible keyboard interface built into main system board; 6-pin, mini DIN connector
Mouse	PS/2 compatible mouse interface built into main system board; 6-pin mini DIN connector
Optional game port	Optional 10-pin game port interface on system board; can control joystick functions with the addition of a port connector
Option dots	Connector card with five 16-bit, ISA compatible expansion slots; three full-length and two half-length
Speaker	Internal

Mass Storage

Internal mounts:
One 3½-inch wide, one-inch high drive

Externally accessible mounts:
One 3½-inch wide, one-inch high drive and two 5¼-inch wide, half-height drives

Diskette drives

3.5-inch diskette drive, 1.44MB (high-density) or 720KB (double-density)

5.25-inch diskette drive, 1.2MB (high-density) or 360KB (double-density)

Combination 3.5-inch/5.25-inch diskette drive

Hard disk drives

5¼-inch or 3½-inch form factor hard disk drive(s), up to half-height size; maximum of two drives supported by the internal IDE controller

Otherdevices

Half-height tape drive, CD-ROM drive, optical drive, or other storage device; 5¼-inch, or 3½-inch with mounting frames

Keyboard

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

Mouse

Detachable, two-button, PS/2 compatible

SETUP Program	Stored in ROM; accessible by pressing F2 during boot

Physical Characteristics

width	16.8 inches (427 mm)
Depth	15.8 inches (401 mm)
Height	4.4 inches (112 mm)
Weight	17 lb (7.7 kg) (with one diskette drive, but without keyboard)

Power Supply

Type	200 Watt, switchable, UL/TUV listed, fan-cooled
Input ranges	90-132 VAC or 180-260 VAC
Maximum outputs	+5 VDC at 20 Amps, -5 VDC at 0.5 Amp, +12 VDC at 8 Amps, -12 VDC at 0.5 Amp
Frequency	47 to 63 Hz
Cables	Two to main system board; five to mass storage devices

Environmental Requirements

Condition	Operating range	Storage range
Temperature	41° to 90° F (5° to 32° C)	-4° to 140° F (-20° to 60° C)
Humidity (non-condensing)	20% to 90%	10% to 90%
Altitude	-330 to 9,900 ft (-100 to 3,000 m)	-330 to 39,600 ft (-100 to 12,000 m)
Maximum wet bulb	68° F (20° C)	134° F (57° C)
Acoustical noise	46.2 d B	N/A

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® DR DOS®
Novell NetWare* 2.2, 3.12, and 4.01
Novell NetWare Lite
IBM® OS/2
SCO® UNIX
SCO Open Desktop
Microsoft Windows 3.0 and later
Microsoft Windows WorkGroup
Microsoft Windows NT

* 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.

Video Memory and Supported Resolutions

Resolution	Memory Requirements	Color	Vertical Frequencies (Hz)	Remarks
640 x 480	512KB	256	60/72	8 bits/pixel
	1MB	32K/64K	60/72	16 bits/pixel
	1MB	16.7M (TrueColor)	60/72	24 bits/pixel
800 x 600	512KB	256	56/60/72	8 bits/pixel
	1MB	32K/64K	56/60/72	16 bits/pixel
1024 × 768	512KB	16	43.5/60/70/ 72	4 bits/pixel
	1MB	256	43.5/60/70/ 72	8 bits/pixel
1280 × 1024	1MB	16	43.5	4 bits/pixel

Options Available from EPSON

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

Monitors
Keyboards
Mass storage devices
Printers
Operating system software

Call your nearest marketing location for more information on specific options.

Hard Disk Drive Types

Your computer comes with a hard disk auto-sensing feature. When you select **AUTO DETECT** **1** or *2* for your hard disk type in SETUP, the system detects the type of hard disk drive you have installed and fills in the drive information using values in the following table.

Hard disk drive types

Type	Size* (MB)	Cylinders	Heads	Sectors/ Track	Landing Zone -	Write Precomp	Drive Name
1	**81**	**903**	4	46	**903**	**0**	**CP30084E**
2	116	762	8	39	762	**0**	**CP30104H**
3	102	1024	12	17	1024	**0**	**ST3123A**
4	62	940	8	17	615	300	
5	46	940	6	17	940	512	
6	162	903	8	46	903	0	**CP30174E**
7	163	332	16	63	332	0	**CP30174**
8	204	1024	12	34	1024	0	**ST3243A**
9	112	900	15	17	901	0	
10	325	768	14	62	768	0	**ST3390A**
11	504	1024	16	63	1024	0	**ST3655A**
12	49	855	7	17	855	-1	
13	162	1010	6	55	1010	0	AC1170
14	244	1010	9	55	1010	0	AC2250
16	325	1010	12	55	1010	0	AC2340
17	202	989	12	35	989	0	AC1210
18	203	685	16	38	685	0	CFS210A
19	62	1024	7	17	1023	512	
20	30	733	5	17	732	300	
21	122	919	16	17	919	0	ELS127A
22	30	733	5	17	733	300	
23	162	1011	15	22	1011	0	ELS170A
24	234	723	13	51	723	0	LPS240A
25	240	895	10	55	895	0	CP30254
26	327	665	16	63	665	0	CP30344

Hard disk drive types(continued)

Type	Size* (MB)	Cylinders	Heads	Sectors/ Track	Landing Zone	Write Precomp	Drive Name
27	515	1048	16	63	1048	0	CFA540A AC2540
28	406	826	16	63	826	0	CFS420A
29	125	1002	8	32	1002	0	7131A
30	234	967	16	31	967	0	7245A
31	329	790	15	57	790	0	7345A
32	40	809	6	17	809	128	
33	48	830	7	17	830	0	
34	68	830	10	17	830	0	
35	42	1024	5	17	1024	0	
36	68	1024	8	17	1024	0	
37	40	615	8	17	615	128	
38	104	1024	8	26	1024	0	
39	69	925	9	17	925	0	
40	76	1024	9	17	1023	0	
41	114	918	15	17	917	0	
42	124	1001	15	17	1001	0	ST3145A
43	136	823	10	34	822	0	
44	Auto-detect 1						
45	Auto-detect 2						
46	User-defined 1						
47	User-defined 2						

* Actual formatted size may be slightly different from size on drive label; you cannot change thisvalue.

Drive Option Information

Hard disk drive options for 1-inch IDE drives

Parameters	Conner®							Quantum®		Western Digital®		
	CP-30084E	CP-30104H	CP-30174E	CP-30254	CP-30344	CFS420A	CFA540A	ELS170AT	LPS240AT	AC1170	AC2250	AC2340
Formatted capacity (MB)	85	120	170	250	340	420	540	170	245	170	240	340
Size, width × height (in)	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	4 × 1	3.5 × 1	3.5 × 1	3.5 × 1
Weight (lbs)	1.3	1.3	1.3	1.2	1.2	1.16	1.16	0.91	1.05	1.12	1.12	1.12
Cylinders	1806	1524	1806	1895	2116	2388	2805	1536	1818	2233	2233	2233
Disks	1	2	2	2	2	2	2	2	2	1	2	2
Heads	2	4	4	4	4	4	4	4	4	2	3	4
Sectors per track	46	39	46	62	63-95	63-100	72-114	54	44-87	56-96	56-96	56-96
Rotational speed (RPM)	3822	3399	3833	4542	4500	3600	4500	3863	4306	3322	3322	3322
Buffer size (KB)	32	32	32	64	64	32	256	32	256	64	64	128
Average seek time (ms)	17	<19	17	14	13	14	12	17	16	<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	RLL 1,7	RLL 1,7
Power dissipation (seek)	3.75W	3.9W	3.75W	3.75W	3.75W	5-12W	5.7W	4.0W	4.9W	5.2W	5.2W	5.2W
Logical parameters												
Cylinders	903	762	903	895	655	826	1048	1011	723	1010	1010	1010
Heads	4	8	8	10	16	16	16	15	13	6	9	12
Precomp zone	0	0	0	0	0	0	0	none*	none*	1011	1011	1011
Landing zone	903	762	903	895	655	1048	1048	1011	723	1011	1011	1011
Sectors	46	39	46	55	63	63	63	22	51	55	55	55

* Select 1 or none for the precomp value. If neither of these optionsare available, select the maximum available precomp value.

IDE hard disk drive jumper settings

Model number	Single drive	Masterdrive	Slave drive
ConnerCP30084E	C/D jumpered	C/D jumpered	No jumpers
ConnerCP30104H	C/D jumpered	C/D, DSP jumpered	No jumpers
ConnerCP30174E	C/D jumpered	C/D jumpered	No jumpers
ConnerCP30254	C/D jumpered	C/D jumpered	No jumpers
ConnerCP30344	C/D jumpered	C/D jumpered	No jumpers
ConnerCFS420A	C/D jumpered	C/D jumpered	No jumpers
Conner CFA540A	C/D jumpered	C/D jumpered	No jumpers
Quantum ELS170AT	DS jumpered	DS, jumpered or DS jumpered	No jumpers
Quantum LPS240AT	DS jumpered *	SP and DS jumpered *	No jumpers*
Western Digital AC1170	No jumpers	MA jumpered	SL jumpered
Western Digital AC2250	No jumpers	MA jumpered	SL jumpered
Western Digital AC2340	No jumpers	MA jumpered	SL jumpered

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

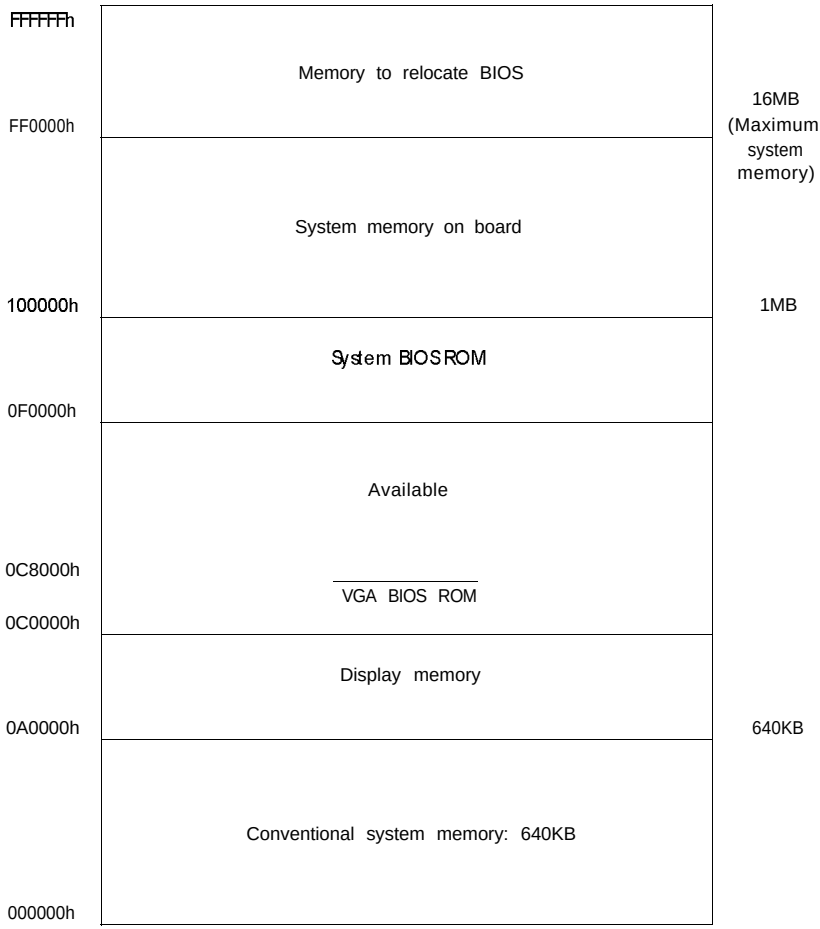
DMA Assignments

Level	Assigned device
DMA0	Reserved (8-bit)
DMA1	Reserved (8-bit)
DMA2	FDD controller (8-bit)
DMA3	Reserved (8-bit)
DMA4	Cascade for DMA2
DMA5	Reserved (16-bit)
DMA6	Reserved (16-bit)
DMA7	Reserved (16-bit)

Hardware Interrupts

IRQ no.	Function
IRQ0	Timeout 0 (internal connection)
IRQ1	Keyboard
IRQ2	Cascade IRQ 9
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Parallel port 2
IRQ6	Diskette drive controller
IRQ7	Parallel port 1
IRQ8	Real-time clock
IRQ9	Available
IRQ10	Available
IRQ11	Available
IRQ12	PS/2 mouse
IRQ13	Math coprocessor
IRQ14	Hard disk drive controller
IRQ15	Available

System Memory Map



System I/O Address Map

Hex address	Assigned device
000 - 01 F	DMA controller 1,8237
020 - 03F	Interrupt controller 1,8259
022 - 024	Ali M1217 configuration register
040 - 05F	Timer, 8254
060 - 06F	Keyboard controller, 8042
070 - 07F(CMOS)	Real-time clock NMI (non-maskable interrupt) mask
080 - 09F	DMA page register, 74LS612
0A0 - 0BF	Interrupt controller 2,8259
0C0-0DF	DMA controller 2,8237
0F0	Clearmath coprocessor
0F1	Reset math coprocessor
0F8 - OFF	Math coprocessor
1F0 - 1F8	Hard disk
200 - 207	Game I/O
278 - 27F	Parallel printer port 2
2B0 - 2DF	Alternate enhanced graphicsadapter
2E1	GPIB (adapter 0)
2E2,2E3	Data acquisition (adapter 0)
2F8 - 2FF	Serial port 2
300 - 31F	Prototype card
360 - 363	PC network (low address)
368 - 36B	PC network (high address)
378 - 37F	Parallel printer port 1
380 - 38F	SDLC, bisynchronous 1

System I/O addressmap (continued)

Hex address	Assigned device
390 - 393	Cluster
3A0 - 3AF	SDLC, bisynchronous 2
3B0 - 3BF	Monochrome display and printerport
3C0-3CF	Enhanced graphicsadapter
3D0-3DF	Color graphics monitor adapter
3F0 - 3F7	Diskette drive controller
3F8 - 3FF	Serial port 1
6E2, 6E3	Data acquisition (adapter 1)
790 - 793	Cluster (adapter 1)
AE2, AE3	Data acquisition (adapter 2)
B90, B93	Cluster (adapter 2)
EE2, EE3	Data acquisition (adapter 3)
1390 - 1393	Cluster (adapter 3)
22E1	GPIB (adapter 1)
2390 - 2393	Cluster (adapter 4)
42E1	GPIB (adapter 2)
63E1	GPIB (adapter 3)
82E1	GPIB (adapter 4)
A2E1	GPIB (adapter 5)
C2E1	GPIB (adapter 6)
E2E1	GPIB (adapter 7)

Connector Pin Assignments

Parallel port connector pin assignments (CN5)

Pin	Signal	Pin	Signal	Pin	Signal
1	Strobe	10	$\overline{\text{ACK}}$	19	Signal ground
2	Data 0	11	Busy	20	Signal ground
3	Data 1	12	PE	21	Signal ground
4	Data 2	13	Select	22	Signal ground
5	Data 3	14	$\overline{\text{ALF}}$	23	Signal ground
6	Data 4	15	$\overline{\text{Error}}$	24	Signal ground
7	Data 5	16	$\overline{\text{Init}}$	25	Signal ground
8	Data 6	17	$\overline{\text{Selectin}}$		
9	Data 7	18	Signal ground		

Serial port connector pin assignments (CN6 and CN7)

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	Ground		

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486SLC2-50

A processor chip specifically designed for high-performance systems. The chip is fully compatible with the i486 instruction set, and includes a 1KB instruction/ data cache.

AUTOEXEC.BAT file

A batch file that MS-DOS executes automatically each time you turn on or reset the computer.

BIOS

Basic Input/ Output System. Routines in ROM that handle the basic input/ output functions of the operating system.

Cache

A high-speed memory buffer that stores frequently used data where your microprocessor can access it faster. Your computer includes 1KB of internal cache.

CONFIG.SYS file

A special system file that MS-DOS executes each time you turn on or reset the computer. You use this file to customize your system by installing device drivers, setting limits for files and buffers, and specifying MS-DOS commands to be run during startup.

Coprocessor

An optional integrated circuit (chip) that assists the CPU in performing certain numeric calculations faster.

CPU

Central Processing Unit. The integrated circuit (chip) responsible for integrating program instructions, performing calculations, and controlling all input and output operations.

Driver

A program that controls a specific piece of equipment in the system. Examples of drivers include expanded memory managers, display drivers, printer drivers, and mouse drivers.

IDE

Integrated Drive Electronics. A type of hard disk drive interface in which the controller is on the drive instead of on a controller card. Your computer includes an interface on the main system board for up to two IDE hard disk drives.

ISA

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

Jumper

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

Local bus

An internal group of wires that sends information from the microprocessor directly to the video controller in the computer. Local bus video provides increased performance.

Math coprocessor

See Coprocessor.

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 main system board to expand your computer's memory.

Microprocessor

A CPU chip, such as the 486SLC. See also *CPU.*

Numeric coprocessor

See Coprocessor.

Parallel

A way of organizing communications between two pieces of computer equipment, in which the signals that make up each character are sent simultaneously. See also *Serial.*

Power-on diagnostics

A set of testing routines the computer performs automatically every time you turn it on.

RAM

Random Access Memory. The portion of the computer's memory that runs programs and temporarily stores data while you work. See also *ROM.*

Real-time clock

A battery-powered clock in the computer that keeps track of the current time and date even when the computer's power is off.

ROM

Read Only Memory. The portion of the computer's memory that contains permanent instructions and cannot be modified. Unlike RAM, ROM retains its contents even after you turn off the computer. See also *RAM.*

RS-232C

A standard serial interface. The computer has a connector that lets you attach an RS-232C-compatible device to your computer.

Serial

A way of organizing communications between two pieces of computer equipment, in which the signals that make up each character are sent sequentially. See also *Parallel.*

Shadow RAM

The function that copies the system BIOS and video BIOS from ROM into RAM to speed up performance.

SIMM

See Memory Module.

VGA/SVGA

Video Graphics Array/ Super Video Graphics Array. High-resolution (640 x 480 or greater) display adapter standards.

Write-protect

To prevent a diskette from being overwritten. When a diskette is write-protected, you cannot erase, change, or record over its contents.

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