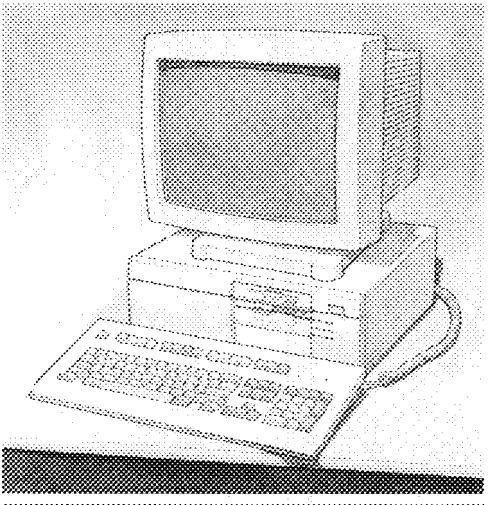
EPSON



EQUITY 486DX2/50 PLUS
EQUITY 486SX/25 PLUS

User's Guide

FCC COMPLIANCE STATEMENT FOR AMERICAN USERS

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

WARNING

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. It is the responsibility of the user to obtain and use a shielded equipment interface cable with this device. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FOR CANADIAN USERS

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le present appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

EPSON®

User's Guide

IMPORTANT NOTICE
DISCLAIMER OF WARRANTY

Epson America makes no representations or warranties, either express or implied, by or with respect to anything in this manual, and shall not be liable for any implied warranties of merchantability and fitness for a particular purpose or for any indirect, special, or consequential damages. Some states do not allow the exclusion of incidental or consequential damages, so this exclusion may not apply to you.

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TRADEMARKS

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Equity is a registered trademark of Epson America, Inc.

General notice: Other product names used herein are for identification purposes only and may be trademarks of their respective companies.

Y73899110100

Important Safety Instructions

1. Read all of these instructions and save them for later reference.

2. Follow all warnings and instructions marked on the product.

3. Unplug this product from the wall outlet before cleaning. Use a damp cloth for cleaning, not liquid cleaners or aerosol cleaners.

4. Do not use this product near water.

5. Do not place this product on an unstable cart, stand, or table.

6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; these openings must not be blocked or covered. This product should never be placed near or over a radiator or heat register.

7. This product should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

8. Connect all equipment to properly grounded (earthed) power outlets. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Avoid using outlets on the same circuit as photocopiers or air control systems that regularly switch on and off.

9. Do not locate this product where the cord will be walked on.

10. If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.

11. Never push objects of any kind into this product through the cabinet slots. Never spill liquid of any kind on the product.

12. Except as specifically explained in the User's Guide, do not attempt to service this product yourself. Refer all servicing to qualified service personnel.

13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    A. When the power cord or plug is damaged.

    B. If liquid has entered the product.

    C. If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions, since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

    D. If the product has been dropped or the cabinet has been damaged.

    E. If the product exhibits a distinct change in performance.

Importantes Mesures de Sécurité

1. Lire attentivement les instructions qui suivent. Les conserver en lieu sûr.

2. Observer les avertissements et suivre rigoureusement les instructions marquées sur l'ordinateur.

3. Débrancher l'appareil avant de le nettoyer. Se servir d'un chiffon humide, sans détergents ni aérosols.

4. Ne pas se servir de l'ordinateur près de l'eau.

5. Ne pas placer l'appareil sur un meuble instable.

6. Les ouvertures et fentes à l'arrière et au dessous du coffre en assurent la ventilation. Il est important de ne pas couvrir ni bloquer ces prises d'air. De même, il ne faut jamais placer l'ordinateur près d'un appareil de chauffage.

7. N'utiliser comme type de courant que celui qui est indiqué sur l'étiquette. En cas de doute, consultez votre distributeur ou la compagnie électrique de votre secteur.

8. Toutes les connexions électriques doivent être des connexions de sécurité, avec contact de terre. Si la fiche de sécurité n'entre pas dans le socle de prise de courant, demander à un électricien de remplacer l'ancien socle par un socle neuf. Eviter de brancher l'ordinateur sur le même circuit que des machines qui se mettent en marche et s'arrêtent tour à tour, telles que photocopieurs ou climatiseurs.

9. Ne pas laisser de fils ou cordons électriques dans un lieu de passage; éviter de leur marcher dessus.

10. S'il est nécessaire d'employer un cordon prolongateur pour brancher l'appareil, s'assurer que la consommation d'énergie totale des machines branchées sur le cordon prolongateur ne dépasse pas la capacité en ampères dudit cordon. L'ampérage total de toutes les pièces branchées sur le socle ne doit pas dépasser 15 ampères.

11. Ne jamais rien introduire dans les prises d'air. Ne pas renverser de liquide sur l'appareil.

12. Sauf dans les cas spécifiquement indiqués dans le Guide de l'utilisateur, ne pas essayer de réparer l'ordinateur soi-même; s'adresser à un spécialiste qualifié.

13. Débrancher l'appareil et s'adresser au personnel de service qualifié dans les cas suivants:

    A. Lorsque le cordon, les broches, la prise ou le socle sont endommagés.

    B. Lorsqu'un liquide a pénétré à l'intérieur de l'appareil.

    C. Lorsque l'ordinateur ne répond pas normalement aux commandes passées en suivant les instructions. Ajuster uniquement les contrôles décrits dans les instructions; il est possible de gravement endommager l'appareil en touchant les autres, ce qui pourrait nécessiter l'intervention d'un technicien qualifié pour le remettre en état de marche.

    D. Lorsque l'appareil est tombé ou le coffre a été endommagé.

    E. Lorsque la performance de l'ordinateur est nettement inférieure à l'ordinaire.

Contents

Chapter 3 ***Using Your Computer***

Chapter 4 ***Enhancing System Operations***

Introduction

You've chosen a powerful, versatile Epson@ computer, ideally suited for use in a network or as a high-performance personal workstation.

Whether you have the 25 MHz model or the 50 MHz model (with built-in math coprocessor), your system includes 4MB of internal memory, a built-in VGA display adapter, built-in parallel and serial interfaces, and an IBM® PS/2™ compatible mouse port. These interfaces allow you to connect most of your peripheral devices directly to the computer.

> **Note**
> The 25 MHz model has an 80486SX microprocessor and the 50 MHz model has an 80486DX2/50 microprocessor. The instructions in this manual refer to both models, except where specified.

Your computer has six option slots (five 16-bit and one 8-bit) for installing additional devices, such as a modem or a network card. Additionally, the computer supports up to five drives: three externally-accessible drives and two internal drives.

Your computer offers several other outstanding features:

- ❑ Memory caching copies portions of your system memory into a high-speed cache buffer so your computer can access programs and data very quickly.
- ❑ Shadow RAM copies your system and video ROM into the computer's 32-bit RAM to further accelerate performance.
- ❑ The built-in VGA adapter and VGA drivers support extended graphics resolutions up to 1024 x 768 in 16 colors or 640 x 480 in 256 colors on compatible monitors.

Optional Equipment

You can easily upgrade your computer by installing additional memory and adding just about any optional device that is compatible with the IBM Personal Computer, PC XT,™ or PC AT®.

By adding memory modules to the memory card, you can expand the computer's memory up to 16MB.

If you have the 25 MHz model and want to speed up mathematical calculations in certain application programs, you can have your computer's 80486SX microprocessor chip replaced with an 80487SX, 25 MHz chip. This optional microprocessor includes a built-in math coprocessor.

Check with your authorized Epson dealer for information on optional equipment.

Operating Systems and Other Software

You probably chose a version of MS-DOS@ to use with your computer. However, you can run another operating system, such as OS/2, UNIX®, or XENIX®.

> **Note**
> This manual covers basic operating instructions for using your computer, but does not explain how to install or use the operating system. See your MS-DOS or other operating system manuals for comprehensive instructions.

You can use virtually any application program designed for the IBM PC, PC XT, PC AT, or compatible computers. You can also use powerful 32-bit software, such as Microsoft Windows™ 3.0 (or later), with your computer.

VGA Utilities

Epson has included special VGA device drivers and utilities for use with your built-in VGA adapter. With these utilities, you can take advantage of extended VGA features such as 16-color graphics mode resolutions up to 1024 x 768 (non-interlaced), 256-color resolutions up to 640 x 480, and 132-column text mode. The VGA device drivers and utilities are described in the VGA Utilities booklet that came with your system.

How to Use This Manual

This manual explains how to set up and operate your computer, install options, and run diagnostic checks. You do not need to read everything in this book to use your computer; see the following chapter summaries to find the sections you need.

Chapter 1 provides simple step-by-step instructions for setting up your system.

Chapter 2 describes how to run the Setup program to define your computer's configuration. Do this before you use your computer. You may need to run it again later, if you change the configuration.

Chapter 3 provides instructions for general operating procedures, such as locking the computer's cover and copying files.

Chapter 4 describes special features you can use to enhance your system's performance.

Chapter 5 tells you how to remove and replace the computer's cover, front panel, and subassembly to access components inside the computer.

Chapter 6 describes some of the options you can use in your computer and contains instructions for setting jumpers and installing various options.

Chapter 7 explains how to install and remove disk drives.

Appendix A describes how to perform a low-level format on a hard disk.

Appendix B contains troubleshooting tips.

Appendix C covers the system diagnostic tests you can run to diagnose hardware problems.

Appendix D contains the specifications for your computer.

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

Where to Get Help

If you purchased your Epson product in the United States, Epson America provides local customer support and service through a nationwide network of authorized Epson dealers and Service Centers.

Epson also provides the following support services through the Epson Customer Resource Center at (800) 922-8911:

- ❑ Technical assistance with the installation, configuration, and operation of Epson products
- ❑ Assistance in locating your nearest Authorized Epson Reseller or Service Center
- ❑ Sales of ribbons, supplies, parts, documentation, and accessories for your Epson product
- ❑ Customer Relations
- ❑ Epson technical information library fax service
- ❑ Product literature with technical specifications on our current and new products.

If you purchased your computer outside of the United States, please contact your dealer or the marketing location nearest you for customer support and service. International marketing locations are listed on the inside of this manual's back cover.

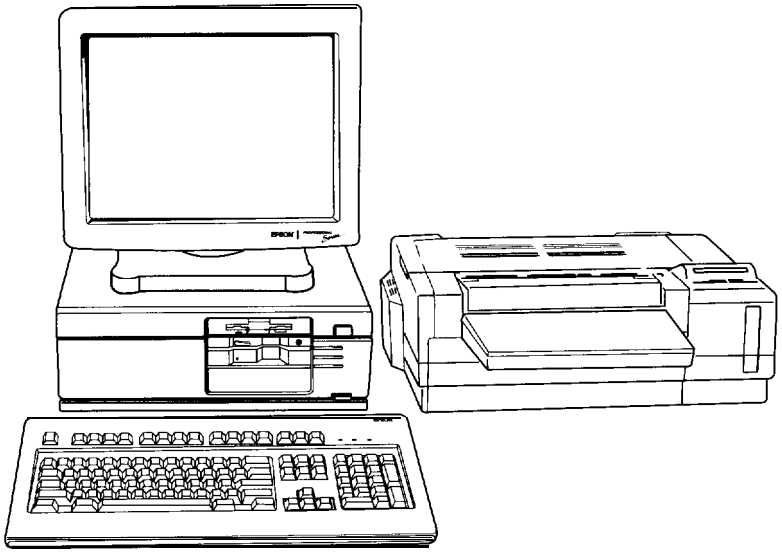
Chapter 1

Setting Up Your System

Setting up your Epson personal computer is easy. Just follow the eight steps in this chapter. You may want to leave this manual's back cover foldout open so you can refer to the illustrations identifying the different parts.

Before you begin, make sure your computer is turned off by pressing the power button on the right side of the front panel. It is off when the button pops out.

1 Choosing a Location



Before you set up your computer, it's important to choose a safe, convenient location that provides the following:

- ❑ A sturdy desk or table strong enough to support the weight of your system and all of its components.

- ❑ A flat, hard surface. Soft surfaces like beds and carpeted floors attract static electricity, which can erase data on your disks, damage the computer's circuitry, and prevent proper ventilation.

- ❑ Good air circulation. Leave several inches of space around the computer so air can move freely.

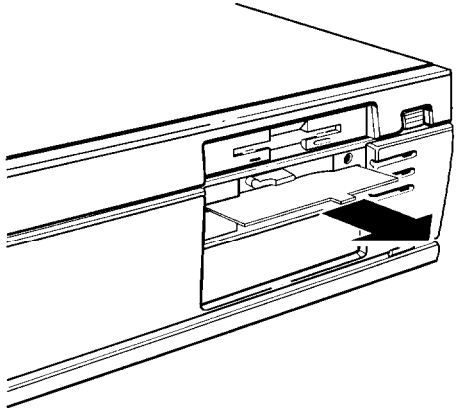
- ❑ Moderate environmental conditions. Select a cool, dry area and protect your computer from extremes in temperature, humidity, dust, and smoke. Avoid direct sunlight or any other source of heat.

- ❑ Appropriate power sources. Connect all your equipment to the appropriate power source. (See "Power Source Requirements" in Appendix D for more information.) You need one outlet for the computer, one for the monitor, and additional outlets for a printer and any other peripheral devices.

- ❑ No electromagnetic interference. Do not place your system too close to any electrical device, such as a telephone, which generates an electromagnetic field.

2 Removing the Protector Card

If you have a 5¼-inch diskette drive, a protector card has been inserted in the diskette slot at the factory to protect the drive's read/write heads. To remove it, either flip up the latch or press the release button to pop the card out part way. Then pull it all the way out.



Save any protector cards you remove; you may want to reinsert them later, if you transport your computer.

3 Connecting a Monitor

If you have a VGA monitor (or a multi-frequency monitor with an analog connector), you can connect it to the computer's built-in VGA port. See "Using the VGA Interface," below. If you have any other type of monitor, skip to "Using a Display Adapter Card," below.

Using the VGA Interface

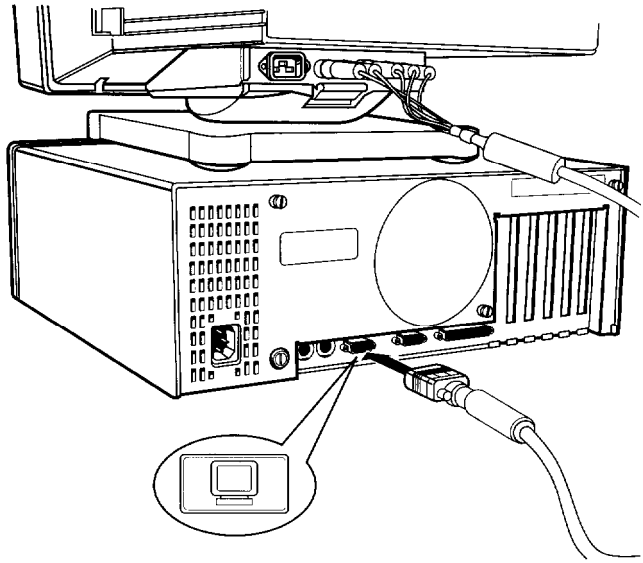
Follow these steps to connect your VGA monitor to the VGA port on the computer:

1. Make sure your monitor and computer are turned off.

2. Place your monitor on top of or near the computer. For easy access, turn the monitor and computer around so the backs of both components are facing you.

3. If necessary, connect the monitor cable to the monitor. (Your monitor may have a permanently attached cable.)

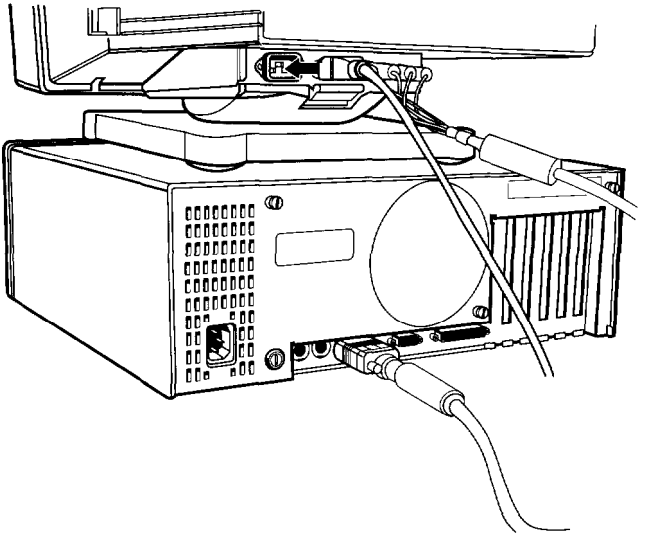
4. Examine the connector end of the monitor cable, and position the plug to match the orientation of the monitor port (marked with a monitor icon). Then insert the plug into the port, as shown below.



Caution
To avoid damaging the connector, take care not to bend the pins when you insert the plug.

5. If the connector has retaining screws, be sure to tighten them.

6. Plug the monitor power cord into the monitor's power inlet, as shown below.



7. Plug the other end of the power cord into a properly grounded (earthed) electrical outlet.

Using a Display Adapter Card

If you are using a non-VGA monitor, you'll need to install a display adapter (video) card in one of the computer's option slots before you **can** connect the monitor. (Your dealer may have already installed the video card for you.)

If the video card is not installed, follow the instructions in Chapter 6 to install an option card. But first, check the following table to make sure your display adapter card and monitor are properly matched.

Monitor/video card compatibility

Monitor	Video card
Monochrome	Monochrome display adapter (MDA) Multi-mode graphics adapter (MGA) Enhanced graphics adapter (EGA) Hercules' graphics card
CGA	Color graphics adapter (CGA) Multi-mode graphics adapter (MGA) Enhanced graphics adapter (EGA)
EGA	Enhanced graphics adapter (EGA)
Monochrome or color VGA	Video graphics array (VGA)
Extended VGA	Super VGA adapter

switches or jumpers on the card are set properly. For example, you may need to change a setting to select color or monochrome. See the documentation that came with your monitor or video card for instructions.

If you install an EGA or VGA display adapter card or if you install another type of card that you want to be the primary display adapter, you must set jumper JP4 on the main system board to disable the built-in VGA interface.

If you install one or more cards, you also may need to set jumper JP6 to tell the computer the type of monitor you are using: monochrome or color. If you have two types of cards, set the jumper to indicate which one is your primary monitor type. See Chapter 6 for instructions on changing jumper settings.

Once you have installed your video card, return to this section to connect your monitor to the computer. Follow the steps in "Using the VGA Interface" on page 1-4, but insert your monitor connector into the video card port instead of the built-in VGA port.

4 Connecting a Printer or Other Device

Your computer has both parallel and serial interfaces. To connect a printer or other peripheral device to one of these interfaces, follow the instructions below. Epson offers a full range of printers; ask your dealer for more information.

Using the Parallel Interface

The parallel interface on your computer is Centronics® compatible and uses a DB-25S connector.

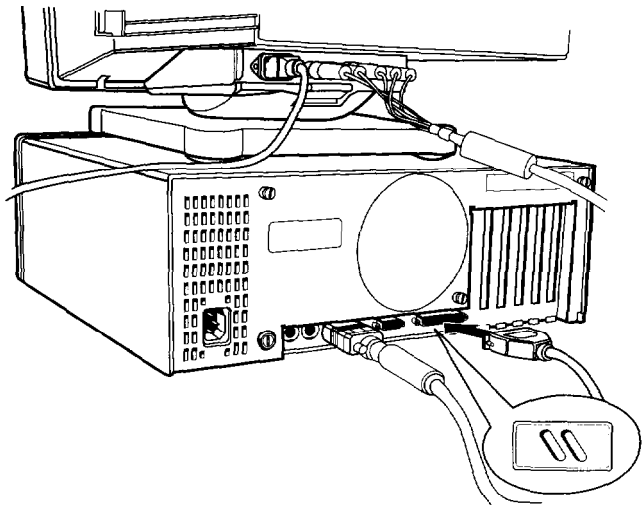
To connect your printer and computer, you need an IBM compatible printer cable. If you are not sure which one you need, check with your Epson dealer.

Once you have the correct printer cable, follow these steps:

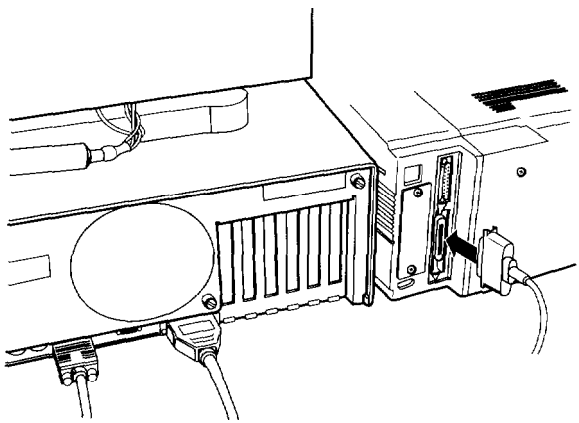
1. Make sure the printer and your computer are turned off.

2. Place the printer next to the computer with the back panels of both components facing you.

3. One end of the printer cable has a 25-pin, D-shell connector. Position the plug to match the orientation of the parallel port (marked with a special icon); then insert it into the port, as shown below. If the plug has retaining screws, be sure to tighten them.



4. Connect the other end of the cable to the printer, as shown below. To secure the cable, squeeze the clips at each side of the printer port.

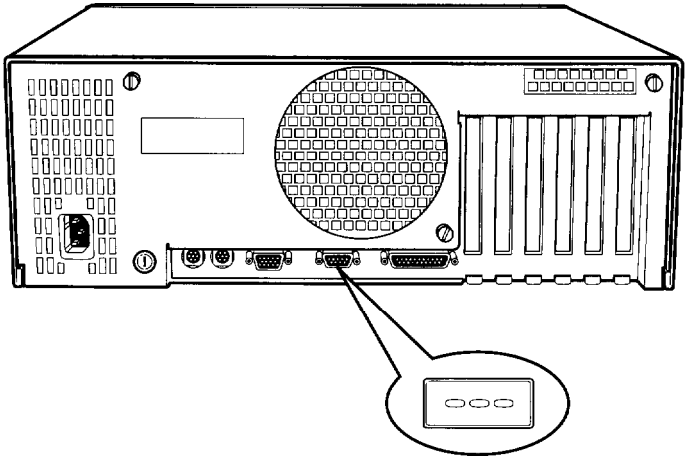


5. Plug the printer's power cord into a properly grounded (earthed) electrical outlet.

Using the Serial Interface

If you have a printer, a modem, or other peripheral device with a serial interface, you can connect it to the serial (RS-232C) port on the back of the computer.

The serial port has a DB-9P connector, so be sure you have a compatible cable. To connect a serial device, follow the same steps as above for connecting a parallel device, but insert the connector into the serial port, marked with a special icon, as shown below.



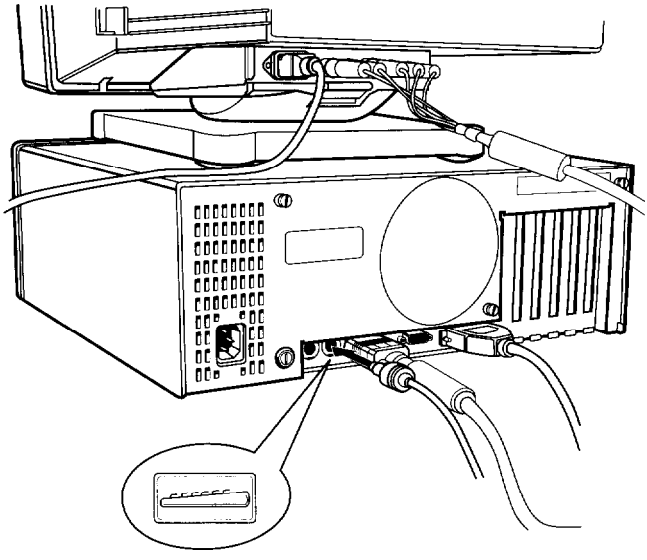
Note
Additional steps may be necessary to set up the serial port so it functions properly. If you are using the port for a printer, you need to direct printer output to the serial port, not the parallel port. To do this, you can use the MS-DOS MODE or SETMODE command. See your MS-DOS manual for details.

5 Connecting the Keyboard

Follow these steps to connect the keyboard:

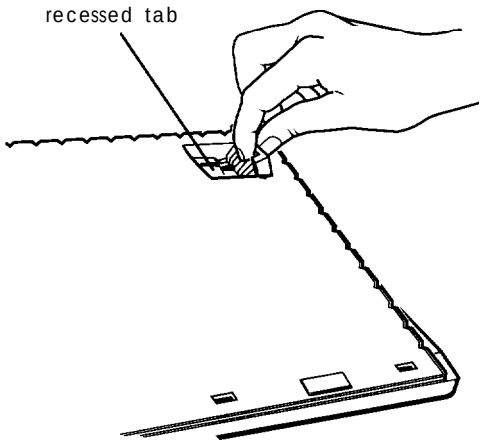
1. Make sure the computer is turned off.

2. Hold the keyboard cable connector so the arrow indicator on the housing faces up. Insert the connector into the port marked with the keyboard icon, as shown below.



Caution
Although the connectors and ports for the keyboard and mouse are physically identical, they cannot be used interchangeably. Be sure to plug the keyboard only into the keyboard port.

3. You can raise the keyboard by adjusting the legs on the bottom. To change the angle of the keyboard, turn it over and flip each leg upward until it locks into place, as shown below.



If you want to lower the keyboard, press down on the recessed tab (labelled L or R) and lower the leg into the slot.

6 Connecting the Mouse

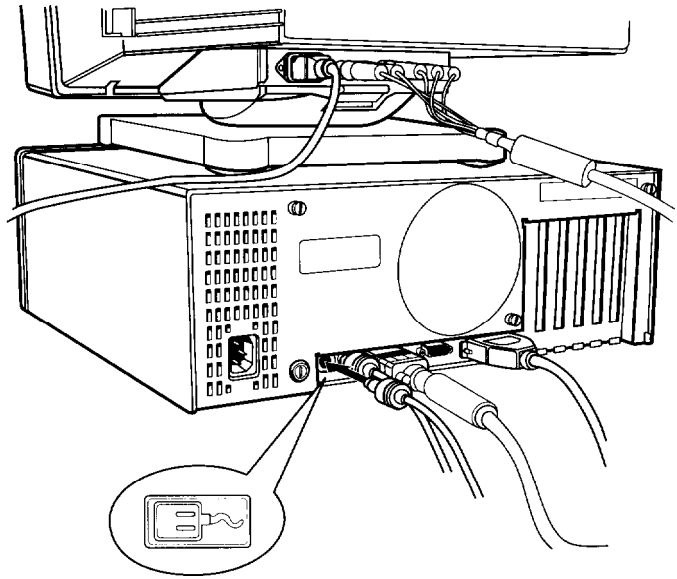
Your computer has an auxiliary port for an IBM PS/2 compatible mouse that uses a miniature DIN (6-pin) connector. If your mouse has this type of connector, you can connect it to the built-in port on your computer.

> **Note**
> If you have a mouse that requires a different interface port, you can connect it to the built-in serial port or install an option card to provide the interface. You also need to change the setting of jumper JP7 inside the computer. See Chapter 6 for instructions or ask your dealer for assistance.

Follow these steps to connect a mouse:

1. Make sure the computer is turned off.

2. Hold the mouse connector so it is oriented properly with its port (marked with a mouse icon). Insert the connector as shown below.



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 only into the mouse port.

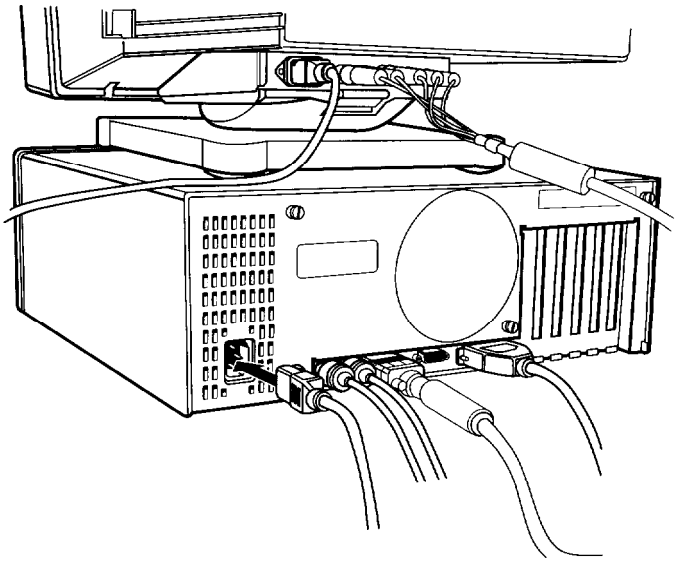
3. After you connect a mouse, you may need to add commands to your MS-DOS CONFIG.SYS file to enable your computer to use it. See your MS-DOS and mouse manuals for instructions.

7 Connecting the Power Cord

Follow these steps to connect the power cord:

1. Plug the power cord into the AC power inlet on the back panel, as shown below.

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



2. Plug the other end of the power cord into a properly grounded (earthed) electrical outlet.

8 Turning On the Computer

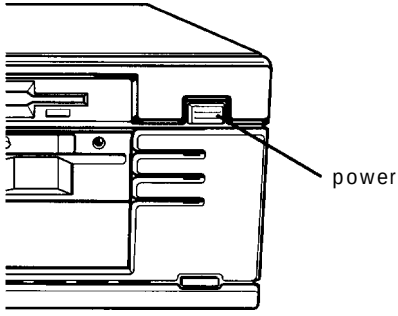
After you set up your system, you're ready to turn on the power. But first, read the following safety rules to avoid accidentally damaging your computer or injuring yourself:

- ❑ Do not connect or disconnect any peripheral device or power cables when the computer's power is on.
- ❑ Never turn on the computer with a protector card in a diskette drive.
- ❑ Never turn off or reset your computer while a disk drive light is on. This can destroy data stored on the disk.
- ❑ Always wait at least five seconds after you turn off the power before you turn it on again. This allows the computer to clear and reset its memory.
- ❑ Do not leave a beverage on top of or next to your computer or any of its components. Spilled liquid can damage the circuitry of your equipment.
- ❑ Always turn off the power, disconnect the computer's power cord, and wait 30 seconds before you remove the cover. Only remove the cover to access internal devices.

Follow these steps to turn on your system:

1. Make sure the power cord is plugged into the power inlet on the back panel of the computer and into a properly grounded (earthed) electrical outlet.
2. Place your system components in an arrangement that suits you. (See step 1, "Choosing a Location," for a typical setup.)
3. Turn on the monitor, printer, and any other peripheral devices connected to the computer.

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 below the button lights up. After a few seconds, the computer starts to perform a diagnostic self test- a series of checks it completes each time you turn it on to make sure everything is working correctly.

Note
If you or your dealer have made a major change to your system, such as adding a disk drive, you may need to wait a few minutes for your computer to complete power-on diagnostics the first time you turn it on.

When the system has successfully completed its self test, you see a prompt to insert a system diskette. (Do not insert a diskette at this point.)

If necessary, use the controls on your monitor to adjust the brightness and contrast until characters on the screen are clear and at a comfortable level of intensity. If your monitor has horizontal and vertical hold controls, you may need to use them to stabilize the display.

Turning Off the Computer

When you are ready to turn off your system, reverse the sequence of steps you followed to turn it on. Turn off the computer first, then turn off the monitor and any peripheral devices.

Now go on to Chapter 2 and follow the instructions to run the Setup program.

Chapter 2

Running the Setup Program

The first time you use your computer, you need to run the Setup program on the Reference diskette to define the computer's configuration. You may also need to run it again later, if you change the configuration.

The Setup program automatically configures parts of your system and lets you set (or change) the following for your computer:

- ❑ Display adapter type
- ❑ Power-on password
- ❑ Extended memory caching
- ❑ Processor speed
- ❑ Keyboard and speaker options
- ❑ Real-time clock's time and date
- ❑ Hard disk drive configuration
- ❑ Diskette drive type(s)
- ❑ Serial and parallel port settings.

The configuration you define with Setup is stored in the computer's CMOS RAM, which is backed up by a battery. Whenever you turn on the computer, it searches the CMOS RAM for the correct installation information. If the computer discovers a difference between the information in the CMOS RAM and its actual configuration, it prompts you to run the Setup program.

Automatic Configuration

Your computer automatically defines your system's memory configuration and recognizes whether the CPU chip contains a math coprocessor. It also detects and configures most of the devices you have installed in your system. For this reason, you may not need to change any of the default settings in the Setup program. However, you should check each of the options on the Setup menu to verify that the settings are correct for your configuration.

The computer automatically configures the 4MB of memory that comes with your system as 640KB of base memory and 3072KB of extended memory. If you install even more memory, Setup configures it as extended memory also.

> **Note**
> To run certain application programs, you may need to reduce the amount of base memory from 640KB to 512KB or 256KB. Check the documentation that came with your software to see if this is necessary. If you do need to change the amount of base memory, you must set jumpers on the computer's main system board. See "Changing the Jumper Settings" in Chapter 6 for instructions.

Starting the Setup Program

Follow these steps to start the Setup program:

1. Make sure your computer is turned off.

2. Insert the Reference diskette in drive A. (If you have a 3½-inch drive, the diskette clicks into place automatically. If you have a 5¼-inch drive, press the button to secure the diskette in the drive after you insert it.)

3. Turn on your system. (Remember to turn on your monitor and any peripheral devices before you turn on the computer.) The screen displays the Operation Menu:

```
OPERATION MENU

1 - Setup
2 - Format hard disk
3 - System diagnostics
4 - Prepare hard disk for moving

0 - Exit to DOS for more utilities
```

If an error message appears when you turn on the computer, see "Continuing From an Error Message," below.

4. The Setup option is highlighted. To select it, press Enter. The screen displays the main Setup menu:

```
Exit
Display
Password
Cache memory
Processor speed
Keyboard/Sound
Real-time clock
Hard disk drive
Diskette drive
Serial/Parallel
```

Continuing From an Error Message

If your computer has never been set up, you may see an error message, such as the following:

```
162 - System options not set
   (Run SETUP in REFERENCE DISK)

(Resume = "F1" key)
```

If you see an error message like this one, follow these steps:

1. Press F1. The computer beeps and the screen displays a message, such as the following:

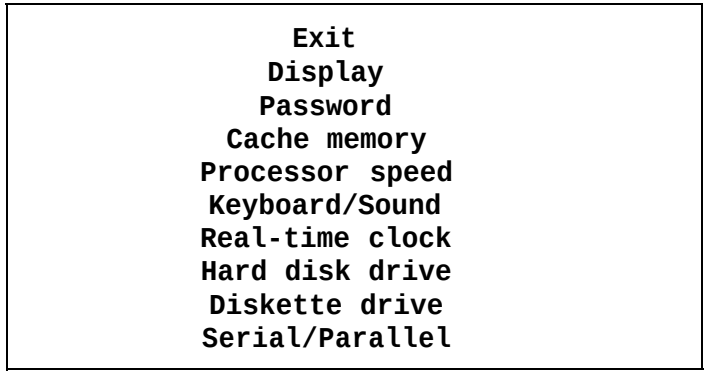
```
        Error(s) detected

  • Incorrect configuration

Set default value ? ( Y / N )
```

   The error message next to the diamond indicates the condition causing the error. There may be more than one error listed in the message. Here are some of the error messages you may see:

```
Time is invalid
HDD and/or HDC failed initialization
Memory size is incorrect, correction made
Cacheable range is adjusted
Incorrect configuration
Checksum is incorrect
HDD is incorrect
```

   Some errors, such as Time is invalid, do not allow you to set a default value, so the screen does not display the Set default value prompt. If you see one of these errors, press Esc; the screen displays the main Setup menu so you can enter a new setting.

2. Be sure Y is highlighted and press Enter. The Setup program changes the setting that caused the error to one that is more likely to match your configuration. The screen displays the main Setup menu:



You should check all the settings in the Setup program to make sure they are correct for your system. The default value for the setting that caused the error may not be the correct one for your configuration.

Note
If you choose N or press Esc instead of selecting Y to set a default value, the Setup program does not change the setting that caused the error and the screen displays the main Setup menu. Be sure to correct this setting before you exit Setup.

Moving the Cursor Block

Use ↓ and ↑ to move the cursor block (the highlighted bar) through the options on the main Setup menu. After you highlight the option you want, press [Enter to select it.

> **Note**
> If the arrow keys on the numeric keypad do not appear to work, num lock mode may be enabled (turned on). If the **Num Lock** indicator in the upper right corner of the keyboard is lit, press [Num Lock] once to turn it off and enable the arrow keys on the numeric keypad. If you need to enter numbers while using the Setup program and you want to use the numeric keypad, press [Num Lock] to turn it back on.

Follow the instructions in the rest of this chapter to use the Setup program to define your computer's configuration.

Setting the Display *Adapter Type*

The Setup program can usually detect the exact type of display adapter you are using with your computer. If you have connected a VGA monitor to the built-in VGA port, the Setup program automatically sets the display adapter type. (With this option you select the type of display adapter you are using-not the type of monitor.) If you have installed a display adapter card-or you just want to check the display adapter setting-follow these steps.

Note
If you have installed an EGA or VGA display adapter card, or another type of card that you want to be the primary display adapter, you must set jumper JP4 on the main system board to disable the built-in VGA interface.

If you have installed one or more video cards, you also may need to set jumper JP6 to tell the computer the type of monitor you are using: either monochrome or color. If you have two types of cards, set the jumper to indicate which one is your primary monitor type. See Chapter 6 for instructions on changing jumper settings.

1. At the main Setup menu, highlight **Display.** A submenu appears identifying the current display adapter type, such as the following:

   VGA

   If the display adapter type is correct for your system, you can skip the rest of this section.

2. To change the display adapter setting, press (Enter. The cursor block moves into the submenu and you see an additional menu on the right side:

   CGA *40* **column**
   CGA *80* **column**
   Monochrome 80 column
   EGA,MCGA,VGA or other

3. Press Enter to move the cursor block into this submenu and then use ↑ or ↓ to highlight the option that matches your display adapter type. If you are not sure which one to choose, follow these guidelines:

   - If you are using the built-in VGA adapter or have installed a VGA, EGA, or MCGA card, select EGA, **MCGA,VGA or other.**

   - If you have a color graphics adapter (CGA) or a multi-mode graphics adapter (MGA) attached to an RGB (color) monitor, select CGA 80 column. (Also set the color/mono switch on the MGA card to color.)

   - If you have a composite color monitor, such as a color television with a video input, try selecting CGA 80 column. If the resulting resolution is poor, run Setup again and select CGA 40 column.

   - If you have a monochrome display adapter (MDA), an MGA, or a Hercules MGA attached to a monochrome monitor, choose Monochrome 80 column. (Also set the color/mono switch on the MGA card to mono.)

   - If you have any other combination of monitor and display adapter card, select EGA, MCGA, VGA or **other.** In addition, consult the documentation supplied with your display adapter card.

> **Note**
> If you have two different display adapters, select the setting for the one you want to be your primary display adapter. The other one is your secondary adapter. A message appears at power-on telling you whether you are currently using your primary or secondary adapter.

4. After you highlight the appropriate display adapter type, press Enter. The screen displays your new setting.

5. Highlight ***** SAVE SETTING** *** and press Enter to return to the main Setup menu.

Setting the Power-on Password

A power-on password is an optional feature that lets you control who can access your system. If you do not want to set a password, skip this section.

Once you set a power-on password, you must enter it at the key prompt ( ) every time you turn on or reset your computer. If you do not enter it correctly, you cannot access your system.

If you want to use your computer as a network server, you can set your password to operate in network server mode. (See "Using Your Computer as a Network Server" in Chapter 4 for more information.)

Follow these steps to set a power-on password and turn on network server mode (if necessary):

1. At the main Setup menu, highlight **Password.** This submenu appears:

```
Power-on password
Network server mode OFF
```

2. Press Enter. The cursor block moves to **Power-on password.**

3. Press Enter. The cursor block moves to an empty box.

Note
If a password already exists, this message appears:

Power-on **password already installed**

The Setup program does not allow you to enter a new password if you have already set one. However, you can easily change or delete the current password if you know it. See "Using a Power-on Password" in Chapter 3 for instructions.

4. To enter a password, type any combination of characters (including letters, numbers, and blank spaces) up to a total of seven characters. You can use the backspace key to delete mistakes.

   Do not use characters requiring the Shift key, such as $, @, or * in your password. The computer does not recognize the Shift key when you use your password to access the system.

Caution
Be sure to remember the password you enter or write it down and keep it in a safe place. If you cannot remember your password, you will not be able to access the computer the next time you turn it on.

   If you want to return to the password submenu without saving any changes, press Esc.

5. After you enter a password, press Enter to return to the password submenu.

6. If you want to change the network server mode setting, highlight Network server mode. To turn network server mode on or off, press Enter.

   You must set a power-on password to turn on network server mode. If you did not yet enter a password, this message appears:

   ```
   Set a power-on password first
   ```

   To enter a password, highlight Power-on password and follow steps 3 through 5 above.

7. After you enter a password and turn network server mode on or off, highlight ****** SAVE SETTINGS** ****and press Enter to return to the main Setup menu.

> **Note**
> If you forget your password, there is a way to disable the password function. See "Password Problems" in Appendix B for instructions.

Setting the Extended Memory Caching

Extended memory caching allows your system to work much faster. When you cache portions of memory, the computer copies information from that memory into a high-speed cache buffer, where it can find information faster.

> **Note**
> Caching is active only when your computer is operating at high speed.

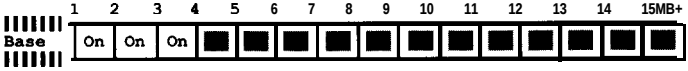
Your computer automatically enables memory caching for the 640KB of base memory. For the memory above 1MB, the Setup program allows you to turn extended memory caching on or off. The default setting is on for all the extended memory currently installed in your system from 1MB up to the maximum.

Most of the time, you should cache all of your extended memory to maximize the performance of your 32-bit computer. However, if you install an optional memory card that "shares" memory with any of your other system memory, you should turn caching off in memory areas that are shared. See the manual that came with your memory card to see if this is necessary.

To check or change the extended memory cache setting, follow these steps:

1. At the main Setup menu, highlight **Cache memory.** You see the following cache memory table:

Extended memory caching



The table indicates the range of extended memory currently installed in your system. You see **ON** or **OFF** in the first three areas because your computer comes with 4MB of memory and the extended memory area from 1MB to 4MB can be cached. If you installed additional memory, you see **ON** or **OFF** for each additional megabyte of memory you have installed. The shaded areas indicate ranges of memory that are not installed.

If your extended memory cache setting is correct, you can skip the rest of this section.

2. To change the setting, press [Enter]. The cursor block moves to **Extended** memory caching.

3. Press [Enter] again. The cursor block moves to the first range in the cache table. To change the setting for the first range from **ON to OFF or vice** versa, press (Enter.

4. If you installed memory above 4MB, press → three times to move the cursor block to the 4MB to 5MB range. Press [Enter] to change the setting from **ON** to **OFF,** if necessary.

   Then press → or ← to move to the other ranges and press [Enter], as necessary, to change the settings.

5. When you are finished, press ↑ to move the cursor block to the submenu.

6. Highlight *** ** SAVE SETTING** ** * and press [Enter] to return to the Setup menu.

Setting the Processor Speed

Your computer's processor can operate at two speeds: high or low. High speed is 25 MHz or 50 MHz (depending on your model) and low speed simulates 8 MHz. The processor is set to operate at high speed (where it can access memory faster) unless you change it to low or set the speed to change automatically (when necessary).

When the computer is running at high speed, the **TURBO** indicator on the front panel is illuminated.

You should use high speed for almost everything you do unless you are using an application program that requires a slower speed. Some programs (especially older ones) have specific timing requirements when accessing diskettes. Check your application program manual.

You can also set the processor to change its speed automatically. This enables the computer to switch to low speed whenever it needs to access a diskette drive, but run at high speed for all other operations.

> **Note**
> You may not want to use the automatic setting for certain copy-protected programs. See "Changing the Processor Speed" in Chapter 4 for more information.

In addition to selecting the default operating speed through the Setup program, you can change the speed temporarily by entering a keyboard command or running the ESPEED program. See "Changing the Processor Speed" in Chapter 4 for details.

Follow these steps to set your processor speed:

1. At the main Setup menu, highlight Processor **speed.** The current status appears:

   ```
   Speed: High
   ```

   If the displayed setting is correct, skip the rest of this section.

2. To change the processor speed, press Enter. The cursor moves into the submenu and you see another menu:

   ```
   High
   Automatic
   Low
   ```

3. Press Enter to move the cursor block into the option menu.

4. Use ↑ or ↓ to highlight the speed you want and press Enter.

5. Highlight **** SAVE SETTING** ** and press Enter to return to the main Setup menu.

Setting the Keyboard and Speaker Options

The **Keyboard/Sound** option lets you control these three features:

- Speaker
- Initial num lock mode
- Keyboard repeat rate.

Your computer has a built-in speaker that beeps when you perform certain operations. The default setting is **Enabled** (on) since it serves a useful purpose in many applications; however, you may prefer to disable the speaker.

The **Initial num lock** option determines whether num lock is on or off when you turn on your computer. When num lock mode is on, you can use the numeric keys on the keypad to enter numbers.

To turn num lock mode off, just press Num Lock. The **Num Lock** light on the keyboard goes out and the feature is disabled until you turn the computer off or until you press Num Lock again. The next time you turn on your computer, num lock returns to the setting you selected in the Setup program.

Note
If you are using the keyboard that came with your computer (or another IBM AT compatible keyboard), the default setting for the initial num lock setting is **ON.** If you are using a keyboard that has 83 or 84 keys, the initial num lock default setting is **OFF.**

The keyboard repeat rate option lets you change the speed at which your keyboard repeats a character when you hold down a key. The default setting is **Normal,** but you can make the rate faster or slower.

Follow these steps to check or change the keyboard and speaker options:

1. At the main Setup menu, highlight **Keyboard/Sound.** The current settings appear:

   ```
   Speaker            Enabled
   Initial num lock        ON
   KB repeat rate      Normal
   ```

   If the displayed settings are appropriate for you, skip the rest of this section.

2. To change any of the settings, press Enter. The cursor block moves into the submenu and the **Speaker** option is highlighted.

3. To enable or disable the speaker (turn it on or off), press Enter.

4. To turn the initial num lock setting on or off, highlight **Initial num lock** and press Enter.

5. To change the keyboard repeat rate, highlight KB repeat **rate.** You see the following option menu:

   Slow
   Normal
   Fast

6. Press [Enter] to move the cursor block into the menu.

7. Use ↑ or ↓ to highlight the speed you want and press [Enter].

8. Highlight *** **SAVE SETTINGS** *** and press [Enter] to return to the main Setup menu.

Setting the Real-time Clock

The real-time clock in your computer continuously tracks the time and date-even when the computer is turned off. The first time you run Setup, use the Real-time **clock** option to set the time and date. You may need to use this option again later to adjust your clock for daylight savings time. The computer automatically changes the date for leap years.

> **Note**
> You can also change the real-time clock's time and date with the MS-DOS TIME and DATE commands. See your MS-DOS manual for instructions.

Follow these steps to set the real-time clock:

1. At the main menu, highlight Real-time **clock.** If the time and date have been previously set, the current settings appear:

   ```
   Time    09:16:52
   Date    03-29-1992
   ```

   If the time and date are correct, you can skip the rest of this section.

   If the time and date are incorrect, go to step 2 below.

   If the time and date have never been set, the submenu contains a template for you to fill in:

   ```
   Time    xx:xx:xx
   Date    xx-xx-xxxx
   ```

2. Press [Enter] to move the cursor block into the submenu.

3. To set or change the time, press [Enter] again. You see this template:

   ```
   hh:mm:ss
   ```

   ("hh" stands for hours, "mm" stands for minutes, and "ss" stands for seconds.)

4. Using a 24-hour clock, enter the time in the exact format shown in the box. Type two digits for each part; the Setup program automatically inserts the colons (:). For example, to set the time to 1:30 p.m., you would type the following:

   133000

You can use the backspace key to make corrections. When the time is correct, press [Enter. If you enter an invalid time-for example, a number greater than 23 for the hours or greater than 59 for the minutes or seconds-the computer ignores your entry. Try again.

5. To set or change the date, highlight Date and press Enter. You see this template:

```
mm-dd-yyyy
-
```

("mm" stands for month, "dd" stands for day, and "yyyy" stands for year.)

6. Enter the date in the exact format shown in the box. Use two digits for the month and day and four digits for the year; the Setup program automatically inserts the hyphens (-). For example, to set the date for March 29,1992, you would type the following:

```
03291992
```

You can use the backspace key to make corrections. When the date is correct, press Enter. If you enter an invalid date-for example, a number greater than 12 for the month or greater than the number of days in that month-the computer ignores your entry. Try again.

7. Press ↑ once or twice to return to the main Setup menu.

Note
The Setup program automatically saves the time and date when you press Enter after typing each one. If you then exit the Setup program without saving your changes, the new time and date still take effect.

Setting the Hard Disk Drive Configuration

If your computer came with a factory-installed hard disk, your hard disk configuration has already been set and you can skip this section.

If you installed or removed a hard disk, follow these steps to set the computer's hard disk configuration:

1. At the main menu, highlight **Hard disk drive.** Your current settings appear, such as the following:

   ```
   Drive 1:    Type  34
   Drive 2:    None
   ```

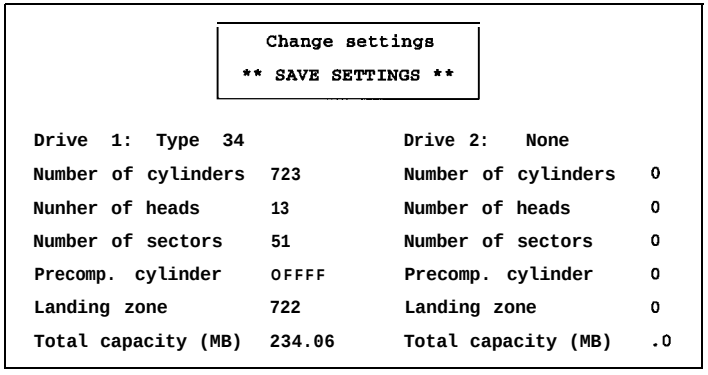
   The Type number indicates the type of hard disk installed in your computer. See your hard disk documentation for the correct drive type number or for a list of the drive's parameters which you can use to identify the drive type number. Then consult the Hard disk drive types table on page 2-24 for a list of the types you can use in your computer.

   The None following Drive 2 : indicates that there is no second hard disk.

   If the displayed settings match your hard disk configuration, skip the rest of this section.

   If a setting is incorrect, or if you want more details about your hard disk configuration, go to step 2.

2. Press Enter. You see a menu such as the following:



The menu lists the settings you can change for each drive: the number of cylinders, the number of read/write heads, the number of sectors, the precompensation cylinder, and the landing zone (the cylinder on which you park the heads when moving the computer). It also displays the total storage capacity in megabytes.

3. If you want to change the settings for drive 1 (which is drive C on most computers), press Enter to highlight **Drive 1:.** If you want to change the settings for drive 2, press Enter and then → to highlight Drive 2:.

4. Press Enter again. You see this submenu:

None
Type 34
User defined

5. If you have disconnected the drive or if the drive does not exist, highlight None and press Enter. All the drive settings revert to 0. Go to step 8.

   If your hard disk matches one of the drive types listed in the Hard disk drive types table, go to step 6.

   If your hard disk does not match one of the drive types listed in the Hard disk drive types table, go to step 7.

6. Highlight **Type** and press Enter. The current type number appears:

   Type 34

   Now select the drive type number that matches your hard disk configuration in the Hard disk drive types table.

   You can enter the drive type in one of two ways:

   - Type the drive type number and press Enter. The screen displays the new number and settings.
   - Use the cursor keys to scan through the drive type numbers. This is a handy way to verify new hard disk settings before you press Enter because the settings list is updated as you display each new type.

   After you select the appropriate drive type, press Enter. The screen displays the hard disk settings. Go to step 8.

7. If your hard disk does not match one of the drive types listed in the Hard disk drive types table, highlight User **defined** and press [Enter. You see the following:

   Number of cylinders 000

   The same parameter is highlighted on the submenu above. Enter the correct number of cylinders and press [Enter].

   The information for Number of cylinders is automatically updated on the submenu above and you see the next parameter, Number of heads. Enter the correct number of read/write heads for the hard disk and press [Enter.

   Follow this same procedure for each remaining item in the settings list (the number of sectors, the precompensation cylinder, and the landing zone).

   If you enter a parameter incorrectly, press ↑ or ↓ to highlight the parameter and then enter it again.

   The Setup program does not allow you to enter the total storage capacity; it calculates the storage capacity based on what you enter for the number of cylinders, heads, and sectors.

   After you type the landing zone number and press [Enter, the **cursor** block returns to the Drive submenu heading.

8. If you want to change the hard disk type for another drive, press → or ← and return to step 4.

9. When the hard disk drive settings are correct, press ↑ to move the cursor block into the top submenu. Highlight ** SAVE SETTINGS ** and press [Enter] to save your hard disk drive configuration.

Hard Disk Drive Types

The following table lists the types of hard disk drives you can use in your computer. Check this table and the documentation supplied with your hard disk to find the correct type number for the hard disk drive(s) installed in your computer.

Hard disk drive types

Type no.	Cylinders	Heads	Sectors (Sec)	Precomp (WPcom)	Landing Zone	Size (In MB)	Drive name/ manufacturer
1	306	4	17	128	305	10	
2	615	4	17	300	615	20	Seagate ST225 and ST4026, Western Digital WD-93024
3	615	6	17	300	615	30	Seagate ST138A*
4	940	8	17	512	940	62	
5	940	6	17	512	940	46	
6	615	4	17	none	615	20	Conner CP3024, Seagate ST125, ST125A, and ST325A
7	462	8	17	256	511	30	
8	733	5	17	none	733	30	Seagate ST4038
9	900	15	17	none	901	112	
10	820	3	17	none	820	20	
11	855	5	17	none	855	35	
12	855	7	17	none	855	49	
13	306	8	17	128	319	20	
14	733	7	17	none	733	42	
15							reserved

Hard disk drive types (continued)

Type no.	Cylinders	Heads	Sectors (Sec)	Precomp (WPcom)	Landing Zone	Size (In MB)	Drive name/ manufacturer
16	612	4	17	0	663	20	
17	977	5	17	300	977	40	CDC 94205-51, Conner CP3044* and CP2044*, Maxtor 7040*, Miniscribe 8051A*
18	977	7	17	none	977	56	
19	1024	7	17	512	1023	59	Conner CP2064
20	733	5	17	300	732	30	Toshiba MK-133FA
21	733	7	17	300	732	42	Toshiba MK-134FA, Seagate ST-157A*
22	733	5	17	300	733	30	
23	306	4	17	0	336	10	
24	903	4	46	none	902	80	Conner CP3084
25	776	8	33	none	775	100	Conner CP3104
26							reserved
27	698	7	17	300	732	40	
28	976	5	17	488	977	40	
29							reserved
30							reserved
31	732	7	17	300	732	42	
32	1023	5	17	none	1023	42	
33	901	5	53	none	900	116	Quantum LPS120AT

Hard disk drive types (continued)

Type no.	Cylinders	Heads	Sectors (Sec)	Precomp (WPcom)	Landing Zone	Size (In MB)	Drive name/ manufacturer
34	723	13	51	none	722	234	Quantum LPS240AT
35	934	16	17	none	933	124	Toshiba MK-2124FC
36							reserved
37	683	16	38	none	682	202	Conner CP3204F
38	548	8	38	none	547	81	Conner CP2084
39	761	8	39	none	760	115	Conner CP30104
40	980	10	17	none	979	81	Maxtor 7080A, Toshiba MK-2024FC
41	1022	5	34	none	1022	84	CDC-94216-106**
42	1022	5	36	none	1022	89	CDC-94216-106
43	1024	8	17	512	1023	68	Micropolis 1325, Ataal 3085, Lanstor LAN64, Maxtor XT1085, Newbury NDR1085
44	828	10	34	none	828	137	Toshiba MK-156F
45	1024	5	17	512	1023	42	
46	615	8	17	128	618	40	
47	—	—	—	—	—	—	user defined type

- Supported in translate mode.
- * With Western Digital ESDI controller.

Setting the Diskette Drive Type(s)

Your system probably came with one factory-installed diskette drive. If you added a second diskette drive or removed one, you may need to change the diskette drive settings to match your configuration. If you haven't made any changes, you can verify your drive type settings. Follow these steps:

1. At the main menu, highlight **Diskette drive. The** current settings appear:

   ```
   Drive A:     1.44 MB
   Drive B:     None
   ```

   If the diskette drive types on the screen match your diskette drive configuration, you can skip the rest of this section.

2. To change a setting, press Enter. The cursor block moves into the diskette drive submenu and you see the following:

   ```
   Not  installed
   360 KB drive
   720 KB drive (3.5")
   1.2 MB drive
   1.44 MB drive (3.5")
   ```

   You also see themessage **Selected drive light is ON.** This tells you that the light on the diskette drive currently selected is on.

3. If you want to change the drive A settings, make sure **Drive A: is** highlighted and press Enter. If you want to change the drive B settings, highlight Drive **B** : and press Enter. The cursor block moves into the submenu.

4. Use ↓ or ↑ to highlight the correct capacity for your diskette drive and press Enter. The screen displays the type you selected.

   If you want to enter the type for another diskette drive, return to step 3.

5. When the diskette drive settings are correct, highlight **** SAVE SETTINGS **** and press Enter. The cursor block returns to the main Setup menu and you see the updated information for drives A and B.

Setting the Serial/Parallel Interfaces

The serial and parallel interfaces in your computer are set to act as the primary ports. If you have not added an additional serial or parallel port, you can skip this section.

If you install an option card with its own serial or parallel port, you may want to designate the built-in port as secondary and the additional port as primary. The Setup program lets you designate ports as primary and secondary so there is no conflict between the built-in port and the additional port. Here are some guidelines:

- ❑ If you install an option card with a port pre-set as primary by the manufacturer, you must make the computer's built-in port the secondary port.
- ❑ If you install an option card or peripheral device with a port that is not pre-set, you can designate it as the primary or secondary port.
- ❑ If you install two option cards with ports, designate one as the primary port and the other as the secondary port and disable the built-in port.

Follow these steps to change your built-in serial and parallel interface settings:

1. At the main menu, highlight Serial/Parallel. The current settings for each port appear:

   ```
   Serial      Primary
   Parallel    Primary
   ```

2. Press [Enter] to move the cursor block into the submenu. You see this additional option menu:

   ```
   Disabled
   Primary
   Secondary
   ```

3. If you want to change the serial port setting, be sure Serial is highlighted and press [Enter]. If you want to change the parallel port setting, highlight Parallel and press [Enter. The cursor block moves into the submenu.

4. Use ↓ or ↑ to highlight the appropriate setting for the port you selected and press [Enter]. The screen displays the new setting.

Note

If you add an option card with a parallel or serial port and highlight a setting that causes a conflict between your built-in port and the port on the option card, you see this message:

```
Conflict with option card
```

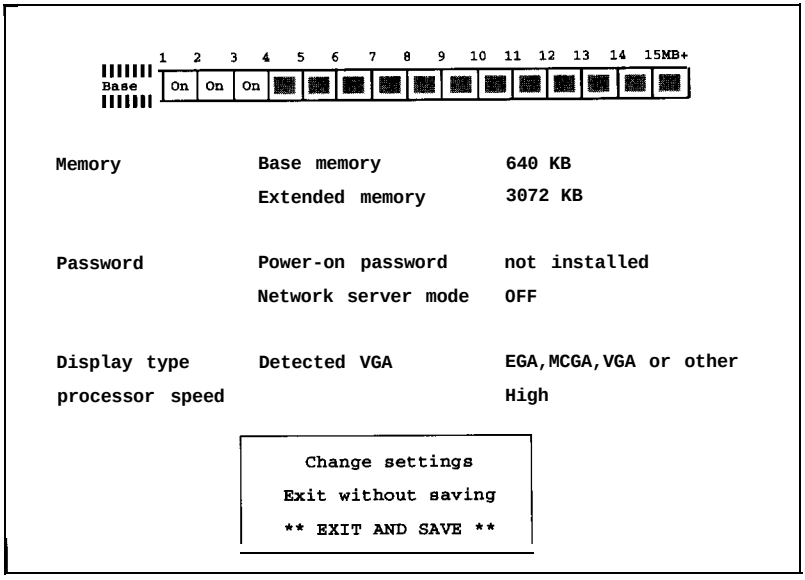
Highlight a setting that is appropriate for your system configuration and press [Enter].

If you want to change the setting for the other port, return to step 3.

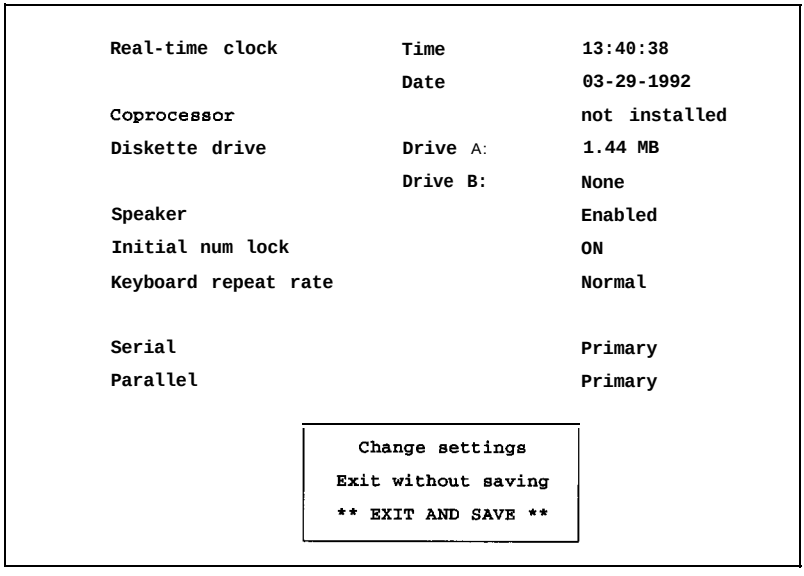
5. When the serial and parallel port settings are correct, highlight **** * SAVE SETTINGS** *** and press Enter. The cursor block returns to the main Setup menu and you see your updated serial and parallel interface settings.

Reviewing Your Settings

When you finish using the Setup program to define your computer's configuration, use ↑ to highlight **Exit at** the **main** Setup menu and press Enter. The following Setup summary appears on the screen:

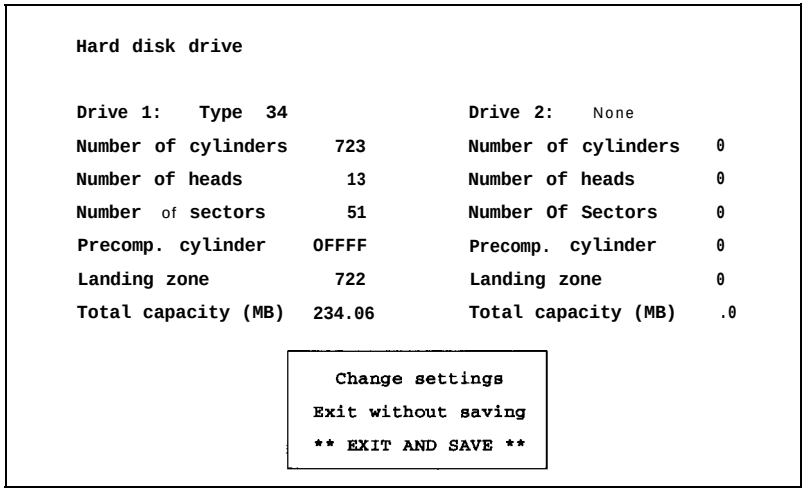


There are two more Setup summary screens you need to check. To display the next screen, press Pg Dn. You see the following:



If you have never set the real-time clock, the entry at the top of the screen flashes to remind you to set the time and date. See "Setting the Real-time Clock" on page 2-17 for instructions.

To view the last Setup summary screen, press Pg Dn. You see your hard disk drive configuration(s):



Check each Setup summary screen to see if all the information is correct. You can press Pg Up to display the previous screen or Pg Dn to display the next screen. If anything is incorrect, highlight **Change** settings and press Enter. The main Setup menu appears and you can change the appropriate settings.

Leaving the Setup Menu

If you did not change any settings or you want to cancel the changes you made, highlight **Exit without saving** at a Setup summary screen and press Enter. The Operation Menu appears.

If you want to save the settings you entered, highlight ** **EXIT** AND **SAVE** ** and press Enter at a Setup summary screen. The Setup program stores the new settings and resets the computer using the new configuration. If you have set a password, you need to enter it at the key prompt. (See "Using a Power-on Password" in Chapter 3 for instructions.) The Operation Menu appears.

If you have just run Setup for the first time, remove the Reference diskette from the drive and turn off your computer. Then follow the instructions in your MS-DOS manual to install the operating system. (If you are using a different operating system, follow the installation instructions in that manual.)

Once you have installed MS-DOS, you should always boot the computer from the hard disk or the MS-DOS Startup diskette when you are finished running Setup. First remove the Reference diskette from drive A. If you do not have a hard disk, insert the Startup diskette. Then reset your computer to make sure it performs all the commands in the CONFIG.SYS and AUTOEXEC.BAT files.

If the computer displays an error message while it is starting up, run the Setup program again and check the setting the error message indicates. If the computer still displays an error message after you check your Setup program settings, see Appendix B or C, or ask your dealer for assistance.

Note
Be sure to make a backup copy of your Reference diskette after you run the Setup program and install your operating system.

Chapter 3

Using Your Computer

This chapter briefly describes the following procedures for using your computer:

- ❑ Installing MS-DOS or another operating system
- ❑ Copying the Reference and Utility diskette files
- ❑ Locking the computer's cover
- ❑ Using special keys on the keyboard
- ❑ Stopping a command or program
- ❑ Resetting the computer
- ❑ Using a power-on password
- ❑ Preparing a hard disk for moving.

Installing MS- DOS or Another Operating System

After you connect the components of your system and run the Setup program, you must install the operating system on your computer. The instructions in this manual assume that you are using MS-DOS with your computer, but you can install another operating system, such as OS/2 or UNIX. See the documentation that came with your operating system for instructions on installing it.

> **Note**
> Be sure to make backup copies of your original operating system diskettes.

Copying the Reference and Utility Files

If you have a hard disk, you'll probably want to copy some of the files on your Reference and Utility diskettes to the hard disk for convenience. This allows you to run the programs any time without having to insert a diskette. Copy the following files from the Reference diskette to your hard disk:

```
AFDD.EXE    ESPEED.EXE    HDSIT.COM
HDSIT.VER   ROMBIOS.COM
```

(See Chapter 4 and Appendix B for instructions on using these files.)

The Reference diskette also contains files for the Setup program and the System diagnostics program. Because you should always run these programs from the Reference diskette, do not copy these files to your hard disk.

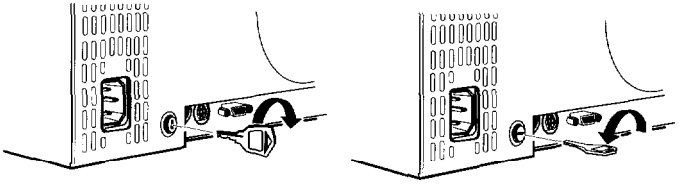
The Utility diskettes contain VGA drivers that allow you to display graphics in certain high-resolution modes. If you want to use any of these extended modes on your VGA monitor, copy any VGA files you need to your hard disk. See the VGA Utilities booklet for instructions.

> **Note**
> Be sure to make backup copies of your Reference and Utility diskettes.

Locking the Computer's Cover

You can lock the cover onto the computer to prevent unauthorized users from accessing its internal components.

To lock the cover, insert the key as shown on the left and turn it clockwise. To unlock the cover, insert the key as shown on the right and turn it counterclockwise.



Special Keys on the Keyboard

Certain keys on your keyboard serve special functions when your computer is running MS-DOS or application programs. These special keys are described in the table below.

Special key functions

Key	Purpose
Tab	Moves the cursor one tab to the right in normal mode and one tab to the left in Shift mode.
Caps Lock	Changes the letter keys from lower- to uppercase; changes back to lowercase when pressed again. The numeric/symbol keys on the top row of the keyboard and the symbol keys in the main part of the keyboard are not affected.
Shift	Produces uppercase characters or the top symbols on the keys when used with the main character keys. Produces lowercase characters when the Caps Lock function is on.

Key	Purpose
Ctrl	Works with other keys to perform special (control) functions, such as editing operations in MS-DOS and various application programs.
Alt	Works with other keys to enter alternate character codes or functions.
Backspace	Moves the cursor back one space, deleting the character to the left of the cursor.
Enter	Ends a line of keyboard input or executes a command.
Insert (Ins)	Turns the Insert function on and off.
Delete (Del)	Deletes the character marked by the cursor.
Home End Pg Up (PageUp) Pg Dn (PageDown) ↑ ← ↓ →	Control cursor location,
Num Lock	Changes the function of the numeric/cursor keys from entering numbers to positioning the cursor; changes back when pressed again.
Esc	Cancels the current command line or operation.
F1 – F12	Perform special functions within application programs.
Print Screen (PrtSc)	Prints the screen display on a printer.
Sys Req (Req)	Generates the System Request function in some application programs (used with Alt).
Scroll Lock	Controls scrolling in some applications.
Pause	Suspends the current operation.
Break	Terminates the current operation (when used with Ctrl).

The Caps Lock, Num Lock, and Scroll Lock keys work as toggles; press the key once to turn on a function and again to turn it off. When the function is enabled, the corresponding light in the upper right corner of the keyboard is on.

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 command that you want to stop, try one of the following commands:

- Hold down the Ctrl key and press C.
- Hold down the Ctrl key and press Break.

These methods may also work in your application program. If not, you may need to reset the computer as described below.

> **Caution**
> Do not turn off the computer to stop a program or command because the computer erases any data you did not save.

Resetting the Computer

Occasionally, you may want to clear the computer's current settings or its 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 as a means to exit a program. Some programs classify and store new data when you exit them in the normal manner. 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.

There are two ways to reset the computer:

- If you are using MS-DOS, hold down Ctrl and Alt and press the Delete key. The screen goes blank for a moment and then the computer reloads MS-DOS. If it doesn't, try the next method.

- Press the **RESET** button on the front panel. This method works even when the computer does not respond to your keyboard entries.

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 five seconds. If you do not have a hard disk, insert the system diskette in drive A. Then turn on the computer.

Using a Power-on Password

If you set a power-on password when you ran the Setup program, you must enter it every time you turn on or reset the computer. Follow these steps to use your password:

1. If you do not have a hard disk, insert your system diskette in drive A.

2. Turn on or reset the computer. You see this key prompt:

   3 

3. At the key prompt, type your power-on password. The key turns when you type a character, but the screen does not display the characters you type. Then press Enter.

After you type the password correctly and press Enter, a happy face character appears. Then the computer loads the operating system and displays the command prompt.

> **Note**
> If you turned on network server mode when you ran the Setup program, you need to use a different procedure to enter your password. See "Using Your Computer as a Network Server" in Chapter 4.

You have three chances to enter the correct password. After the third incorrect try, the screen displays a zero, the keyboard locks up, and you cannot use the computer. Reset the computer and try to enter the correct password again.

> **Note**
> If you do not know the correct password, see "Password Problems" in Appendix B.

Changing a Power-on Password

To change your power-on password, follow these steps:

1. If you do not have a hard disk, insert your system diskette in drive A.

2. Turn on or reset the computer. At the key prompt, enter your current password followed by a forward slash (/) and the new one you want to use. For example, if your current password is 123 and you want to change it to ABC, type:

   ```
   123/ABC
   ```

   The screen does not display what you type.

Do not use characters requiring the Shift key, such as $, @, or *, in your new password.

> Caution
> Be sure to remember the new power-on password you enter or you will not be able to access your computer the next time you turn it on.

3. Press Enter. A happy face character appears and then the computer loads the operating system.

Deleting a Power-on Password

To delete your power-on password, follow these steps:

1. If you do not have a hard disk, insert your system diskette in drive A.

2. Turn on or reset the computer. At the key prompt, enter your current password followed by a forward slash. For example, if your password is 123, type:

   123/

3. Press Enter. A happy face character appears and then the computer loads the operating system.

The next time you turn on or reset the computer, it does not request a password and loads the operating system immediately.

> **Note**
> You need to know the password in order to delete it using this method. If you do not know the password, see "Password Problems" in Appendix B.

Preparing the Hard Disk for Moving

If you need to move your computer to a new location, you may want to run the HDSIT program (on your Reference diskette) to protect the hard disk during the move.

HDSIT moves (or parks) the disk drive's read/write heads to a region on the disk surface that does not contain data, and locks them securely in position. This protects the hard disk from being damaged if the computer is bumped accidentally.

Many hard disk drives, including all Epson drives, automatically park their heads when you turn off the computer. If your hard disk drive does not do this, or if you are not sure that it does, be sure to run HDSIT.

Follow these steps:

1. Exit any program you are using and make sure the MS-DOS command prompt appears on the screen.

2. If you copied HDSIT to your hard disk (as described at the beginning of this chapter), type **C** : and press Enter to log onto the root directory of the hard disk.

   If you did not copy HDSIT to drive C, insert the Reference diskette in drive A. Then type **A** : and press Enter to log onto that drive.

3. Type the following and press [Enter:

   HDSIT

You see a message on the screen as the computer locks the heads and disables the keyboard. Remove any diskettes and turn off the computer. You are now ready to move it to the new location.

Chapter 4

Enhancing System Operations

This chapter tells you how to use the following procedures to enhance the operation of your computer:

- ❑ Using AUTOEXEC.BAT and other batch files
- ❑ Changing the processor speed
- ❑ Reassigning the diskette drives
- ❑ Using your computer as a network server
- ❑ Using expanded memory beyond 640KB
- ❑ Using special VGA features.

Using AUTOEXEC.BAT and Other Batch Files

As you get used to using MS-DOS and your application programs, you may find that there are commands you need to run frequently. You can automate the execution of these commands by listing them in a special file called a batch file. When you type the name of the batch file and press Enter, MS-DOS executes the commands in the file just as if you had typed each command from the keyboard.

If you have a word processing program that can save a file as a text-only file (sometimes called an ASCII file), you can use that program to create a batch file. You can also use the MS-DOS COPY or EDLIN command, or a text editor, to create the file.

One batch file that you may find particularly useful is called AUTOEXEC.BAT. Every time you turn on your computer, MS-DOS looks for the AUTOEXEC.BAT file and automatically executes each of the commands in the file.

When you install MS-DOS, it creates an AUTOEXEC.BAT file for you. To modify the file or replace it with a new one, you can use the COPY or EDLIN command, a text editor, or a word processing program that can save a file as text-only. Be sure to name the file AUTOEXEC.BAT and store it in the root directory of the hard disk or diskette from which you load MS-DOS.

See your MS-DOS manual for more information about creating and using batch files.

Changing the Processor Speed

Your computer's processor can operate at two speeds: high and low. High speed is 25 MHz or 50 MHz (depending on your model) and low speed simulates an 8 MHz processor speed. At high speed, the computer can access memory faster than at low speed. The default setting is high speed unless you changed it in Setup to low or to change automatically.

> **Note**
> When your computer is operating at high speed, the **TURBO** light on the front panel is on. It is off when the computer is operating at low speed.

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

Some copy-protected programs require the computer to run at low speed while accessing the program on a diskette. These programs also usually require you to leave a key disk-the diskette that contains the copy protection-in the diskette drive. If you use a copy-protected program often, you may want to set your processor speed to change automatically to low speed when accessing the diskette and return to high speed when it is finished.

Depending on the type of copy-protected program you have, you may or may not want to set the processor to automatic speed. Follow these guidelines:

- If you are using a copy-protected program that can run only on a diskette or that requires a key disk, try to load the program at high speed. If this works, you do not need to set the speed to change automatically. If you can't load the program on high, set the speed to change automatically.

- If you are using a copy-protected program that does not require a key disk but requires a special procedure to install it on a hard disk, set the speed to low while you are installing the program. Then set the speed to high while you load and run the program.

  If this does not work, try installing and loading the program at low speed and then change to high speed to run it. Do not set the speed to change automatically.

There are three ways to change the processor speed:

- Run the Setup program

- Enter a keyboard command

- Run the ESPEED program.

If you frequently use programs that require low or automatic speed, use Setup to change the processor speed. See Chapter 2 for instructions.

If you use these programs only occasionally, you should use the keyboard commands or the ESPEED program (described below) to change the processor speed.

Entering Keyboard Commands

You can change the processor speed by entering one of the following commands:

Ctrl Alt + Changes the speed to high.

Ctrl Alt − Changes the speed to low.

Ctrl Alt * Changes the speed to low when the computer accesses a diskette.

To enter these commands, hold down the Ctrl key and the Alt key and press the +, −, or * key *located on the numeric keypad.* The commands do not work if you use the characters on the main keyboard.

Note
You can use the commands listed above while you are running a program. However, if the program uses one of the same commands for another function, you cannot use it to change the processor speed. For example, if you are running a program that uses the Ctrl Alt − command to move the cursor, you cannot enter Ctrl Alt − to change the processor speed to low. Another alternative is to use the ESPEED program, described below.

The speed setting remains in effect until you press the **RESET** button or turn off the computer, or until you change it again using the Setup program, another keyboard command, or the ESPEED program, described below.

Using the ESPEED Program

ESPEED provides an easy way to change the processor speed if your application program does not recognize the Ctrl key commands or if you want to include the program command in a batch file.

The ESPEED program is on the Reference diskette. If you have a hard disk drive, copy the file ESPEED.EXE from your Reference diskette onto your hard disk-if you have not already done so-and run the program from there. If you do not have a hard disk, insert your Reference diskette in drive A and log onto drive A before you enter the command to start the program.

To run the ESPEED program, type the following at the MS-DOS command prompt and press Enter:

```
ESPEED
```

You see the following messages:

```
Usage: ESPEED[/H] [/L] [/A]
  /High    set High speed (no auto)
  /Low     set Low speed (no auto)
  /Auto    set Auto speed
```

These messages tell you the switches you should use to set the speed to high, low, or automatic. At the MS-DOS prompt, type the ESPEED command again and include the appropriate switch, such as the following:

```
ESPEED /A
```

(This command sets the processor speed to change to low speed automatically when the computer accesses a diskette.)

If you include the switch when you type the initial ESPEED command, the program changes the speed without displaying the command options.

The processor speed you set remains in effect until you change it using the Setup program, a keyboard command, or the ESPEED program again or until you press the **RESET** button or turn off the computer.

Entering the ESPEED command in a batch file

You may want to run the ESPEED program by including the command in a batch file. For example, let's say you have a program called SLOWDOWN which requires a slower processor speed. You could include the following commands in a batch file to start the SLOWDOWN program:

```
ESPEED /A
SLOWDOWN
```

You could name the batch file SLOW.BAT. Whenever you need to run the SLOWDOWN program, insert the program diskette into drive A. Then type **SLOW** and press Enter. The computer changes the processor speed to automatic and starts the program.

Reassigning the Diskette Drives

If your system has two diskette drives, they are connected inside your computer so that the top drive is A and the bottom drive is B. Because drive A is the boot drive, whenever you want to load the operating system or a bootable program from a diskette, you must insert the diskette into drive A.

If both of your drives are the same type—3½-inch, 1.44MB capacity, for example-you never need to reassign the drives. If your two drives are different types, however, you may need to change the drive letter assignments so you can boot the computer from drive B. For example, you may have a 5¼-inch program disk which you need to use to boot the computer. Or you may have an application program that requires you to leave the 5¼-inch key disk in drive A while you run the program.

For these situations, you can reverse the drive assignments to make the top drive B and the bottom drive A. There are two ways to do this:

- Insert the diskette in drive B and turn on the computer. The drive automatically becomes drive A.
- Run the AFDD program to reassign the drive. See "Using the AFDD Program," below, for instructions.

Your assignments remain in effect until you press the **RESET** button or turn off the computer, or until you reassign the drives to their original assignments. The reassignment remains in effect if you reset the computer from your hard disk by entering the Ctrl Alt Delete command.

Using the AFDD Program

AFDD reverses the current diskette drive assignments and resets the system. When you are done using the reversed drive assignments, you can use the AFDD program again to reassign the drives to their original configuration.

The AFDD program is provided with your system on the Reference diskette. If you do not have a hard disk, insert your Reference diskette in drive A and log onto drive A before you enter the command to start the program.

If you have a hard disk drive, copy the file AFDD.EXE from the Reference diskette onto your hard disk (if you have not already done so); then you can run the program from there.

To run AFDD, type the following at the command prompt and press Enter:

```
AFDD
```

You see messages such as the following:

```
      New Assign Present
Drive A:    1.44MB  <=  1.2MB
Drive B:    1.2MB   <=  1.44MB
 (S)et and Reboot,  Any other key to abort ?
```

If you inserted the Reference diskette to run AFDD, remove it now.

If you want to change the drive assignments, press S. The system reboots and loads the operating system, and the new drive assignments take effect. If you do not want to change the drive assignments, press any other key.

If you are running the AFDD program from a hard disk, you can reassign the drives and reset the computer automatically. Type the following command and press Enter:

```
AFDD /S
```

The /S switch tells the AFDD program to reset the computer, load MS-DOS, and change the diskette drive assignments without displaying the messages.

> **Note**
> You may want to run AFDD by including the command in a batch file.

Using Your Computer as a Network Server

A network server is the master computer in a network and provides storage space for the other computers connected to it. It can also write files to and read files from the other computers, making it the most powerful computer in the network.

Even if no one is typing commands at the network server keyboard, the server can process commands sent to it from other computers. If you use your computer as the network server, you may want to prevent unauthorized users from entering commands at the keyboard. To provide this security, you can enable a power-on password in network server mode using the Setup program.

If you set a power-on password but do not turn on network server mode, you enter the password *before* the computer loads the operating system or the network software. Once you load it, anyone can access your system by typing commands on the keyboard. However, if you set a password and turn on network server mode, you can load your operating system or network software before you enter the password. This allows other computers in the network to access the system, but prevents unauthorized users from entering commands at your keyboard and using any network server access privileges.

When you boot the computer in network server mode, you do not see the key prompt ( ), as you would if network server mode was turned off. The password prompt is hidden to prevent unauthorized users from knowing that a password is required.

You do not have to set a password in network server mode to use your computer as a network server, but it is helpful. See "Setting the Power-on Password" in Chapter 2 for instructions on setting the password and enabling network server mode. Then read the next section to use your network password.

Note

If your hard disk drive has a partition larger than 32MB, you must use the MS-DOS SHARE command to install file sharing and locking protection in a network environment. See your MS-DOS manual for more information.

If you do not install SHARE, the following message flashes on your screen after you install your networking software and reboot your computer:

```
WARNING! SHARE should be loaded for large media
```

Using a Password in Network Server Mode

When you turn on or reset the computer, it loads your operating system or network software and you see either the command prompt or the first screen displayed by your network software.

Follow these steps to enter your password:

1. Turn on or reset your computer. You do not see the key prompt (⚷) even though the computer is now waiting for you to enter the correct password.

2. Type your password and press Enter. The screen does not display what you type.

Now you should be able to use your computer. Press a key such as (Enter] to see if the keyboard accepts your command. If you entered an incorrect password, the computer does not respond. Type the correct password, press Enter, and try using the computer again.

> **Note**
> You cannot change or delete a power-on password in network server mode. You must run Setup and turn off network server mode first. See Chapter 2 for instructions. Then you can change or delete the password as described in Chapter 3.

Using Expanded Memory Beyond 640KB

Your computer comes with 4MB of random access memory. MS-DOS and your application programs that run under MS-DOS use the first 640KB of memory. You can use the unused memory above 640KB as extended memory, or you can convert it to expanded memory, as described below.

Expanded memory is used by application programs (such as Lotus® 1-2-3®) that support the Lotus/Intel/Microsoft Expanded Memory Specification (LIM 4.0 EMS). To take advantage of expanded memory, you need to use a memory management program to convert the computer's extended memory to expanded memory.

If you selected a memory management software package when you bought your computer, you can use it with any version of MS-DOS. Just follow the instructions included with the package.

If you are using MS-DOS version 4.01 or 5.0 and you did not get a memory manager, you can use the MS-DOS program EMM386.SYS or EMM386EXE (respectively) to convert your extended memory to expanded memory. See your MS-DOS manuals for instructions.

If you are using MS-DOS version 3.3 and you did not get a memory manager, ask your authorized Epson dealer which expanded memory manager program you should use.

Using Special VGA Features

Your built-in VGA display adapter supports standard VGA monitors and multi-frequency monitors with analog connectors. The VGA adapter allows these monitors to operate in all standard VGA modes without requiring any special device drivers. However, if you want to use extended VGA modes, you can install one or more of the device drivers provided on your Utility diskettes. These drivers allow you to use all of the capabilities of your monitor and built-in VGA display adapter.

The device drivers provide VGA features such as these:

- Resolutions of 800 x 600 or 1024 x 768 (non-interlaced) in graphics modes with 16 colors
- Resolutions up to 640 x 480 in graphics modes with **256** colors
- 132-column text mode in 16 colors
- Graphics cursor movement performed by the built-in VGA hardware.

> **Note**
> To use graphic display drivers in 800 x 600 or 1024 x 768 resolutions, you must have a multi-frequency monitor capable of displaying these resolutions. Standard VGA monitors cannot display them.

The Utility diskettes that came with your computer contain device drivers for various application programs, as well as special utilities that allow you to enhance VGA performance. See the VGA Utilities booklet for more information about VGA device drivers and utilities.

Chapter 5

Accessing Internal Components

To access your computer's internal components, you need to remove the cover. In some cases, you may also need to remove the front panel and the subassembly (the metal case that holds the drive bays). The instructions in this chapter explain how to do these tasks:

- ❑ Remove and replace the cover
- ❑ Remove and replace the front panel
- ❑ Remove and replace the subassembly
- ❑ Perform post-installation setup procedures.

Read the following safety precautions before you begin.

Special Precautions

As you perform the procedures described in this chapter and in Chapters 6 and 7, observe the following precautions to avoid damaging your equipment or injuring yourself:

- ❑ While this manual provides detailed instructions for installing a variety of optional equipment, do not attempt a procedure if you have any reservations about performing it; ask your dealer for assistance.
- ❑ Always turn off the computer, disconnect all cables to the computer and any peripheral devices, and wait at least 30 seconds before you remove the cover. First disconnect the power cord from the electrical outlet and from the computer's back panel. Then disconnect all peripheral devices, including the monitor and keyboard.

- ❑ Every time you remove the cover, be sure to ground yourself by touching the inside of the computer's back panel before you touch any components inside. If you are not properly grounded, you could conduct static electricity and damage your components. Also, do not touch any components except those that this manual instructs you to touch.

- ❑ When disconnecting cables from sockets on the computer's main system board or any devices (such as disk drives), avoid pulling on the cable; grasp the plastic connector to remove it from a socket.

- ❑ When plugging a connector or a component into a socket, be sure to position it correctly. Carefully align any connector pins with the corresponding holes in the socket before you push in the connector. Otherwise, you can severely damage the equipment.

- ❑ Always replace the computer's cover *before you* turn on the power, or the computer may overheat.

Removing the Cover

Remove the computer's cover to do any of the following:

- ❑ Change jumper settings

- ❑ Install or remove option cards

- ❑ Install or remove single inline memory modules (SIMMs)

- ❑ Install or remove a math coprocessor

- ❑ Install or remove disk drives or other storage devices.

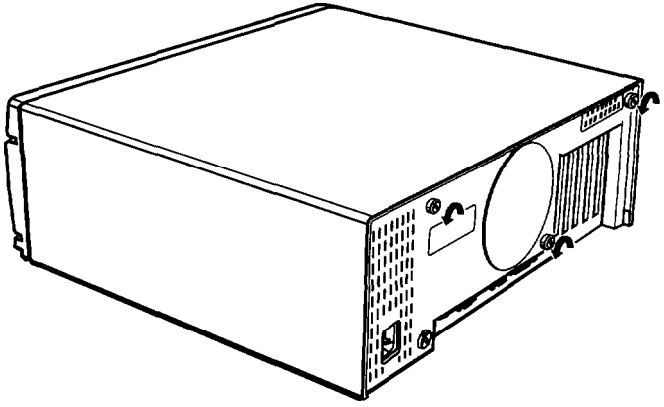
Follow these steps to remove the cover:

1. Turn off the computer and any peripheral devices connected to it. Then disconnect the computer's power cord from the electrical outlet and from the back panel. Also disconnect any peripheral device cables that are connected to the computer, including the keyboard cable.

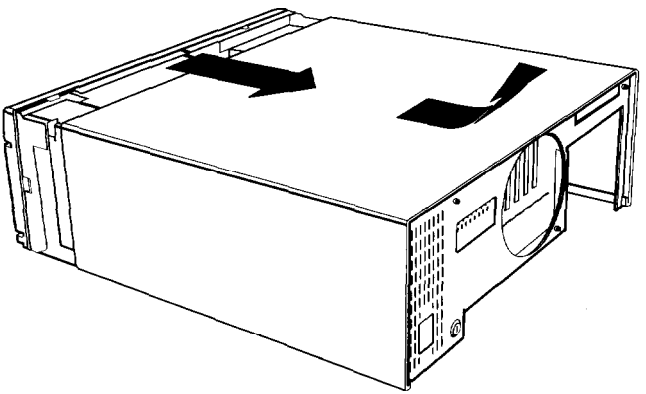
2. Turn the computer around so you are facing the back panel.

3. If necessary, unlock the computer's cover. (See Chapter 3 for instructions.)

4. Loosen the three thumbscrews on the computer's back panel by turning them counterclockwise, as shown below. (The screws disengage but don't come all the way off.)



5. Grasp the sides of the cover (toward the front of the computer) and pull it firmly toward you, as shown below. Then lift it up and off the computer.



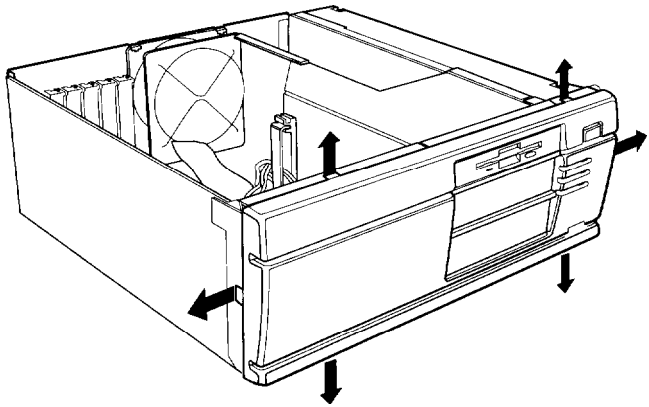
Removing the Front Panel

You must remove the computer's front panel if you need to install or remove a disk drive from the external drive bay or if you need to remove the subassembly from the computer.

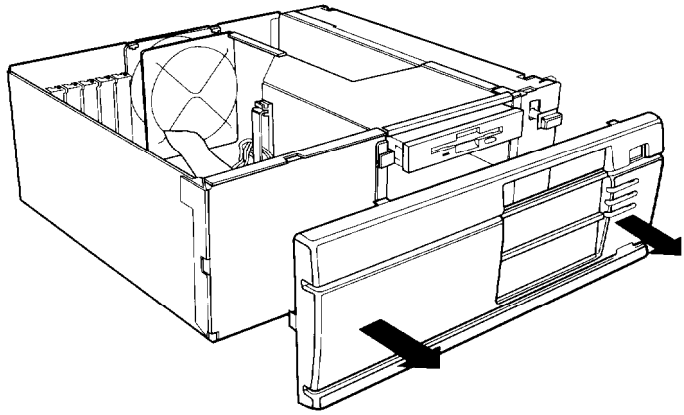
Follow these steps:

1. Turn the computer so you are facing the front panel.

2. Release the six tabs securing the front panel to the computer case, as shown below. You may want to use a flat-blade screwdriver to release the tabs.



3. Once these tabs are free, grasp the sides of the front panel and pull it *straight* toward you to disengage the two tabs at the bottom, as shown below. Be careful not to pull the panel off at an angle; this may bend or pop off the power and **RESET** buttons. If a button pops off, carefully place it back onto its post.



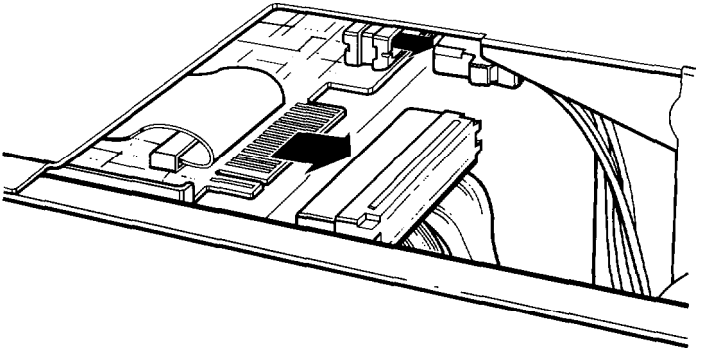
Removing the Subassembly

You need to remove the subassembly only if you are installing or removing the hard disk drive that is mounted next to the power supply.

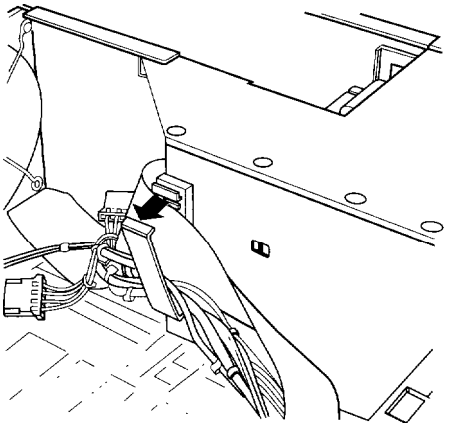
Follow these steps:

1. Turn the computer so you are facing the front panel.

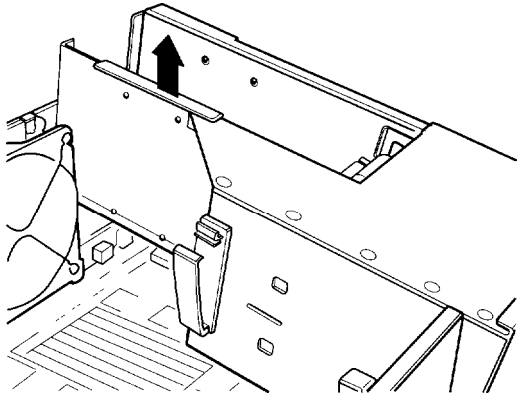
2. Disconnect the power supply and drive cables from the backs of all the drives installed in your computer, as shown below. Note which cables are connected to which drives so you can easily reconnect them later.



3. Open the clasp holding the power supply and drive cables to the side of the subassembly, as shown below. Then remove all the cables from the clasp.



4. Grasp the back of the subassembly by the edge on its upper left side, as shown below, and lift up the back end.



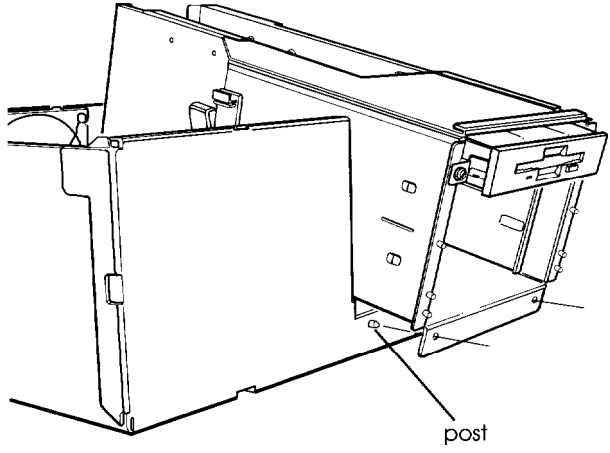
5. Pull the subassembly forward slightly to release it from the two pins beneath the front panel opening. Then lift it out of the computer and place it on your work surface.

Replacing the Subassembly

Follow these steps to replace the subassembly:

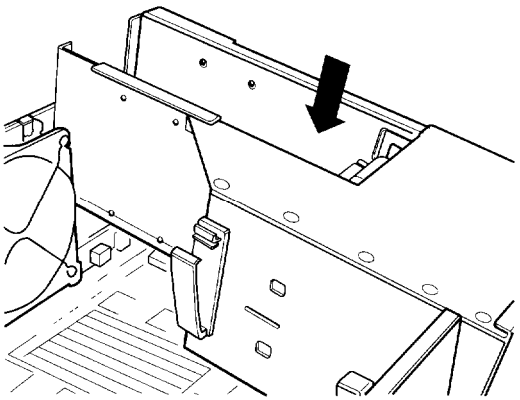
1. Turn the computer so you are facing the front panel.

2. Hold the subassembly at a slight angle and guide the front of it down through the opening in the front of the computer, as shown below.



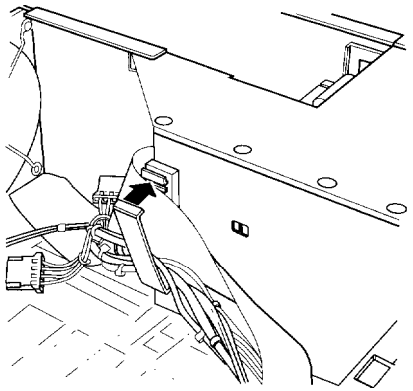
3. Fit the two holes in the lower front of the subassembly over the two posts on the front of the computer case, as shown above.

4. Lower the back end of the subassembly into the computer. If necessary, fit the post beneath the back right edge of the subassembly into the hole on the top of the power supply. Then lower the subassembly all the way down.



5. If necessary, connect the diskette drive cable to the FDD socket on the main board, then connect the hard disk drive cable to the HDD socket beside it. (These sockets are located to the right of the memory card.)

6. Gather the power supply and drive cables in the clasp on the side of the subassembly. Snap the clasp shut.



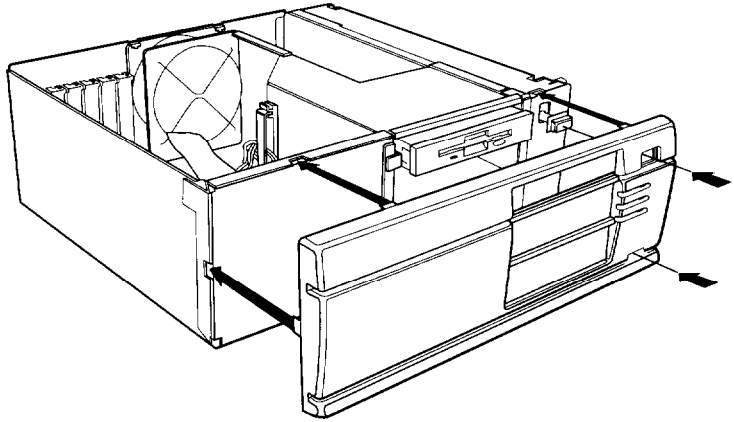
7. Connect the power supply and drive cables to the backs of all your drives, as described in Chapter 7.

Replacing the Front Panel

Follow these steps to replace the computer's front panel:

1. Turn the computer so you are facing its front.

2. Align the openings in the front panel with the power button, **RESET** button, and drives that extend out from the front of your computer case. Also align the front panel tabs with the corresponding notches in the case. Then guide the front panel straight onto the computer case, as shown below.



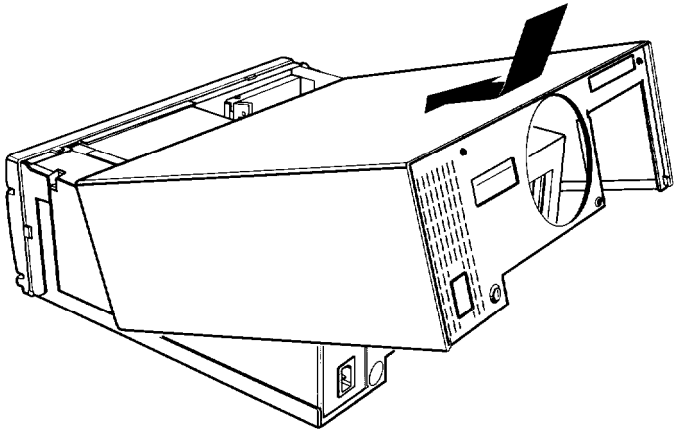
3. Press the front panel onto **the** computer to fully insert all the tabs into the notches on the computer case. If all the front panel tabs do not snap into position, remove the front panel and try again.

Replacing the Cover

Follow these steps to replace the computer's cover:

1. Turn the computer so you are facing the back panel.

2. Hold the cover at a slight angle, as shown below, and lower the front part onto the computer. Then lower the back of the cover.



3. Slide the cover forward until the front edge overlaps the top edge of the front panel.

4. Tighten the three thumbscrews on the back panel to secure the cover to the computer.

5. Lock the computer's cover, if desired. (See **Chapter 3.)**

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

Post-installation Setup

Any time you install or remove a math coprocessor or memory modules, you must run the Setup program on your Reference diskette so it can automatically update the computer's configuration information. You must also run Setup if you install or remove any other type of option, such as an option card or a disk drive. For example, if you add a hard disk drive, you need to let the computer know the type of drive you have installed. Follow the instructions in Chapter 2 to run Setup.

If you install a hard disk drive that has never received a hardware level format (such as some non-Epson hard disk drives), you need to format it before use. Check the manual that came with your drive to see if it is already formatted, and then, if necessary, follow the instructions in Appendix A to format the new hard disk.

If you have added a hard disk drive and you want to load MS-DOS or another operating system from that drive, you need to install the operating system on it. See the documentation that came with your operating system for instructions.

If you install a memory option card, use the setup program that came with it to configure the computer for use with the card. See your memory card manual for instructions.

> **Note**
> If you want to use any of your extended memory as expanded memory, see "Using Expanded Memory Beyond 640KB" in Chapter 4.

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

You may also want to test a newly-installed option. Some options come with their own diagnostics programs; however, you can test the following with the System diagnostics program on your Reference diskette:

- ❑ System memory
- ❑ Math coprocessor
- ❑ Serial and parallel ports
- ❑ Disk drives
- ❑ Monitors and display adapters
- ❑ Dot matrix printers.

See Appendix C for instructions.

Chapter 6

Installing and Removing Options

You can enhance the performance of your computer by adding a variety of options, including the following:

- ❑ Option cards
- ❑ Memory modules
- ❑ An 80487SX microprocessor with built-in math coprocessor (for the 25 MHz model).

An option card is a circuit board you install in your computer to add a particular function. Most option cards contain a device, such as a modem, or provide an interface, such as a monitor connector. This chapter describes how to install option cards and configure your computer for use with them.

Memory modules-also called SIMMs (single inline memory modules)-allow you to increase the amount of memory in your computer. This chapter describes the types and amounts of SIMMs you can install on the memory card in your computer. If you want to install memory modules, it is best to ask your dealer to do it for you. You can, however, follow the instructions in this chapter to install them yourself.

> **Note**
> It is best to add memory to your computer by installing SIMMs rather than an additional memory card. Memory modules are more efficient because the computer can access memory installed on SIMMs faster than memory installed on a card. If you do install an additional memory card, it will slow the performance of your computer.

A math coprocessor speeds up the numeric calculations and graphic displays your computer performs when using certain application software. The 50 MHz model includes a built-in math coprocessor. If you have the 25 MHz model and you want math coprocessor capabilities, you must remove your 80486SX microprocessor and install the 80487SX microprocessor (with an internal math coprocessor). Because the system circuitry may be damaged if this procedure is not performed correctly, you must have an authorized Epson dealer or Service Center do it for you.

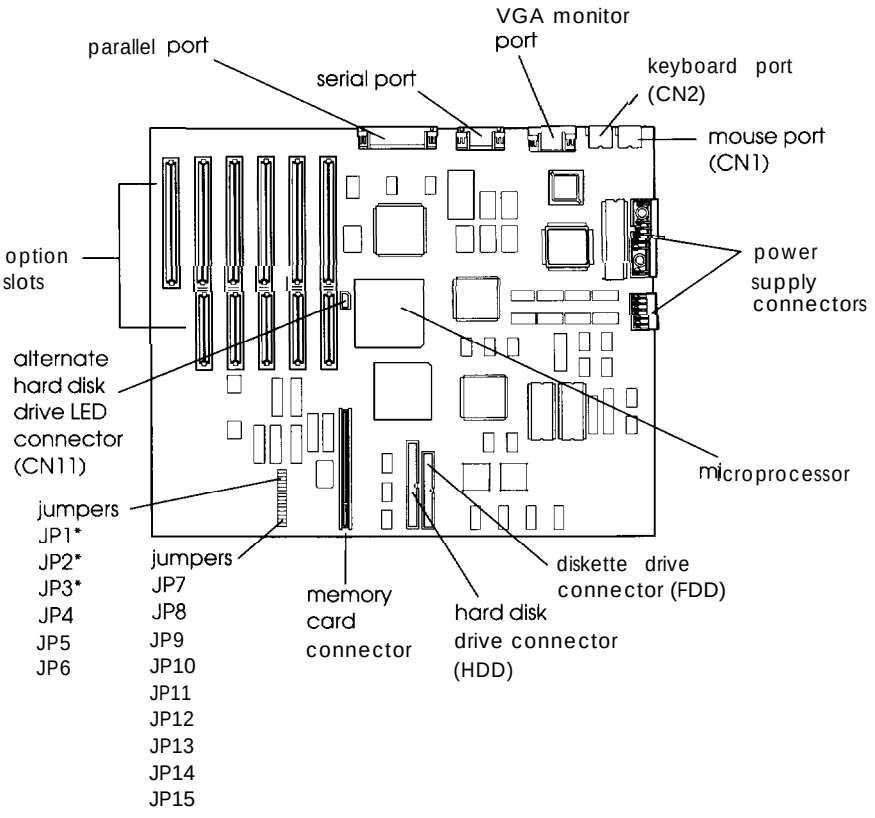
This chapter also explains how to change the jumper settings inside the computer. You need to change jumper settings if you add memory modules, install certain types of option cards, or want to change the way your computer operates.

In addition, you'll find an illustration of your main system board which shows the location of the jumpers, option slots, and any other components you may need to locate.

Before you can change jumper settings or install any of the options mentioned above, you need to remove the cover from the computer. See Chapter 5 for instructions.

Main System Board

As you follow the instructions in this chapter and in Chapter 7, use the illustration below to locate the necessary components on your main system board.



* 25 MHz system only

Jumper Settings

If you change your computer's configuration or need to alter the way it operates, you may need to change a jumper setting inside the computer.

A jumper is a small electrical connector that controls one of the computer's functions. The jumper settings in your computer are preset at the factory; however, you can control certain features by changing the standard settings as follows:

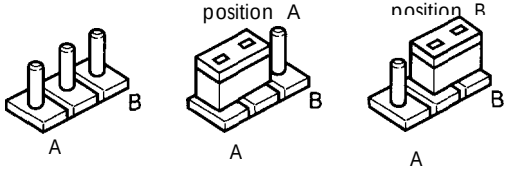
- ❑ Enable or disable the built-in mouse connector
- ❑ Set your monitor type to monochrome or color
- ❑ Change the amount of base memory
- ❑ Enable or disable the power-on password function
- ❑ Enable or disable the built-in VGA display adapter
- ❑ Change the operation of the input/output ready signal.

If you increase your computer's memory by installing memory modules, you must set a group of jumpers to indicate the amount of memory you now have.

If you have the 25 MHz model and you had your 80486SX microprocessor chip replaced with a 80487SX chip, you must set jumpers JP1, JP2, and JP3 to indicate a new microprocessor is installed. (Because the 50 MHz model has a built-in math coprocessor, these jumpers are not used.)

If you need to change any jumper settings, locate the jumpers on the main system board, shown on page 6-3.

A jumper's setting is determined by where the jumper is placed on the pins. The jumper connects either pin A and the middle pin (position A) or pin B and the middle pin (position B), as shown below.



The following tables list the jumper settings and their functions.

Miscellaneous jumper settings

Jumper number	Jumper setting	Function
JP4	A' B	Enables the built-in VGA display adapter Disables the built-in VGA display adapter so you can use a display adapter on an option card in your computer as your primary adapter
JP5	A B*	Disables the power-on password Enables the power-on password
JP6	A* B	Color monitor is installed Monochrome monitor is installed
JP7	A* B	Enables the built-in mouse connector Disables the built-in mouse connector so you can use a mouse or other pointing device connected to a port on an option card in your computer
JP15	A B*	Enables the early input/output ready signal Sets a normal input/output ready signal

* Factory setting

Jumper settings for base memory

Base memory	Jumper JP13	Jumper JP14
640KB	A'	A'
512KB	B	A
256KB	B	B

. Factory setting

Jumper settings for extended memory

Total memory	Jumper JP8	Jumper JP9	Jumper JP10	Jumper JP11	Jumper JP12
4MB*	B	B	B	B	A
8MB	B	B	B	A	A
9MB	A	B	B	A	A
10MB	A	A	B	A	A
12MB	A	B	A	A	A
16MB	A	A	A	A	A

. Factory setting

Jumper settings for alternate 25 MHz microprocessor

Jumper number	Jumper setting	Function
JP1	A	80487SX installed
	B*	80486SX installed
JP2	A	80487SX installed; NMI signal
	B*	80486SX installed; NMI signal
JP3	A	80487SX installed; FERR signal
	B*	80486SX installed; FERR signal

* Factory setting; these jumpers are not used for the 50 MHz microprocessor

Changing the Jumper Settings

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

1. Remove any option cards that may be blocking your access to the jumpers. See page 6-12 for instructions.

2. Change the jumper settings as necessary according to the tables above.

   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. Be careful not to lose the jumper.

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

3. Replace any option cards you removed. See "Installing an Option Card," below.

4. Follow the instructions in Chapter 5 to replace the computer's cover.

Option *Cards*

Your computer has six standard option slots: five 16-bit slots and one 8-bit access slot. Each slot can accommodate an option card. You can buy option cards from authorized Epson dealers as well as other vendors.

Before you install an option card, check the power requirements given in the card's documentation. Make sure that the power required by the card does not exceed the power limit for its slot, and that the total power for all the cards does not exceed the power limits for all six slots. The table below lists the power limits.

Option slot power limits

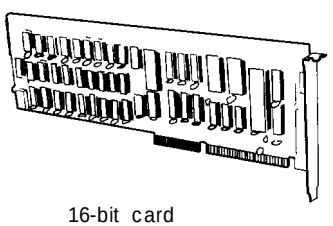
Maximum current	+5 volts	+ 12 Volts	**-5 Volts and - 12 Volts**
For each slot	7 Amps	1.5 Amps	0.5 Amps
For all six slots	16 Amps	3 Amps	0.5 Amps

Caution
Although the computer's power supply is protected against excessive power loads, you could still damage the main system board if you install an option card that draws more power than the limits shown in the table.

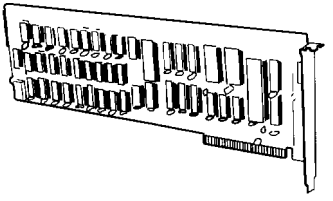
This section explains how to install option cards in your computer. Later on, you **may** need to remove an option card to access jumpers; if so, see "Removing an Option Card" on page 6-12 for instructions.

Note
After you install or remove an option card, see "Post-installation Setup" at the end of Chapter 5 for information on updating your computer's configuration settings.

The illustration of the main system board on page 6-3 shows the six standard option slots inside your computer. Slot 5 is designed for an 8-bit option card and slots 0 through 4 are designed for 16-bit cards. As you can see below, a 16-bit card has an extra connector along the bottom.



16-bit card



8-bit card

Usually it does not matter which slot an option card occupies, as long as it fits in the slot. For example, you can place some 8-bit cards in a 16-bit slot. However, you must follow these guidelines when deciding which slot to use:

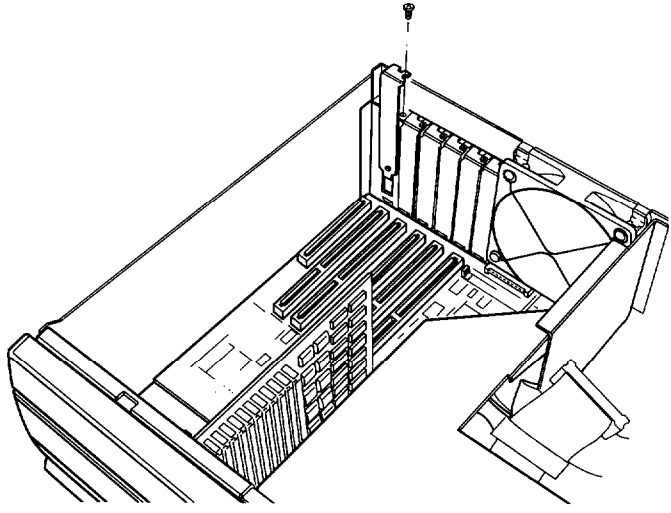
- An S-bit card with an additional tab along the bottom must go into an 8-bit slot.
- If you install a disk drive that uses a controller card, place the card as close as possible to the drive it is controlling.
- Some option cards must be installed in a specific slot. Consult the instructions that come with the card to see if this is the case.

Installing Option Cards

Follow these steps to install an option card:

1. If you are installing an option card that controls a mouse, you need to change the setting of jumper JP7 before you install the card. If you install a display adapter card, you may need to change the settings of jumpers JP4 and JP6. If this is the case, see page 6-4 for instructions.

2. Remove the retaining screw from the top of the metal option slot cover; hold on to the screw so it doesn't fall into the computer. Lift out the slot cover.

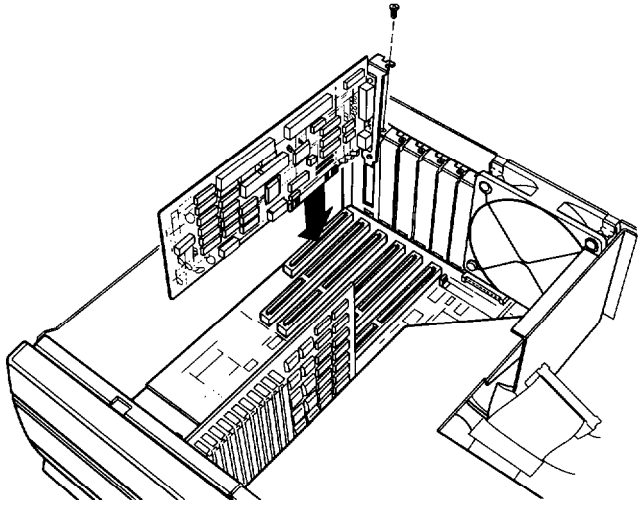


Keep the screw to secure the option card to the computer. Store the slot cover in a safe place in case you remove the option card later.

3. Unpack the option card. When you handle it, 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.

   Adjust any switches or jumpers on it, if necessary. (Check the option card instructions.)

4. Grip the card firmly by the top corners and make sure the connectors point down, as shown below.



5. Insert the card into the slot, guiding it straight down. Once the connectors enter the slot, push the card downward firmly (but carefully) to insert it fully. You should feel the card fit into place.

   If the card does not go in smoothly, do not force it; pull it all the way out and try again, keeping it straight as you insert it. Examine the card to verify that it is fully seated in the slot along the length of the connector.

6. Secure the end of the card to the back of the computer with the retaining screw.

7. Follow the instructions in Chapter 5 to replace the computer's cover. Then see "Post-installation Setup Procedures" at the end of that chapter for information on updating your computer's configuration settings.

Removing *an Option Card*

If you need to remove an option card, follow these steps:

1. Remove the screw securing the card to the back of the computer and pull it straight up and out of the slot.

2. Cover the option slot opening with the original metal slot cover and secure it with the retaining screw.

3. If you are removing an option card that controls a mouse, you need to change the setting of jumper JP7 on the main system board. If you are removing a display adapter card, you may need to change the settings of jumpers JP4 and JP6. See page 6-4 for instructions.

4. Replace the computer's cover as described in Chapter 5.

Memory Modules

Your computer comes with 4MB of memory soldered onto the memory card in your computer. By installing SIMMs (single inline memory modules) on this card, you can increase the amount of memory in your computer up to 16MB.

> **Caution**
> It is best to have your dealer install memory modules for you because they can be damaged easily if installed incorrectly. If you prefer, you can install your own SIMMs by carefully following the instructions in this section.

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

- ❑ Use SIMMs that operate at 80ns (nanosecond) or faster access speed. Be sure all the SIMMs you install have the same access speed.

- ❑ Use the correct SIMM configuration to add the amount of memory you want. See the table on the next page.

Once you have the SIMMs you need, you or your dealer can install them in your computer. If you want to install them yourself, follow the instructions below.

Installing *Memory Modules*

There are 12 SIMM sockets on the memory card organized in three banks consisting of four sockets each. Each socket can contain one memory module. You must fill all of the sockets in any bank you use. Since each bank has four sockets, you must install four SIMMs to fill up the bank.

The following table shows all the possible SIMM configurations for your computer. Do not install SIMMs in any other configuration. Remember that the memory card already contains 4MB (soldered).

SIMM configurations

Bank 1	Bank 2	Bank 3	Total memory
M M M M			8MB
M M M M	K K K K		9MB
M M M M	K K K K	K K K K	10MB
M M M M	M M M M		12MB
M M M M	M M M M	M M M M	16MB

K = 256KB SIMM installed
M = 1 MB SIMM installed

Once you determine where to the add memory modules, do the following to install or remove them:

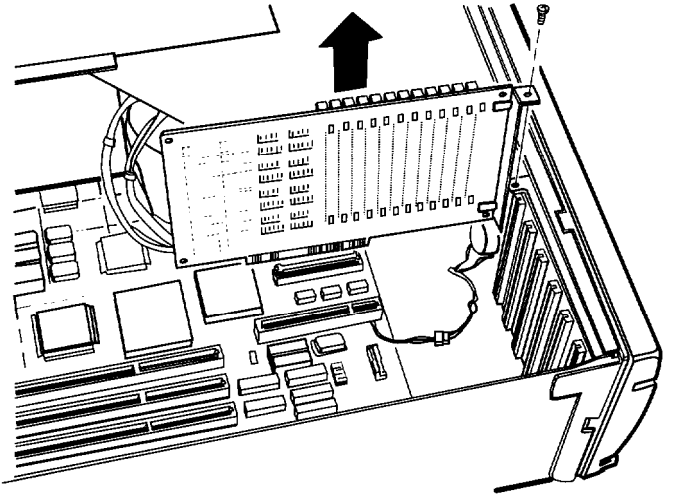
- ❑ Remove the memory card
- ❑ Install or remove the SIMMs
- ❑ Replace the memory card.

These procedures are described below.

Removing the memory card

Follow these steps to remove the memory card from your computer:

1. Remove the screw securing the memory card to the bracket at the front of the computer case, as shown below.



2. Grasp the top of the card and pull it straight up and out of its socket.

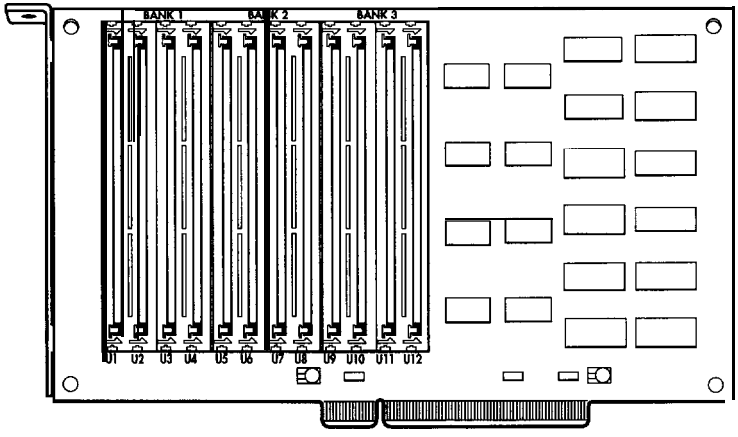
3. Gently place it on your work surface with the component side facing up.

4. Follow the instructions in the next section(s) to install or remove SIMMs as necessary.

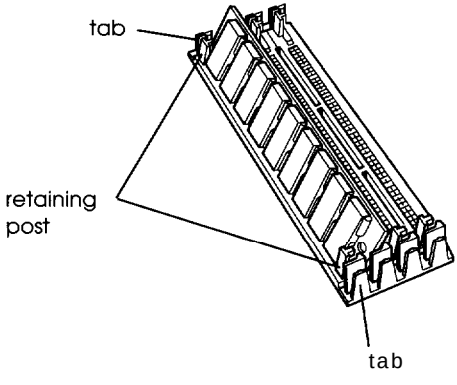
Installing SIMMs

Follow these steps to install SIMMs:

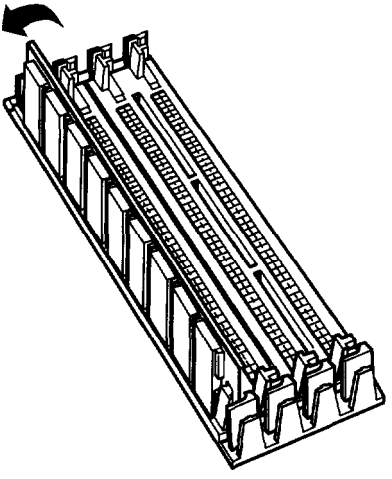
1. Turn the memory card on your work surface so the connectors at the bottom of the board are toward you. The sockets are labeled as shown below.



2. It is easiest to install SIMMs in the left sockets first. Position each SIMM with the notched edge toward the top of the socket and insert it on the right side of the tabs at an angle, as shown below.



3. Gently push the SIMM into the socket and then tilt it left until it is vertical.



The SIMM should snap into place between the tabs and the retaining posts. If it does not go in smoothly, do not force it; pull it all the way out and try again.

Make sure the SIMM is fully inserted into the socket and that the pins on the retaining posts extend through the holes in both ends.

4. Repeat steps 2 and 3 for each SIMM you want to install.

5. Set the appropriate main system board jumpers to indicate the total amount of memory you now have. See “Jumper Settings” on page 6-4 for instructions.

6. Reinstall the memory card as described on page 6-19.

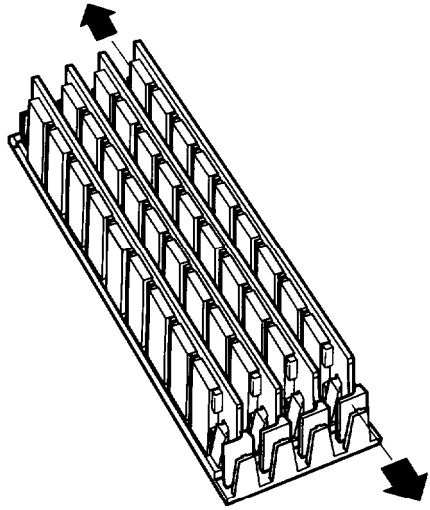
Removing SIMMs

If you need to remove SIMMs from your computer, have your dealer do it for you or follow the steps below. If you remove them yourself, check the table on page 6-14 to be sure you remove SIMMs from the correct sockets.

Follow these steps to remove SIMMs:

1. Turn the memory card on your work surface so the connectors at the bottom of the board are toward you.

2. Remove SIMMs from the right sockets first. Use your fingers or two small screwdrivers to pull away the tabs that secure the SIMM at each end. Be careful not to pull the tabs too far, or they may break.



   As you pull away the tabs, the SIMM falls to the right at an angle. Release the tabs and carefully remove the SIMM from the socket.

3. Repeat step 2 for each SIMM you need to remove.

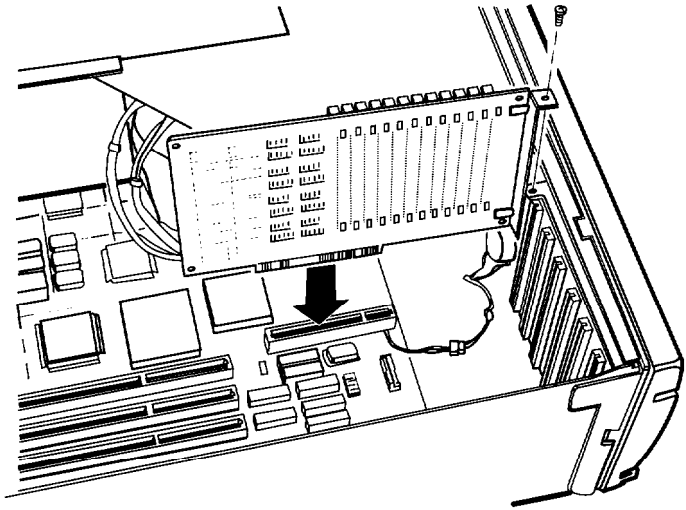
4. Set the appropriate main system board jumpers to indicate the total amount of memory you now have. See “Jumper Settings” on page 6-4 for instructions.

5. Follow the instructions below to reinstall the memory card.

Replacing the memory card

Follow these steps to replace the memory card in your computer:

1. Hold the card by its top corners and guide it straight down into its socket on the main system board, as shown below.



2. Secure the memory card bracket to the front of the computer case with the retaining screw.

3. Replace the computer’s cover as described in Chapter 5. Then see “Post-installation Setup Procedures” at the end of that chapter for information on updating the computer’s memory configuration.

Chapter 7

Installing and Removing Drives

The instructions in this chapter describe how to install and remove optional Epson drives in your computer. You can use these instructions to install a variety of devices, including diskette drives, hard disk drives, and tape drives. Even if your drive looks a bit different from the one illustrated here, you install it the same way.

If you want to install or remove a non-Epson drive, you can follow these instructions, although some of the steps in this chapter may not apply. See the manual that came with your drive for more information.

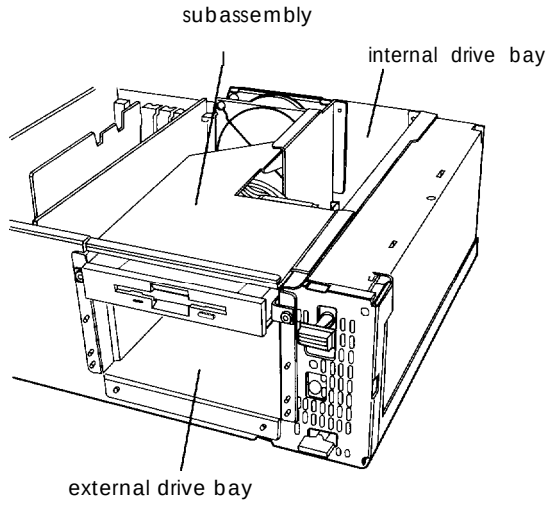
This chapter describes how to do the following:

- ❑ Use the correct drive bay
- ❑ Set the IDE (Integrated Drive Electronics) jumpers on a hard disk drive
- ❑ Install or remove a drive in the external drive bay
- ❑ Install or remove an internal drive.

Before you perform any of the procedures described below, remove the computer's cover as described in Chapter 5. You may also need to remove the front panel and subassembly; the instructions in this chapter tell you when this is necessary.

Using the Correct Drive Bay

Your system can hold up to five half-height drives or a combination of third-, half-, and full-height drives. As shown below, there are two drive bays: the external drive bay and the internal drive bay.



The external bay can accommodate up to three drives in the following configurations:

- One third-height drive and two half-height drives
- One third-height drive and one full-height drive.

You can install either two half-height drives or one full-height hard disk drive in the internal bay.

If you are installing a hard disk, it is best to install it in the internal bay. This reserves the more accessible external bay for any drives you may want to add later. If you prefer, however, you can install a hard disk in the external bay; just leave the drive slot cover installed in the front panel.

You can install 3½-inch drives in the internal bays. In the external bay, you can install 5¼-inch drives or 3½-inch drives with 5¼-inch mounting frames attached.

You also need to attach metal drive brackets to each drive you install in the external bay. Two sets of these brackets (with retaining screws) come in the box with your computer. The instructions in this chapter tell you how to install them.

Setting the IDE Hard Disk Drive Jumpers

You may need to change the hard disk drive jumper settings if you install or remove an IDE hard disk drive. The jumpers tell the computer whether you are using one hard disk drive or two.

> **Note**
> You do not need to set any jumpers if you are removing your only hard disk drive.

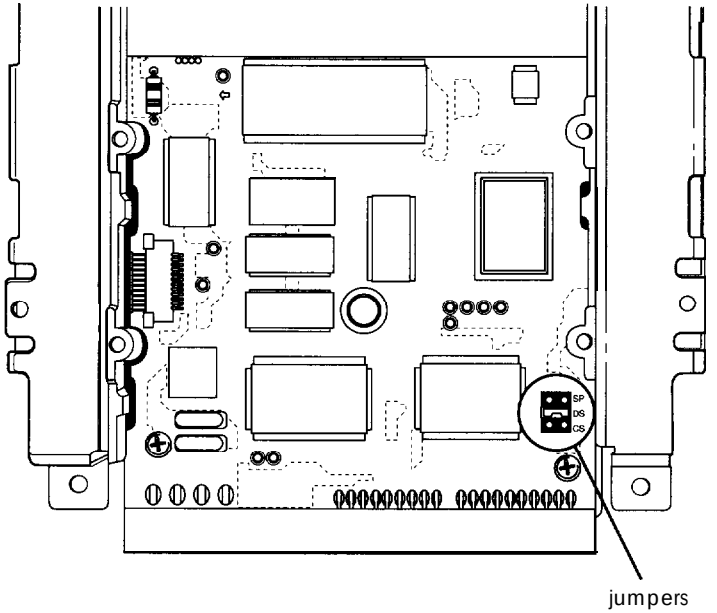
If you are installing only one hard disk drive, see "Changing the Jumper Settings" below to check your drive's jumpers.

If you are removing one hard disk drive and leaving another in your computer, you need to change the jumper settings on the remaining drive to indicate that it is the only hard disk drive installed.

If you install two hard disk drives, you must change the jumper settings on each drive to indicate whether it is the master (primary) or the slave (secondary) drive. The primary drive is the one from which you boot your computer.

Changing the Jumper Settings

The hard disk drive jumpers are usually located on the drive's circuit board, near the large cable connector.



The instructions in this section describe setting the jumpers on the factory-installed hard disk drive. The jumpers on your drive may be in a slightly different location, but you set them the same way. See the documentation that came with your hard disk drive for the proper settings.

Set the jumpers according to the table below.

Hard *disk drive jumper settings*

Jumper positions	One hard disk drive	Two hard disk drives: master	Two hard disk drives: slave
SP	—	X	—
DS	X	X	—
CS	—	—	—

X = jumper installed
- = no jumper installed

To move a jumper from one position to the other, use your fingers, needle-nose pliers, or tweezers to pull it off its pins and gently move it to the other position. Be careful not to drop the jumper or damage the pins as you install it.

If you are going to use only one hard disk drive, make sure the jumper is set in position DS.

If you'll be using two hard disk drives, install two jumpers on the master drive in positions SP and DS. Do not install any jumpers on the slave drive.

To install or remove a drive in the internal drive bay, see page 7-14.

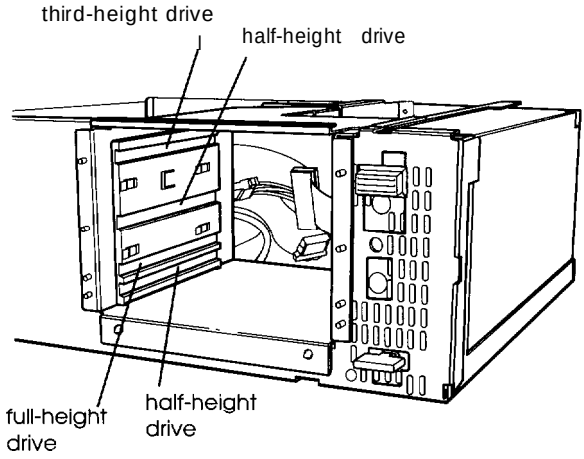
To install or remove a drive in the external drive bay, see the next section.

Installing or Removing a Drive in the External Bay

This section describes how to install or remove an Epson diskette drive; however, you can use these instructions to install or remove another type of storage device. See the manual that came with it for additional installation instructions.

Installing a Drive

On each interior side of the external drive bay, there is a plastic guide with four support grooves, as shown below. You select the appropriate grooves for your drive depending on the size of your drive and where you want to locate it.



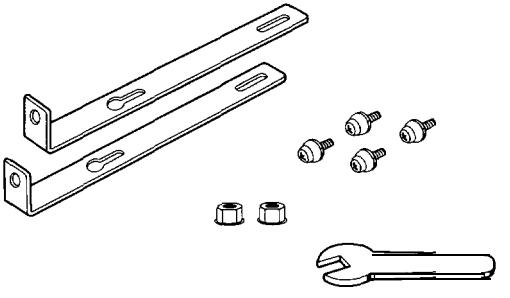
The third-height diskette drive that comes with your computer is installed in the grooves at the top of the bay.

Note
If you are installing a 3½-inch drive that does not have a 5¼-inch mounting frame installed on it, follow the instructions that came with the drive to install the frame.

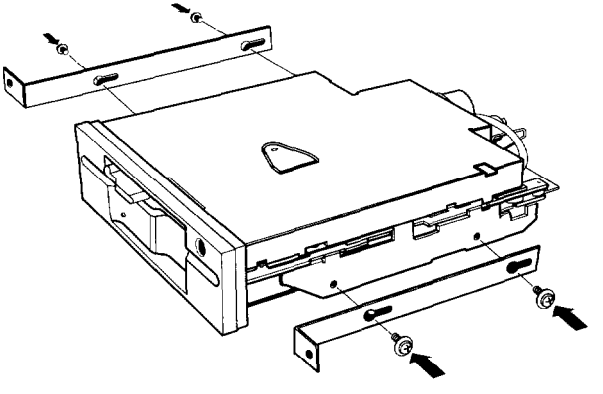
Follow the steps below to install a disk drive in an external bay.

1. Locate the following parts included with your computer for each drive you will install:

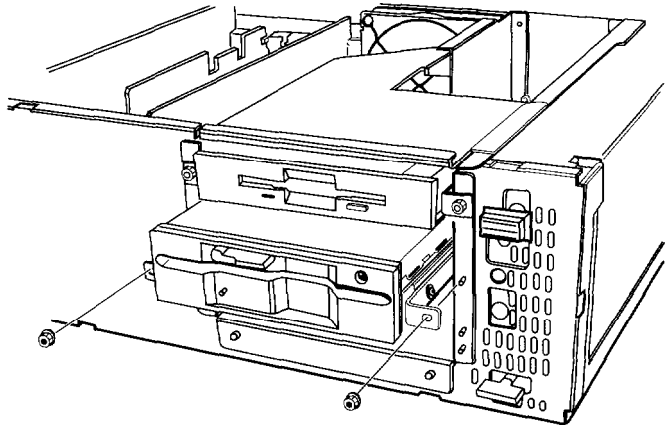
   - ❑ two metal drive brackets
   - ❑ four retaining screws (with attached flat washers)
   - ❑ two nuts (with attached star washers)
   - ❑ small wrench.



2. Attach one bracket to each side of the drive, as shown below. Loosely secure each bracket with two retaining screws.



3. Slide the drive into the bay as shown below, aligning the bracket screws on each side with the appropriate grooves in the drive bay guide.



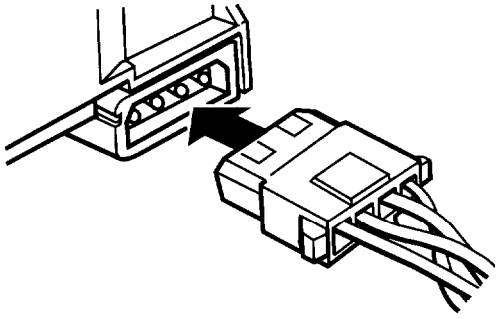
4. Guide the holes in the front of the brackets over the threaded posts on the front of the subassembly. Then push the drive all the way into the bay.

5. Secure the drive to the drive bay with the two nuts.

6. You may need to adjust the drive's position in the drive bay by sliding it along the drive brackets. A diskette drive (or other externally-accessible device) should extend out of the bay and its faceplate should be flush with the front panel. A hard disk drive should fit all the way into the bay. If necessary, replace the front panel (as described in Chapter 5) to check the drive's position.

7. When the drive position is correct, remove the two nuts securing it to the drive bay and slide it out of the bay. Then tighten the four drive bracket screws, slide the drive back into the bay, and replace the two nuts.

8. Locate one of the power supply cables (labelled P1 through P5) in the clasp on the left side of the subassembly. (You can use any one that is available.) Align the notched corners on the cable connector and the socket on the back of the drive, as shown below. Then push in the connector.

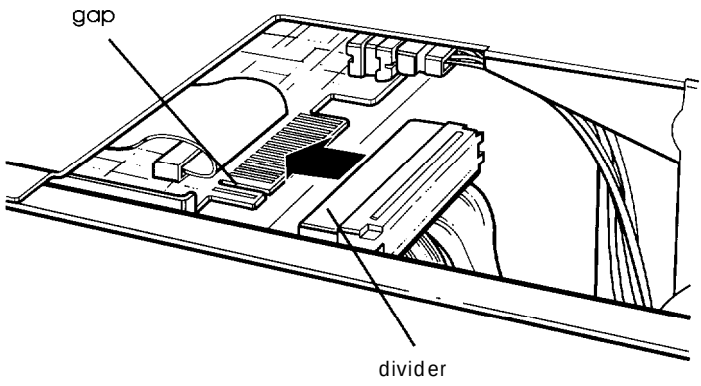


9. Locate the appropriate drive cable for the drive. If you installed a diskette or tape drive, go to step 10. If you installed a hard disk drive, go to step 12.

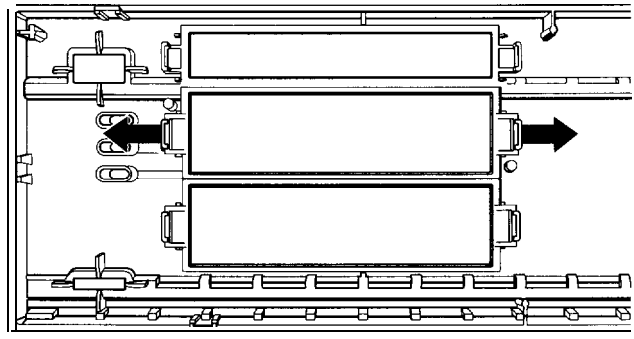
> **Note**
> If you are installing a non-Epson drive, see the manual that came with it for instructions on connecting the drive cable.

10. If you are connecting diskette drive A, use the connector labeled **FDD1** on the end of the diskette drive cable. If you are connecting diskette drive B, use the middle connector, labeled **FDD2.** If you are connecting a tape drive, use the cable connector labeled **TAPE DRIVE ONLY.**

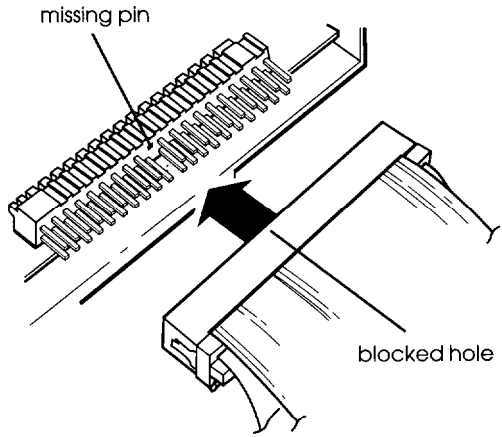
Align the cable connector with the drive interface so that the divider in the connector lines up with the gap in the interface, as shown below. Then push in the connector.



11. To remove the slot cover for the drive you just installed, turn the front panel so you are facing the inside. Press outward on the slot cover tabs, as shown below, and pop the slot cover out.



12. Locate the hard disk drive cable. If you are installing your first hard disk drive, this cable came in the box with your computer. If you are installing a second drive, the cable is attached to your internal hard disk drive. Align the available cable connector with the drive socket so the row in the connector with the blocked hole lines up with the row in the socket with the missing pin, as shown below. The push in the connector.



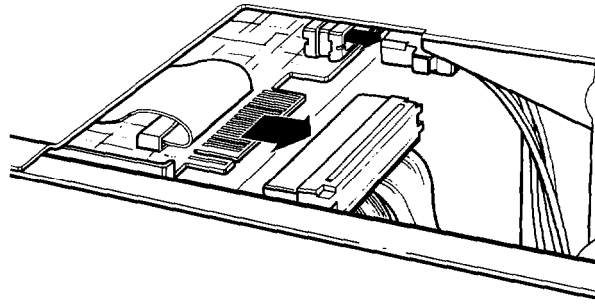
Note
If you are installing your first IDE hard disk drive, you must also connect the hard disk drive cable connector to the HDD socket on the main system board. See the main system board illustration in Chapter 6 to locate the connector. Be sure to thread the cable through the clasp on the left side of the subassembly.

13. Replace the computer's front panel and cover as described in Chapter 5; then see "Post-installation Setup" on page 5-12 to update your configuration.

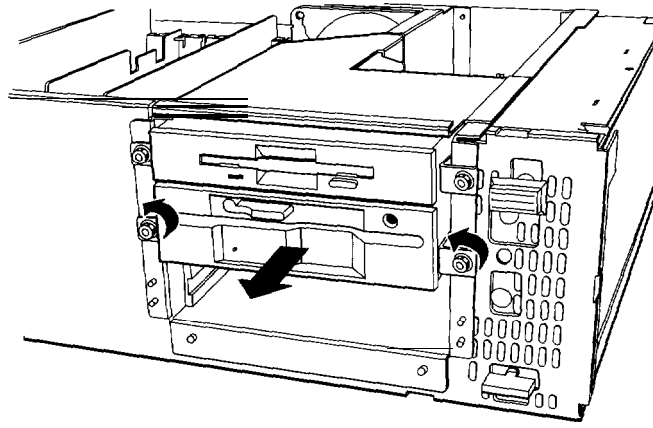
Removing a Drive

Follow these steps to remove a drive from the external drive bay:

1. Disconnect the power supply and drive cables from the back of the drive you want to remove, as shown below.



2. Use the small wrench to remove the two nuts securing the metal drive brackets to the front of the drive bay, as shown below.



3. Grasp the front of the drive and pull it out.

> **Note**
> If you remove an IDE hard disk drive from the external bay and it is your only hard disk drive, you must also remove the hard disk drive cable from its connector on the main system board. First remove the cable from the clasp on the left side of the subassembly. Then disconnect the cable from the main system board.

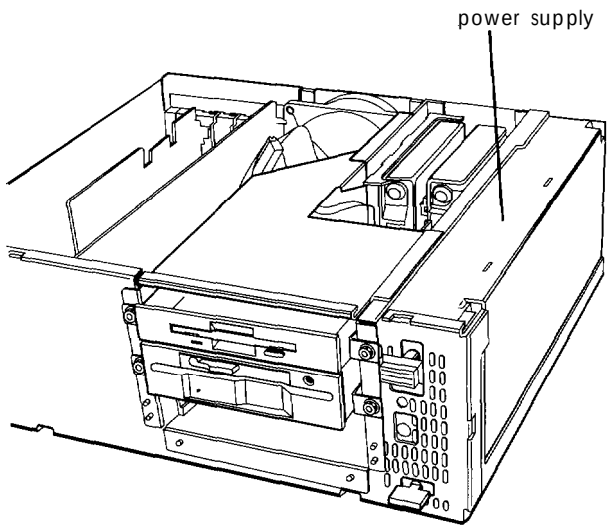
4. If the drive you removed was accessible from the front of the computer, you need to reinstall the front panel slot cover for that drive.

   Turn the front panel so you are facing the inside. Then press the slot cover into the slot until it snaps into place between the tabs on both sides.

5. Replace the computer's front panel and cover as described in Chapter 5; then see "Post-installation Setup" on page 5-12 to update your configuration.

Installing or Removing a Drive in the Internal Bay

You can install only 3½-inch hard disk drives in your computer's internal drive bay. If you are installing your first hard disk drive, install it in the position farthest from the power supply.



If you are installing or removing a hard disk drive in the position next to the power supply, first remove the front panel and subassembly as described in Chapter 5.

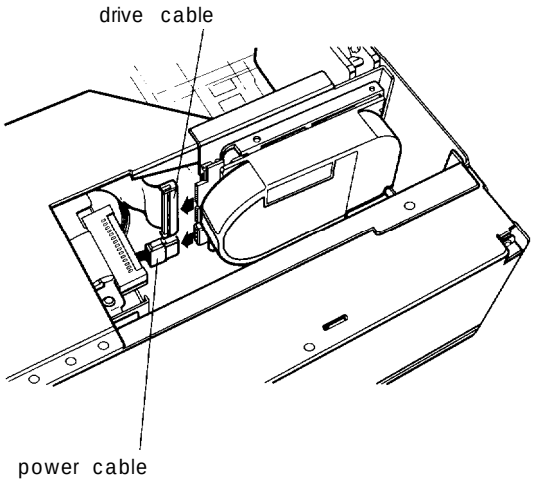
The following procedures explain how to do these tasks:

- ❑ Remove a drive
- ❑ Install a drive
- ❑ Connect the drive cables.

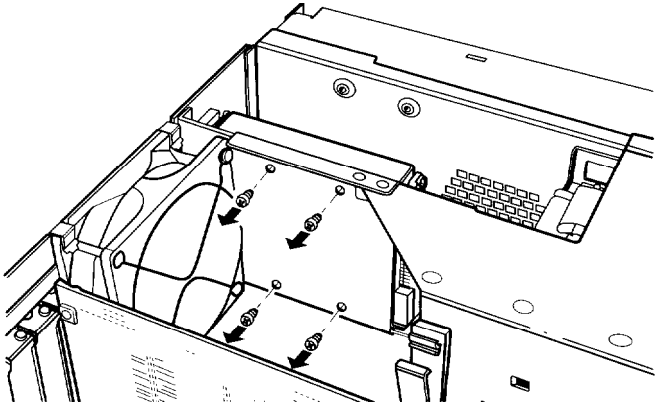
Removing a Drive

Follow these steps to remove an internal drive:

1. Disconnect the power supply and drive cables from the drive (if you have not already done so), as shown below.



2. Remove the four screws securing the drive to the internal drive bay.



> **Note**
> If you remove one IDE hard disk drive and are leaving another one in the system, you must set the jumpers on the remaining drive to indicate that you have only one IDE drive installed. Remove the other drive following steps 1 and 2, above; then see page 7-4 or the documentation that came with your hard disk drive for instructions on setting the jumpers.

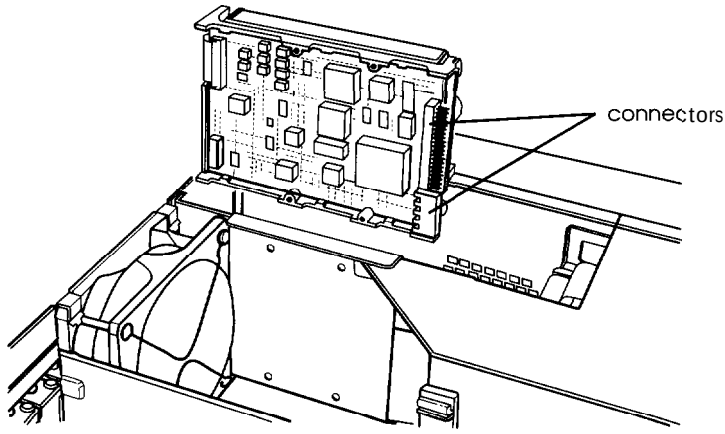
3. If you removed your only IDE hard disk drive, remove the hard disk drive cable from its connector on the main system board. First remove the cable from the clasp on the left side of the subassembly. Then disconnect the cable from the main system board connector.

4. If you need to connect the drive cable on your remaining drive, see "Connecting the Cables," below.

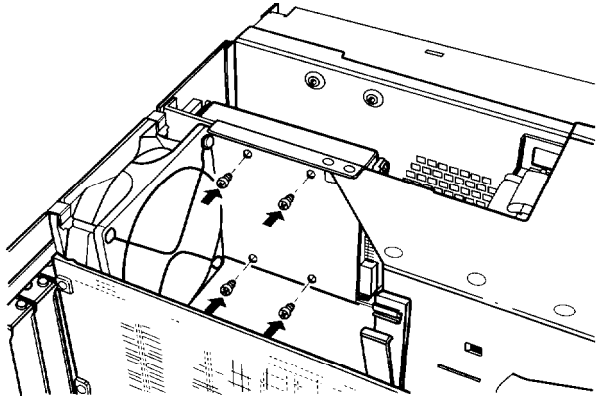
Installing a Drive

Follow these steps to install a new drive (or reinstall a drive you removed):

1. Position the drive so its mounting screw holes face the outside of the drive bay and its power supply and drive connectors face the front of the subassembly, as shown in the following illustration. Then lower the drive into the bay.



2. Adjust the drive's position so that the four holes on the drive are aligned with the corresponding holes in the drive bay. Then secure the drive with four retaining screws.



3. Connect the drive and power supply cables, as described below.

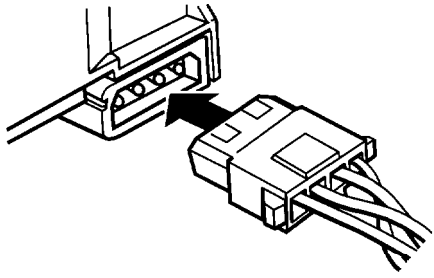
Connecting the Cables

Follow these steps to connect the drive and power supply cables:

1. If the subassembly is out of the computer, follow the steps in Chapter 5 to replace it.

2. Locate one power supply cable for each drive you installed in the internal drive bay. You can use any of the free cables labeled P1 through P5. If you removed the subassembly earlier, also reconnect the power supply cables to the drive(s) in the external drive bay.

   Align the notched corners of the cable connector with the notched corners of the drive socket, as shown below. Then push in the connector.

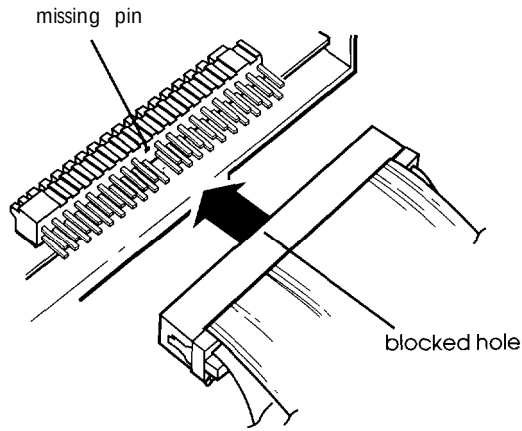


3. Locate the cable for each drive installed in the internal drive bay. (If you removed the subassembly earlier, also reconnect the drive cables to the drive(s) in the external bay. See page 7-9 for instructions on connecting a diskette drive cable.)

   If you are installing your first hard disk drive, use the cable included with your computer.

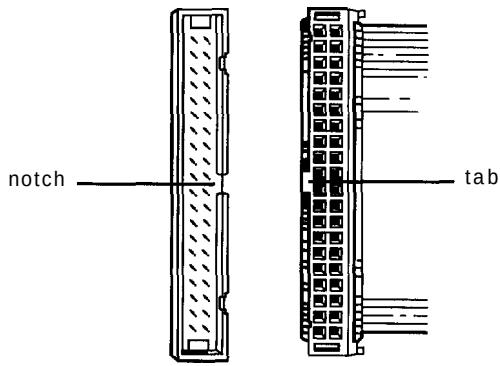
If you are installing your second drive, the cable is already attached to your other drive; use the second connector on that cable. Connect the cable as described below; then skip to step 5.

To connect the cable, align the cable connector with the drive interface so the row in the connector with the blocked hole lines up with the row in the interface with the missing pin, as shown below. Then push in the connector.



Note
If you are connecting a non-Epson drive, see the manual that came with it for instructions on connecting the drive cable.

4. If you are installing your first hard disk drive, you also need to connect the drive cable to the main board. The hard disk drive socket is labeled **HDD** and is located to the right of the memory card. Connect the cable to the **HDD** socket, matching the notch on the socket to the tab on the cable.



If you have difficulty reaching the socket, you can remove the memory card; just be sure to reinstall it before you go on to step 5.

5. Replace the computer's front panel and cover as described in Chapter 5; then see "Post-installation Setup" on page 5-12 to update your configuration.

Appendix A

Physically Formatting a Hard Disk

This appendix describes how to *physically* format a hard disk. Sometimes called a low-level format, this procedure should not be confused with the logical format performed by the operating system, such as the MS-DOS FORMAT command. Physically formatting a hard disk is a separate step that is usually done at the factory by the disk manufacturer.

If your computer came with a factory-installed hard disk, or if you have installed an optional Epson IDE hard disk, it has already been physically formatted. You need only follow the instructions in your operating system manual to prepare your hard disk for use.

If you have installed a hard disk that came with its own format utility, use that program to physically format the disk.

You may need to use the procedure in this chapter to physically format a hard disk if you have installed a non-Epson hard disk in your computer that has never received the low-level format and did not come with its own format utility.

Caution
If you are unsure whether formatting is necessary, contact your Epson dealer for assistance.

Physically formatting a hard disk erases any data it contains. If you are formatting a hard disk you have been using, be sure to back up all its data to diskettes before you format it. See your operating system manual for instructions on backing up data.

In addition to destroying all the data on the hard disk, physical formatting removes any partitions and logical formatting defined on the disk by your operating system. After you physically format a new or used hard disk, follow the instructions in your operating system manual to partition and format the hard disk to prepare it for use.

> **Note**
> Sometimes, after a hard disk has been used for a long time, its data becomes fragmented, causing the disk to perform less efficiently or produce errors. If this happens, check your operating system manual for procedures you can perform to reorganize your data. If those procedures-or a commercial defragmenting utility-do not solve the problem, you may want to reformat the disk as described in this chapter.

Choosing the Type of Format

Follow these steps to display the formatting options:

1. Insert the Reference diskette in drive A.

2. Turn on or reset the computer. It automatically loads MS-DOS and displays the Operation Menu.

3. Select 2 to highlight **Format hard disk** and press Enter. The Hard Disk Format Menu appears on the screen:

```
HARD DISK FORMAT MENU
1-Format
2 - Destructive surface analysis
3 - Non-destructive surface analysis
0 - Exit
```

The formatting options work as follows:

- Format first scans the disk for defective (bad) tracks and lets you decide which tracks to mark as bad. Then it formats the disk and marks the bad tracks so they are never used to store data.

- Destructive surface analysis tests the entire disk for read/write errors or unflagged bad tracks and updates the defective track table. Because this option writes and reads data on the disk, it destroys all data on any track that produces an error. *You cannot run the Destructive surface analysis on a disk that has never been formatted.*

- Non-destructive **surface analysis** checks the disk for unflagged bad tracks without destroying data. You *cannot run the Non-destructive surface analysis on a disk that has never been formatted.*

The type of format you choose depends on whether you are reformatting a disk that has been used or formatting a new disk for the first time. See the recommendations below.

Formatting a New Disk

Many hard disk drives come with a printed list of bad tracks but the bad tracks are not flagged on the disk. You may need to modify the defective track table to add the bad tracks. Other hard disks (such as those supplied by Epson) come with the bad tracks already flagged. If you are formatting a new hard disk that has never been formatted, select the Format option.

Reformatting a Used Disk

If you are reformatting a disk you have been using, follow these steps:

1. Use the Non-destructive surface analysis test to check for unflagged bad tracks.

2. If errors occur during the Non-destructive surface analysis, back up your hard disk to diskettes.

3. Run the Destructive surface analysis to update the defective track table.

4. Select the Format option to format the disk.

Selecting an Option

When using this program, you often need to select an option from a menu. There are two ways to do this:

- Use the arrow keys (↑↓←→) to highlight the option and press Enter.

- Type the number of the option and press Enter.

You can select most options that appear on the screen using either method.

Starting the Formatting Process

If you have more than one hard disk drive, you see this prompt:

```
Enter drive number ? (1/2)
```

Select 1 for the first hard disk or 2 for the second hard disk. Then see the instructions below for the Hard Disk Format Menu option you want to use.

Option 1, Format

If you select **Format** from the Hard Disk Format Menu, you see the following (for a disk with no defective track table):

```
Format Hard Disk  < Drive 1: >

Scan hard disk to get defective track
information      ? (Y/N)
```

(If the disk already has a defective track table, you do not see the message because the disk does not need to be scanned for bad tracks.)

1. Select **Y** to scan the disk or **N** to skip the scanning process.

   If you select **Y**, the program scans the disk and displays these messages during the process:

   ```
   Scanning for flagged bad tracks...

   Head : nnn     Cylinder : nnnnn
   ```

   You see the head and cylinder numbers decrease as the program progresses. After scanning the disk, the program displays the results, such as the following:

   ```
   Scanning finished.

   Count of tracks flagged bad          =     1
   Count of tracks with other errors    =     0
   Count of good tracks                 =  4884
   ```

2. Next you see the following prompt:

   ```
   Accept recommended skewed sectors in
   format       : 1 ? (Y/N)
   ```

For an Epson hard disk drive, it is best to accept the recommended skewed sector (also called the *interleave factor)* of 1 since this setting allows your drive to perform more efficiently. For other hard disk drives, you may need to change this value if the documentation that came with the disk recommends a different number.

To accept the default, select **Y.** Then go to step 3.

To enter a new value, select **N.** You see the following prompt:

```
Enter new skewed sectors in
format                (1-16):
```

Enter the recommended number (from 1 through 16) which equals the maximum sector number for the drive minus 1. Then press [Enter.

3. Next you see this prompt:

```
Accept recommended skewed sectors per
head in format : 0 ? (Y/N)
```

For an Epson hard disk drive, accept the recommended value of 0. For another type of drive, use the value recommended in the documentation for the drive.

To accept the default, select **Y.**

To enter a new value, select **N.** You see the following prompt:

```
Enter new skewed sectors per head
in format (0-16):
```

Enter the recommended number (from 0 through 16) which equals the maximum sector number for the drive minus 1. Then press Enter.

4. The program now allows you to edit the defective track table. At the bottom of the table is this prompt:

```
Modify defective track table ? (Y/N)
```

Select **N** to leave the table as it is. Then skip the following section and go to "Formatting the Disk" on page A-8.

To add bad tracks to the defective track table, see the next section.

Modifying the Defective Track Table

If you select **Y** to modify the table, you see the following options at the bottom of the table:

```
Defective Track Table : Move box cursor to
desired track with cursor key
A = Add track, C = Change track,
D = Delete track, F = Finish editing
Enter command :
```

To add a bad track, follow these steps:

1. Press [Al. You see this prompt:

```
Enter cylinder number (1 - nnnn):
```

2. Type the number of the cylinder containing the bad track and press [Enter. You see this prompt:

```
Enter head number (0 - nn):
```

3. Type the head number for the bad track and press Enter.

To cancel the operation, press Enter without typing a value.

When you complete a valid entry, it appears in the table and you can add the next bad track, if necessary.

If you make a mistake, move the cursor block to the incorrect track and press C to change the track data or press D to delete the track from the table. Change the track data in the same way as you add a track.

The maximum valid cylinder number and head number (nnnn and nn) vary according to the capacity of the hard disk. If you enter an invalid cylinder or head number, a reminder of the range of values appears and the program asks you to enter the value again.

When you finish adding all the bad tracks, press Enter without typing a value. Then check the entries in the defective track table. When you are sure the table is correct, press F. The program displays a warning about the consequences of proceeding with formatting, as described in the next section.

Formatting the Disk

When you are ready to start formatting the disk, you see the following warning:

```
WARNING!  ALL DATA WILL BE DESTROYED IN ALL
PARTITIONS OF HARD DISK, NOT JUST IN MS-DOS
PARTITION!
Do you want to start formatting ? (Y/N)
```

If you are not sure you want to format the hard disk, select **N.** If you are sure, select **Y.** The program gives you one more chance to cancel:

```
DOUBLE CHECK THAT YOU HAVE BACKUP DISKETTE
COPIES OF ALL YOUR FILES.
Do you want to exit and check your file
copies ? (Y/N)
```

Select **Y** to cancel formatting (and check your backups) or **N** to continue.

If you continue with formatting, you see:

Format started.

Head : *nnn* **Cylinder** : *nnnnn*

The head and cylinder numbers decrease as the program progresses.

When formatting is complete, the program flags any bad tracks and you see a series of messages like these:

Format finished.

Flagging bad tracks...

Cylinder is *nnnn,* **head is** *nn*

Format completed.

Press Enter to return to the menu.

Press Enter **to return to** the Hard Disk Format Menu.

Option 2, Destructive Surface Analysis

You can perform a Destructive surface analysis of your hard disk to accurately locate any bad tracks and flag them, if they are not flagged. The test operates by a complex process of writing, reading, and verifying information on every track of the hard disk, except for tracks that are already flagged as bad tracks.

Caution

If any **errors occur during** this check, all data on the track that produces the error is destroyed. For this reason, if you suspect an unflagged bad track is causing trouble, **first run** option 3, Non-destructive surface analysis, to check the disk **surface.**

To start this test, select **Destructive surface analysis** from the Hard Disk Format Menu, You see these messages:

```
Analyze Hard Disk

Read/Save/Write/Read/Restore/Read
check for all tracks...

Current cylinder is nnnn
```

As the program checks each track, it counts the cylinder numbers (nnnn) down to zero.

When the test is complete, the program displays a disk status report, such as the following:

```
Analysis  finished.
Count of tracks flagged bad                =    n
Count of tracks with write, read errors    =    n

Count of good tracks                       = nnnn

No write, read error was detected.

No data was destroyed.

Press Enter to return to the menu.
```

If the program finds one bad track that is not flagged, the summary would show one track with a write, read error. The report is followed by a table like this:

```
Write, Read Error Tracks

Cylinder  Head  Cylinder  Head  Cylinder  Head  Cylinder  Head
  237      2

Confirm to register the tracks in the Write, Read Error
Track Table as bad tracks.

Do you want to register the error tracks as bad tracks? (Y/N)
```

To flag the error tracks as bad, select **Y.** You see a list of the tracks as they are flagged and these messages:

```
Flagging bad tracks...

Cylinder is 237, head is 2

Press Enter to return to the menu.
```

Press Enter to return to the Hard Disk Format Menu.

Option 3, Non-destructive Surface Analysis

The Non-destructive surface analysis does not destroy any data, and you can use it to safely check the condition of your hard disk drive. However, this test does not flag bad tracks.

To start the test, select Non-destructive surf ace analysis from the Hard Disk Format Menu. You see these messages:

Analyze Hard Disk

Read/Verify check for all tracks...

Current cylinder is ***nnnn***

As the program checks each track, it counts the cylinder numbers down to zero. When the test is complete, the program displays a status report, such as the following:

Analysis finished.

Count **of** tracks **flagged bad** **=** **n**
Count **of** tracks **with read, verify errors** **=** **n**

Count of good tracks = *nnnn*

No read, verify error was detected.

If the program finds tracks with errors, the screen displays a table listing them. Then you see this message:

Press Enter to return to the menu.

Press [Enter] to return to the Hard Disk Format Menu.

Exiting the Hard Disk Format Menu

To leave the Hard Disk Format Menu, select Exit. The screen displays the Operation Menu.

If you formatted the hard disk with option 1 or 2, you must now install MS-DOS (or another operating system) on the hard disk to prepare it for use. Remove the Reference diskette from drive A and then follow the instructions in your operating system manual. The installation process automatically partitions and formats the hard disk.

If you ran only the Non-destructive surface analysis, remove the Reference diskette from drive A and press the RESET button to load the operating system.

Appendix B

Troubleshooting

You should not encounter any difficulties as you set up and use your computer, but if anything out of the ordinary happens, refer to this appendix. You can correct most problems by adjusting a cable connection, repeating a software procedure, or resetting the computer.

Besides trying these suggestions, you can run diagnostics checks on the various components of your system. See Appendix C for instructions. If the suggestions here or in Appendix C do not solve the problem, see "Where to Get Help" in the Introduction.

Identifying Your System

When you request technical assistance from your dealer, a qualified service person, or the Epson Customer Resource Center, be ready to provide your computer's serial number (on its back panel), 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.

If you are able to use MS-DOS, you can obtain your MS-DOS version number and the version number of your computer's ROM BIOS.

If you copied the ROMBIOS.COM file to your hard disk (as described in Chapter 3), follow these steps:

1. At the MS-DOS command prompt, type **ROMBIOS** and press Enter. (You may need to log onto the directory where ROMBIOS.COM is stored.) Write down the version number displayed on your screen.

2. At the MS-DOS command prompt, type **VER** and press Enter. The screen displays the MS-DOS version number. Write down the number so you can give it to your dealer.

If you did not copy ROMBIOS.COM or you do not have a hard disk, follow these steps:

1. Insert the Reference diskette in drive A and turn on or reset your computer.

2. At the Operation Menu, **select Exit to MS-DOS for more** utilities and press Enter.

3. At the **A>** prompt, type **ROMBIOS** and press Enter. Write down the version number displayed on your screen.

4. Remove the Reference diskette and, if necessary, insert your Startup diskette in drive A. Type **VER** and press Enter. The screen displays the MS-DOS version number. Write down the number so you can give it to your dealer.

Error Messages

Your computer's built-in memory (ROM) contains a series of diagnostics programs, called power-on diagnostics, which your computer runs automatically every time you turn it on. These programs check internal devices such as ROM, RAM, the timer, the keyboard controller, and the hard disk drive.

The RAM test program displays the total amount of memory currently installed in your system. If the computer finds an error, it displays an error message on the screen.

If the error is not serious, you see this prompt:

(Resume = **"F1" key)**

Write down the error message, and press F1 to continue.

If the error is serious, the computer cancels further checking and halts system initialization. The error message remains on the screen and the computer locks up. If this happens, contact your dealer as soon as possible.

Report the error messages when you request technical assistance.

The following table lists all the error messages that may appear during power-on diagnostics. If you receive an error message, look it up in the table below; it directs you to the proper troubleshooting section in this appendix. If you do not see an error message, read the section that covers your problem.

Power-on diagnostics error messages

Error code	Message	Action
System board		
101	System board error	Contact dealer
102	System board error	
103	System board error	
105	System board error	
106	System board error	
107	System board error	
108	System board error	
Real-time clock		
161	System options not set	Contact dealer
162	System options not set	Run Setup; see Chapter 2
163	Time and date not set	Run Setup; see Chapter 2
164	Memory size error	Run Setup; see Chapter 2

Power-on diagnostics error messages (continued)

Error code	Message	Action
Memory		
171	BIOS shadow RAM error	Contact dealer
173	Cache options error	Run Setup; see Chapter 2
201	Memory error	
202	Memory address error	
203	Memory address error	
Keyboard		
301	Keyboard error	See "Keyboard Problems"
303	Keyboard or system unit error	
304	Keyboard or system unit error	
Monitor		
401	CRT error	See "Monitor Problems"
501	CRT error	
Diskette drive(s) and controller		
601	Diskette error	See "Diskette Problems" or 'Diskette Drive Problems"
Parallel port (printer interface)		
901	Parallel port error	See "Printer Problems"
Serial port (RS-232C port)		
1101	Serial port error	See "Printer Problems"

Power-on **diagnostics** *error messages (continued)*

Error code	Message	Action
Hard disk drive(s) and controller		
1760	Disk 0 parameter failure	See "Hard Disk Drive Problems"
1761	Disk 1 parameter failure	
1770	Disk 0 parameter error	
1771	Disk 1 parameter error	
1780	Disk 0 failure	
1781	Disk 1 failure	
1782	Disk controller failure	
1790	Disk 0 error	
1791	Disk 1 error	
Auxiliary device(s)		
8601	Auxiliary device failure	See 'Mouse Problems"
8602	Auxiliary device failure	
8603	Auxiliary device failure	

The Computer Won't Start

If your computer does not start when you turn **on** the power, check the following:

1. Is the power light on? If not, remove any diskettes and turn off the power. Make sure the power cord is securely connected to both the AC inlet on the back panel and an electrical outlet. Replace the Startup or Reference diskette, if necessary, and turn **on** the computer again.

> **Caution**
> If you turn off the computer, always wait at least five seconds before turning it back on. This allows the computer to clear and reset its memory.

2. If the power light still does not come on, check the electrical outlet for power. Turn off your computer, unplug the power cord, and plug a lamp into the outlet. Turn it on to see if the outlet supplies power.

3. If you installed or removed any of your system components, such as a disk drive, check to make sure you have reconnected all the internal and external cables correctly.

4. If the electrical outlet is working and all the connections are secure but your computer still won't start, call your dealer.

> **Note**
> If the computer starts but you can't see anything on the screen, see "Monitor Problems," below.

The Computer Does Not Respond

If your computer locks up and does not respond when you type on the keyboard, follow these steps:

1. Some operations take longer than others to complete. For example, the computer takes longer to sort a database than to display the time. If your computer still does not respond after a reasonable length of time, proceed to the next step.

2. If you have just made a change in your system's configuration, your computer may take a few minutes to complete its power-on diagnostics. The first time you turn on your computer after making such a change, it can take up to five minutes to finish its self test, depending on what you changed. If the computer does not display the MS-DOS prompt after five minutes, press the **RESET** button and try again. If that doesn't work, insert the Reference diskette in drive A and press the **RESET** button. If the computer still does not boot, contact your Epson dealer.

3. Did you enter the correct password? See "Password Problems," below.

4. Could your software be causing the problem? If you are running an application program, see "Software Problems," later in this appendix.

5. The problem could be caused by your keyboard. See "Keyboard Problems," later in this appendix.

6. If you want to stop whatever the computer is doing and return to the MS-DOS command prompt, hold down the Ctrl key and press Break (or press [cl). See Chapter 3 for more information on stopping a command or program.

7. If your computer still does not respond, you can reset it using the Ctrl Alt Delete command or the **RESET** button. See "Resetting Your Computer" in Chapter 3 for more information.

8. If resetting the computer does not work, turn off the computer and wait at least five seconds. If you do not have a hard disk drive, insert the Startup diskette in drive A; then turn on the computer. It should load MS-DOS.

9. If you installed an EGA or VGA display adapter card, or another type of card that you want to be the primary display adapter, you must set jumper JP4 to disable the built-in VGA adapter. Otherwise, you will not see any display on the screen. See "Changing the Jumper Settings" in Chapter 6 for instructions.

   If you are using one or more display adapter cards, you may also need to change the setting of jumper JP6. This jumper tells the computer whether you are using a color or monochrome monitor. (JP6 is set for color at the factory.) When this jumper is set incorrectly, you see a CRT error message.

   If you are using two different video cards, set jumper JP10 to the primary monitor type. See "Changing the Jumper Settings" in Chapter 6 for instructions.

10. If your computer suddenly stops operating, its power supply thermal detection circuits may have detected excessive operating temperatures and automatically shut down the power. This protects your system from damage due to overheating.

    When these circuits detect a high temperature, they shut off all the DC outputs in the power supply and cause it to go into latch-offstate. This does not damage the power supply, but you must correct the temperature problem before you can use your computer again. See "Restoring the Power Supply," below.

Restoring the Power Supply

To restore normal power supply operation, follow these steps:

1. Turn off the computer and leave it off for at least 30 seconds to reset the power supply logic.

2. To determine the cause of the high temperature and correct the condition, check for the following:

   - ❑ Room temperature above 95°F (35°C). If this is the case, relocate the computer to a cooler area.

   - ❑ A blocked power supply fan. Make sure there is space around the power supply fan vents in the back and sides of the computer case. Remove the computer's cover and check both inside and outside the computer for blockage. Make sure there is ample room around your system for air circulation.

   - ❑ An overload of the power supply limitations. Check the table on page 6-8 to see if you have exceeded the option slot power limits. See your option card manual(s) for the power requirements for your option card(s).

3. After you correct the problem causing the overheating, allow the computer to cool down for at least five minutes at room temperature (about 78°F or 25°C). This resets the thermal detection circuits.

4. If you removed the computer's cover, replace it now. Then turn on the computer.

If the power supply shuts off again, contact your dealer.

Password Problems

If you have any trouble using your password, try the following:

1. If you think you know the correct password, reset the computer and try again. See Chapter 3 for instructions.

> **Note**
> If you enabled network server mode when you set a password, you do not see the key prompt. For more information, see "Using Your Computer as a Network Server" in Chapter 4.

2. If you know the current power-on password but you want to change or delete it, see Chapter 3 for instructions. (You cannot change or delete a power-on password and remain in network server mode.)

3. If you do not know the current power-on password and you do not want to set a new one, see "Removing a Password," below.

4. If you do not know the current power-on password and you want to set a new one, see "Setting a New Password," below.

5. If you are setting a password and you see the following message, you need to change a jumper setting inside the computer:

```
TURN OFF POWER AND CORRECT JUMPER
SETTING TO ENABLE PASSWORD CHECKING
```

   Remove any diskettes, turn off the computer, and follow the instructions under "Changing the Jumper Settings" in Chapter 6 to enable the password function.

Removing a Password

If you have forgotten your password and you do not want to set a new one, there are two ways to remove the current password:

- ❑ Disable the existing password
- ❑ Disable the password function.

To do either of these procedures, you must reset a jumper on the main system board.

If you are using network server mode and you remove the password, the computer automatically turns off network
I . ,

You should disable the existing password if you want to be able to set a new password later without having to reset a jumper. See "Disabling an existing password," below, for instructions.

If you disable the password function, you cannot set a new password unless you disable the existing password at that time. If you do not want to use a password anymore, follow the instructions under "Disabling the password function" below.

Disabling an existing password

If you do not know your power-on password and do not want to set a new one, follow these steps to disable the existing password:

1. Turn off the computer. Then follow the instructions under "Changing the Jumper Settings" in Chapter 6 to disable the password function by setting jumper JP5 to position A.

2. Insert the Reference diskette in drive A and turn on the computer. You do not see the key prompt.

3. When the Operation Menu appears, highlight Setup and press (Enter. Then see "Setting the Power-on Password" in Chapter 2 and follow the instructions to enter a new password. However, when you see the prompt to enter a password, press [Enter] immediately. This clears the existing password.

   Be sure to save the password setting and highlight **** EXIT AND SAVE** ** when you leave Setup.

4. Remove the Reference diskette and turn off the computer. Then follow the instructions under "Changing the Jumper Settings" in Chapter 6 to enable the password function by setting jumper JP5 to position B.

5. If you do not have a hard disk, insert the system diskette in drive A. Turn on the computer again. You do not see the key prompt and the computer loads the operating system.

Later, if you want to create a power-on password, run Setup and enter a password. The jumper is already in the correct position.

Disabling *the password function*

If you do not want to use a power-on password anymore, you can disable the password function. However, your current password is stored. If you want to be able to easily set a new password later, follow the instructions in "Disabling an existing password," above.

To disable the password function, follow the instructions under "Changing the Jumper Settings" in Chapter 6 to change the setting of jumper JP5 to position A.

Setting a New Password

If you have forgotten your current power-on password and want to set a new one, follow these steps:

1. Turn off the computer. Then follow the instructions under "Changing the Jumper Settings" in Chapter 6 to disable the password function by setting jumper JP5 to position A.

2. Insert the Reference diskette in drive A and turn on the computer. You do not see the key prompt.

3. When the Operation Menu appears, highlight **Setup** and press [Enter. Then follow the instructions under "Setting the Power-on Password" in Chapter 2 to enter a new password.

   Save your password setting and highlight **** EXIT AND SAVE** * * when you leave Setup.

4. After you exit Setup, you see this message:

   TURN OFF POWER AND CORRECT JUMPER SETTING TO ENABLE PASSWORD CHECKING

5. Remove the Reference diskette and turn off the computer. Then follow the instructions under "Changing the Jumper Settings" in Chapter 6 to enable the password function by setting jumper JP5 to position B.

6. If you do not have a hard disk, insert the system diskette in drive A. Turn on the computer. You see the key prompt (). If you enabled network server mode, you do not see the key prompt. Enter your new password to access the system.

Memorize your new password or write it down and keep it in a safe place. If you forget the password you enter now, you may have to repeat the procedure above.

Keyboard Problems

If you are having trouble with the keyboard, check the following:

1. If the screen displays a keyboard error message when you turn on or reset the computer, make sure the keyboard is securely connected to the computer. See "Connecting the Keyboard" in Chapter 1 for instructions.

2. If the cursor keys do not work properly, the num lock function may be on. When num lock is on, the keys on the numeric keypad work only as numbers. If the **Num Lock** indicator in the upper right corner of the keyboard is lit, press [Num Lock] to turn off the function.

   If you want to change the initial setting of the num lock function, see "Using the Keyboard and Speaker Options" in Chapter 2.

3. If nothing happens when you type on the keyboard, see "The Computer Does Not Respond," above.

4. If you still have trouble with your keyboard, run the keyboard diagnostic tests described in Appendix C.

Monitor Problems

For monitor problems, check the following:

1. If there is no display on the screen, check that the monitor's power switch is on and that its power light is lit. If the power light is on, but you still do not see anything on the screen, check the brightness and contrast controls.

2. Did you run the SNOOZE utility (described in your VGA Utilities booklet)? Your screen may be just temporarily blank. Press any key to display the current image. If you still see nothing, go to the next step.

3. If the power switch is on but the power light is not, turn off the monitor's power, wait five seconds, and turn it back on. Wait to see if the screen displays any text.

4. If the monitor's power 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 outlet and turn it on to see if the outlet supplies power.

5. Make sure your monitor is connected to the computer. See "Connecting a Monitor" in Chapter 1 or your monitor manual for instructions.

6. Make sure your monitor and display adapter match, and, if you installed a display adapter card, be sure any switches or jumpers on the card are set properly. See "Connecting a Monitor" in Chapter 1 and the documentation that came with your monitor and display adapter card for instructions.

7. Be sure you have chosen the correct display adapter type in the Setup program. See "Setting the Display Adapter Type" in Chapter 2.

8. 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.

> **Note**
> If your application program requires a monitor that supports graphics but you have a monochrome monitor, the results will be unpredictable.

9. If you installed an EGA or VGA display adapter card, or another type of card that you want to be the primary display adapter, you must set jumper JP4 to disable the built-in VGA adapter or you will not see anything on the screen. See "Changing the Jumper Settings" in Chapter 6 for instructions.

   If you are using one or more display adapter cards, you may need to change the setting of jumper JP6. This jumper tells the computer whether you are using a color or monochrome monitor and is set for color at the factory. If JP6 is set incorrectly, you see a CRT error message.

   If you are using two different types of video cards, set jumper JP6 to the primary monitor type. See "Changing the Jumper Settings" in Chapter 6 for instructions.

10. If you still have difficulty with your monitor, run the appropriate diagnostic test for your adapter as described in Appendix C. If the diagnostics program indicates an error, contact the place where you bought the monitor.

Diskette Problems

If you see a diskette error message or have trouble accessing data on a diskette, try the following steps:

1. Did you secure the diskette in the drive properly? On a 5¼-inch drive, be sure to turn down the latch or press the button.

2. You may have inserted the diskette upside-down or it may not be inserted all the way. Remove the diskette from the drive and reinsert it with the label facing up.

3. If reinserting the diskette does not solve the problem and you have access to another diskette drive of the same type, place the diskette in the other drive and repeat the operation. If you can read the diskette, the trouble may be in your diskette drive. See "Diskette Drive Problems," below.

4. Check to see if you have inserted the right type of diskette. For example, are you trying to read a 1.44MB diskette in a 720KB diskette drive?

5. If your diskette is the right type for your drive, see if it is write-protected. On a 5¼-inch diskette, there may be a write-protect tab over the notch on its side or there may be no notch. On a 3½-inch diskette, the write-protect switch may be set to the write-protect position or there may be no switch. You cannot alter data on a write-protected diskette. (Some application programs do not function properly if the diskette is write-protected. Check the program manual.)

6. Is the diskette formatted? A new diskette must be formatted before you can store data on it. See your operating system manual for instructions on formatting diskettes.

7. You may have entered an incorrect diskette drive type when you ran the Setup program. Run the Setup program again to check the setting. See Chapter 2 for instructions.

8. Did you receive one of the following MS-DOS error messages?

   - ❑ **Disk Drive Error: Abort, Ignore,** Retry?
   - ❑ **Disk error reading drive d:**
   - ❑ **Disk error writing drive d:**

   If you see one of these messages, make sure the diskette is properly inserted in the drive and then try the operation again. If the problem persists, try removing the diskette and reinserting it.

   If the error message still occurs, you may have a defective diskette. Use the COPY command to copy the files from the bad diskette to a new diskette.

9. If you see no error messages but there is something wrong with the data in a file, the operating system or an application program may have updated the storage information on the diskette incorrectly. This is probably the case if you have one of these problems:

   - ❑ Part of a file is missing
   - ❑ A file includes parts of other files
   - ❑ An expected output file is missing.

   Use CHKDSK to make the necessary repairs; see your MS-DOS manuals for instructions.

Diskette Drive Problems

If you see a diskette error message or have difficulty with a diskette drive, follow these steps:

1. Try running the Diskette drives and controller diagnostic test described in Appendix C. If the diagnostics program indicates an error, consult your Epson dealer.

2. If you installed the drive yourself, did you carefully follow all the instructions in Chapter 7? Review the instructions and check all cable connections to make sure you have installed the drive correctly.

3. Did you run the Setup program to define the correct type of diskette drive as part of your computer's configuration? (See Chapter 2 for instructions.)

4. If you still have trouble with the drive, run the Diskette drive and controller diagnostic tests described in Appendix C. If the diagnostics program indicates an error, **contact** your Epson dealer.

5. If the diskette drive is making loud noises, do not attempt any further examination of it. Contact your Epson dealer.

> **Note**
> Diskette drives may make different sounds accessing different diskettes.

Hard Disk Problems

If you are having a problem with a hard disk in your computer, you may see a hard disk error message. The problem could be the result of improper installation, incomplete disk preparation, or corrupted data. The suggestions in this section cover problems in three categories:

- ❑ Installing the drive
- ❑ Preparing the drive for use
- ❑ Accessing data on the drive.

Consult the section that seems most likely to include your problem. For example, if you suddenly cannot use data on your disk, see "Accessing Data on the Drive."

> **Caution**
> If your hard disk has data on it, be very careful performing any procedure that may erase data (such as formatting the disk). Always be sure to back up your data before you reformat or repartition the disk drive. Consult your dealer if you have any questions.

Installing the Drive

If you have problems with a newly-installed drive, check the following:

1. If your dealer installed the drive, consult that person about the problem.

2. If you installed the hard disk in your computer yourself, did you carefully follow all the instructions in Chapter 7? Review the instructions and check all cable connections to make sure you installed it correctly. Also check the jumper settings on your drive to make sure they are set correctly.

3. If you installed a non-Epson hard disk drive, was it physically formatted by **the** manufacturer? A blank, new hard disk must be physically formatted (or *initialized)* before you can partition it and install an operating system on it. If your drive was not physically formatted, you must do it yourself. If the drive came with its own format utility, use that program; if **not,** follow the instructions in Appendix A.

   Note that a physical format is different from the software-based logical formatting commands (such as the MS-DOS SELECT or FORMAT commands). If you're sure your hard disk **has** had a physical format, see "Preparing **the** Drive," below, for more information.

Preparing the Drive

Before you can store data on a new hard disk (which has already been physically formatted), you must prepare it for use as follows:

1. Run the Setup program to define your hard disk as part of the computer's configuration. (See Chapter 2 for instructions.)

2. Partition the drive, format it for MS-DOS, and install MS-DOS. Step-by-step instructions for performing these procedures are provided in your MS-DOS manual. If you are using another operating system, follow the instructions **that came** with it.

If you do not prepare the drive correctly, you cannot store data on the disk. For example, if you partition the drive and format it for MS-DOS (or for another operating system) but you do not copy the operating system to it, you will not be able to load the operating system from the hard disk.

If you are sure the hard disk was installed properly and you prepared it for use as described above but you cannot access the drive, verify that you performed each step in the installation process correctly for your configuration.

If you cannot identify the problem, consult your dealer.

Accessing Data on the Drive

If you have been using your hard disk drive successfully for some time and notice a reduction in performance, the data on the disk may have become fragmented. You may want to back up all your data and then use a disk compaction utility to reorganize the files on your disk. Contact your dealer for information.

If you still have trouble with your hard disk, you can back up your data and physically reformat the disk. Then you'll need to reinstall the operating system and copy your files back onto the disk. See Appendix A and your operating system manual for instructions.

If you cannot access data on your hard disk or you are receiving read/write errors, the disk may have a physical problem. Contact your dealer.

Software Problems

If you are having trouble with an application program, try the following solutions:

1. If 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 have a hard disk and the program is stored in a directory on that drive, make sure you are logged onto or specifying the correct directory. If you don't have a hard disk, make sure you inserted the correct diskette in drive A.

2. Your computer can run at either high speed or low speed. While almost all programs work properly at the faster speed, some must run at the slower speed. Check your software manual to see if this is the case, and change the processor speed if necessary. See "Changing the Processor Speed" in Chapter 4 for instructions and information on using copy-protected programs.

3. If you entered an MS-DOS command that you want to stop, there are special key combinations you can type to cancel the command. These methods may also work in your application programs:

   - Hold down the Ctrl key and press C
   - Hold down the Ctrl key and press Break.

4. An application program can occasionally lock the computer, making it unresponsive to keyboard commands. If your computer does not respond when you type on the keyboard, you can reset it. Follow the instructions in Chapter 3.

5. If resetting the computer does not help, remove any diskettes, turn off your system, wait five seconds, and turn it back on. Then restart your application program.

If none of these solutions solve your software problem, contact the software manufacturer for technical support.

Printer Problems

Below are some general steps to follow if you are having difficulty with your printer. If the problem persists and you need more detailed information, check your printer manual.

You see a port error message if you are having trouble with the port to which your printer is connected. If your printer uses the parallel port, you may see error 901; if your printer uses the serial port, you may see error 1101.

1. If your printer does not work at all, check that the printer has power and is properly connected to the computer. (Also, make sure your printer has paper in it.> See Chapter 1 or your printer manual for instructions.

2. Check the printer's DIP switch or control panel settings. These settings help a printer communicate properly with the computer. See your printer manual for the correct settings.

3. If you are using more than one parallel port or more than one serial port, the computer must know which port is the primary port and which is the secondary port. See Chapter 2 for instructions on how to set the parallel and serial ports using the Setup program.

4. If your printer is properly set up but is still not functioning, test it from the MS-DOS level. When the screen displays the MS-DOS command prompt (such as *C>* or A>), hold down Shift and press Print Screen. This should print the contents of the screen on your printer.

   If it does not, you may need to change the internal setting of the computer's parallel port for a parallel printer (or serial port for a serial printer). To do this, use the MS-DOS MODE or SETMODE command. See your printer and MS-DOS manuals for more details.

5. Many application programs (such as word processors) must be set up properly before they can use a printer. Check your program manual to see what customizing may be required.

6. If you are using an application program that requires a printer driver, make sure the correct driver is installed. See your application program manual for instructions. Also see your printer manual for additional instructions on using your printer with application programs.

7. Try running the Parallel port (printer interface) diagnostic test if you have a parallel printer, or the Serial port (RS-232C) test if you have a serial printer. Appendix C describes these tests. If the test indicates an error, contact your printer dealer.

Option Card Problems

If you install an option card and it does not function properly, check the following:

1. Is the option card installed correctly? Make sure it is well-seated in its slot. Check the installation procedure described in Chapter 6 and also see the instructions that come with the card.

2. Did you set the necessary DIP switches or jumpers on the option card? See the card's manual for instructions.

3. Did you set the necessary jumpers on the main system board? See Chapter 6 for more information.

4. Did you run the Setup program to redefine your computer's configuration after installing the card? See Chapter 2.

5. Did you install a network option card in your computer? Some network option cards require your computer to generate an early input/output ready signal to operate properly. If you have trouble using your network card, set jumper JP15 on the main system board to position A to enable the early input/output ready signal. Then try using the network card again. If it still does not operate correctly, contact your dealer.

6. If you used the option card to add an external device to your computer, did you use the proper cable to connect the device to the connector on the back panel?

7. Did you perform the correct setup procedures for the software you are using with the option card? See your option card or software manual for instructions.

Mouse Problems

If you are having a problem with your mouse or you see an auxiliary device error message, check the following:

- ❑ Make sure the mouse cable is securely connected to the mouse port and not the keyboard port. The mouse port has a special icon on the computer case. See Chapter 1.

- ❑ If you installed a mouse on an option card, be sure to set jumper JP7 to disable the built-in mouse and enable the mouse on the card. See Chapter 6 for instructions.

If you control your mouse with the Microsoft mouse driver 7.0 and the cursor is not operating properly or freezes within a program, you may need to install the MOUSE7PT.EXE program. Follow the instructions below.

Using the MOUSE7PT.EXE Program

The MOUSE7PT.EXE program creates an additional mouse driver which you can load for any program that has trouble controlling the cursor. Your original mouse driver remains unchanged.

> **Note**
> If you are using Microsoft Windows 3.0, you do not need to install this program; Windows 3.0 automatically creates a new driver for you.

Follow these steps to install and run MOUSE7PT.EXE:

1. Identify the disk and directory where the current MOUSE.COM file is stored.

2. Insert your Reference diskette in drive A.

3. Use the COPY command to copy MOUSE7PT.EXE from your Reference diskette to the directory on your hard disk that contains the MOUSE.COM file. (See your MS-DOS manuals for instructions on using the COPY command.)

4. Log onto the directory that contains the MOUSE7PT.EXE and MOUSE.COM files.

5. Type the following and press (Enter to run the program:

   MOUSE7PT MOUSE.COM newmouse.COM

   (where newmouse. **COM** is the name you give the new driver file.)

   This command creates a new mouse driver that has been modified to eliminate the cursor problem. When you name the new driver, be sure to make the extension .COM.

   If you included the file MOUSE.SYS in your CONFIG.SYS file, repeat step 5 to modify MOUSE.SYS as well. Just substitute .SYS for .COM.

6. Before you can use your mouse with the program, you need to load the new mouse driver into the computer's memory. There are two ways to do this:

   - ❑ Type the name of the new mouse driver at the MS-DOS command prompt and then start the program.

   - ❑ Modify your AUTOEXEC.BAT file (or another batch file) to include the name of the new mouse driver. See your MS-DOS manuals for instructions.

Note
If you have already loaded the original mouse driver, reset the computer before you load the new driver.

Memory Module Problems

If you added extra memory to your system by installing SIMMs and that memory is not operating properly, check the following:

1. Check to make sure that you set the memory configuration jumpers (JP8 through JP14) correctly and that they match your current SIMM configuration. See Chapter 6 for instructions on setting memory jumpers.

2. If the jumpers are set correctly but the memory count displayed by the power-on diagnostics program is incorrect, you or your dealer may not have installed the SIMMs correctly. They may be installed in the wrong sockets, they may be the wrong type of SIMM, or they may not be inserted all the way. (Keep in mind that the memory count does not include the 384KB of memory between 640KB and 1MB.)

   If your dealer installed the SIMMs for you, contact your dealer; do not attempt to correct the problem yourself. If you installed the SIMMs, see "Memory Modules" in Chapter 6 and make sure you have followed all the instructions properly.

3. Be sure to run the Setup program after you install or remove memory modules to automatically update your memory configuration. See Chapter 2 for instructions.

If you still have trouble with your SIMMs, write down any error messages that appear and contact your dealer.

Math Coprocessor Problems

If the math coprocessor in your system does not seem to be operating properly, check the following:

1. If you have the 25 MHz model and replaced the 80486SX microprocessor with an 80487SX chip, make sure you set jumpers JP1 through JP3 to indicate that you installed a math coprocessor. See Chapter 6 for instructions.

2. Run the Setup program to make sure the math coprocessor is listed as installed on the Exit display. If it is listed as not installed, your dealer may have installed the math coprocessor incorrectly. See Chapters 2 and 6 for more information.

   Caution
   Do not attempt to remove the microprocessor yourself. Contact your dealer to remove it for you.

3. If your math coprocessor is listed as installed in the Setup program but still does not seem to be working, test it by running the System diagnostics program on your Reference diskette. See Appendix C for instructions.

Appendix C

Performing System Diagnostics

This appendix describes how to test the operation of your computer and its peripheral devices using the System diagnostics program on your Reference diskette.

Run the diagnostics program if you are not sure whether a device is performing correctly. The table at the end of this appendix lists the error messages you may see during testing.

You can test the following devices, each of which is identified by specific reference numbers:

1-System board
2-Memory
3-Keyboard
4-Monochrome display adapter and CRT
5-Color graphics adapter and CRT
6-Diskette drives and controller
7-Math coprocessor
9--Parallel port (printer interface)
11-Serial port (RS-232C port)
12-Alternate serial port
14-Dot-matrix printer
17-Hard disk drives and controller
21-Alternate parallel port
81-Parallel port (on video adapter)

Starting System Diagnostics

To run the System diagnostics program, you turn on or reset your computer with the Reference diskette in drive A. If you start the program in any other way, some tests may produce strange results.

To start the System diagnostics program, follow these steps:

1. Insert the Reference diskette in drive A.

2. Turn on or reset the computer. The Operation Menu appears.

3. If the **Num Lock** indicator is illuminated, press [Num Lock] to turn off the function.

4. Press [3] or use ↓ to select System diagnostics and then press [Enter].

When you start the System diagnostics program, the computer checks any peripheral devices connected to the system. Then you see a list of the devices available for testing. This list includes only the devices that are currently installed, for example:

```
DEVICE LIST

 1 - System board
 2 - Memory
 3 - Keyboard
 5 - Color graphics adapter and CRT
 6 - Diskette drives and controller
 9 - Parallel port (printer interface)
11 - Serial port (RS-232C port)
14 - Dot-matrix printer
17 - Hard disk drives and controller

     DEVICE LIST is correct ? (Y/N)
```

If the list correctly describes your system, highlight *Y* and press Enter. If a device is missing from this list, or if you want to change the list, press N or → and Enter. Then see "Modifying the Device List" on page C-5.

Note
If your system uses the built-in VGA adapter or an EGA or VGA card with a color monitor, your device list should include item 5, Color graphics adapter and CRT. If your system uses the built-in VGA adapter or an EGA or VGA card with a monochrome monitor, your device list should include item 4, Monochrome display adapter and CRT.

After you confirm the Device List, you can test only those items. If you want to add a device later, return to the Operation Menu and reselect System diagnostics.

Note
After you install MS-DOS or another operating system, you should always boot the computer from your hard disk or from the system diskette to use it. When you finish running System diagnostics, remove the Reference diskette from drive A. If you do not have a hard disk, insert the system diskette. Then reset your computer to make sure it performs all the commands in the CONFIG.SYS and AUTOEXEC.BAT files.

Selecting an Option

When you are using the System diagnostics program, you often need to select an option from a menu. There are two ways to do this:

- Use the arrow keys (↑ ↓ ← →) to highlight the option you want and then press [Enter] to select it
- Type the number of the desired option and press [Enter] to select it.

For example, you may see this menu:

```
1 - Run test one time
2 - Run test multiple times

0 - Exit
```

Suppose the first option is highlighted. If you want to select that option, just press [Enter] (because it is already highlighted). If you want to select option 2, you can either press [0] or [2]; this causes the cursor block to move to that option. Then press [Enter] to select it.

> **Note**
> You can press [Esc] at any time to return to the previous menu.

Modifying the Device List

If an installed device is missing from the Device List, you can add it to the list for testing. At the following prompt, select **N.**

```
DEVICE LIST is correct ? (Y/N)
```

You see this menu:

```
1 - Add device
2 - Delete device

0 - Finish modification
```

To add a device to the list, select **1.** The program displays a list of other devices that are not currently included in the Device List. You see a menu similar to this:

```
Additional DEVICE LIST

 4 - Monochrome display adapter and CRT
 7 - Math coprocessor
12 - Alternate serial port
21 - Alternate parallel port
81 - Parallel port (on video adapter)

 0 - Exit to DEVICE LIST
```

Highlight the item you wish to add and press Enter. You can add as many devices as necessary. When the Device List is complete, select **0** (Exit).

To remove a device from the list, select 2 (Delete device). The screen displays the current Device List. Select the item you wish to delete. You can delete as many devices as necessary.

When the Device List is correct, select 0. The screen displays the modified Device List for a final check. If the list is correct, select **0** (Finish modification).

Selecting a Test

From the Device List, select the device you wish to test. Before the test begins, the program asks how many times to perform the test. You see this menu:

```
Number of times to test device

1 - Run test one time
2 - Run test multiple times

0 - Exit
```

You can specify that the test be performed any number of times in the range 1 to 9999. Running a test multiple times is for reliability testing of essential functions only; in most cases, running a test once is sufficient.

To perform the test once, select 1. The program may display a submenu of tests for the device you selected.

To perform the test multiple times, select 2. You see this prompt:

```
Terminate checking if an error detected ?
(Y/N)
```

Select Y to terminate checking if the device produces an error, or N to repeat the tests regardlessof an error. You see this prompt:

```
Repeat times (1-9999) ? 1
```

To perform the test once, press Enter. To run the test more than once, type the number of times and press Enter.

For some devices, the computer does not display a submenu of tests to choose from. Instead, it performs all the tests that do not require you to enter a response. If you chose to test the device more than once, the computer runs all the tests and then repeats them in the same order.

You may see this message on the screen during the tests:

```
On errors, press any key to stop
```

If you see an error while one of the tests is running, press any key to terminate the test.

Resuming From an Error

If an error occurs during a test, the test stops at that point, and an error message appears. If you want to record the problem, you can print the message using your printer. You see this prompt:

```
Do you want a printout of the error
message(s) ? (Y/N)
```

To continue without printing the error message, select **N.**

Before you request a printout, be sure your printer is ready and contains paper. Then select **Y.** If the printer is not ready, the following message and prompt appear:

```
Printer is not installed correctly.
Install correctly before entering.
Continue ? (Y/N)
```

Correct the problem and select **Y** to continue printing, or select **N** to cancel printing.

After printing the error message, the program displays this prompt:

> Printout is finished. Press ENTER to return to the menu.

The program continues after an error in one of the following ways:

- ❑ It returns to the Device List
- ❑ If you are running multiple tests and are not terminating on an error, the program repeats the test that caused the error.

The table below lists the tests you can run on your system. You may not see all of the tests listed when you run System diagnostics; some tests appear only if you have installed the device.

Tests that check the operation of parallel or serial ports require you to use a special connector in order to test the port. Contact your dealer to obtain the connector.

For a complete list of the error messages these tests may display, see the table at the end of this appendix.

System diagnostics tests

Device	Tests available	Description
System board		Checks the microprocessor
Memory		Checks all memory and displays a memory count
Keyboard		Tests all keys on the keyboard

System diagnostics tests (continued)

Device	Tests available	Description
Monochrome display adapter and CRT	Adapter check Attribute check Character set check Graphics mode check Screen paging check Video check Sync check Run all above checks	Tests all types of monochrome monitors
Color graphics adapter and CRT	Adapter check Attribute check Character set check Graphics mode check Screen paging check Light pen check Video check Sync check Run all above checks	Tests all types of color monitors
Diskette drive(s) and controller	Sequential seek check Random seek check Write, read check Disk change check Run all above checks	Tests operation of the diskette drive(s): requires **a** formatted diskette for some tests
Math coprocessor		Tests the operation of the math coprocessor
Parallel port (printer interface)		Tests the primary parallel port: requires a loop-back connector (contact your dealer)
Serial port (RS-232C)		Tests the primary serial port; requires a loop-back connector (contact your dealer)
Alternate serial port		Tests the secondary serial port; similar to primary serial port test

System diagnostics tests (continued)

Device	Tests available	Description
Dot matrix printer		Tests the operation of a dot matrix printer in several modes; requires the printer to be loaded with paper
Hard disk drive(s) and controller	Seek check Write, read check Read, verify check Run all above checks	Tests the operation of the hard disk drive(s)
Alternate parallel port		Tests the secondary parallel port; similar to primary parallel port test
Parallel port on a video adapter		Tests the parallel port included on a video adapter; requires a loop-back connector (contact your dealer)

Error Messages

The following table lists all the error messages that may appear during System diagnostics testing.

System diagnostics error messages

Error code	Message
System board	
101	CPU error
102	ROM checksum error
103	Timer counter register error
104	Timer counter error
105	Refresh error
106	DMA page register error

System diagnostics error messages (continued)

Error code	Message
System board (continued)	
107	Keyboard controller timeout error
108	Keyboard controller self diagnostic error
108	Keyboard controller write command error
109	Interrupt controller error
110	CMOS shutdown byte error
111	CMOS battery error
112	CMOS checksum error
113	CPU instruction error
114	Protect mode error 1
115	Protect mode error 2
Memory	
201	Memory parity error
Keyboard	
301	Keyboard controller error, keyboard error
302	Keyboard is non-standard, or keyboard is defective
Monochrome display adapter and CRT	
401	Error in adapter check
402	Video signal error
403	Error in attribute check
404	Error in character set check
406	Error in graphics mode check
408	Error in screen paging check
409	Error in light pen check
410	Error in video check
411	Error in sync check

System diagnostics error messages (continued)

Error code	Message
Color graphics adapter and CRT	
501	Error in adapter check
503	Error in attribute
504	Error in character set check
506	Error in color graphics check
508	Error in screen paging check
509	Error in light pen check
510	Error in color video check
511	Error in sync check
Diskette drive(s) and controller	
601	Diskette drive controller error
602	Sequential seek error
603	Random seek error
604	Write error
605	Read error
606	Disk change check remove error
607	Disk change check insert error
Math coprocessor	
701	Coprocessor not installed
702	Coprocessor initialize error
703	Coprocessor invalid operation mask error
704	Coprocessor st field error
705	Coprocessor comparison error
706	Coprocessor zero divide mask error
707	Coprocessor addition error
708	Coprocessor subtraction error
709	Coprocessor multiplication error

System diagnostics error messages (continued)

Error code	Message
Math coprocessor (continued)	
710	Coprocessor precision error
Parallel port (printer interface)	
901	Error pin p
Serial port (RS-232C port)	
1101	control signal always low
1101	control signal always high
1102	Timeout error
1103	Verify error
Alternate serial port	
1201	*control signal* always low
1201	*control signal* always high
1202	Timeout error
1203	Verify error
Dot matrix printer	
1401	*status*
Hard disk drive(s) and controller	
1701	Seek error
1702	Write error
1703	Read error
1704	Head error
1705	Error detection error
1706	Error correction error
Alternate parallel port	
2101	Error pin **p**
Parallel port (on video adapter)	
81nn	Error pin *p*

Appendix D

Specifications

CPU and Memory

32-bit CPU	25 MHz system: 80486SX processor, 50 MHz system: 80486DX2/50 processor
System speed	25 MHz regardless of CPU; for 80486DX2/50, 50 MHz speed is internal only; 8 MHz speed is simulated by inserting wait states; high/low speed selection through software or keyboard command; 0 wait state memory access at high speed
System memory	4MB RAM standard soldered onto the memory card; base memory of either 256KB, 512KB, or 640KB, selectable through jumpers; memory expandable using 256KB or 1MB SIMMs up to 16MB (maximum); SIMMs must be 80ns (or faster) access speed
ROM	128KB (includes system and VGA BIOS)
Shadow RAM	0 wait state access speed; automatically copies both ROM BIOS and video ROM into RAM
Math coprocessor	Standard for 50 MHz model; on 25 MHz model, 80486SX microprocessor can be replaced with optional 80487SX chip
Clock/calendar	Real-time clock, calendar, and 50-byte CMOS RAM; battery backup
Cache controller	82385 (25 MHz) standard

Cache RAM	32KB high-speed static RAM, two-way set associative on main system board; 8KB integrated into microprocessor
Speaker	Internal, programmable; volume selectable by software

Controllers

Diskette	Supports up to two diskette drives in any of four formats: 5¼-inch, high-density, 1.2MB; 5¼-inch, double-density, 360KB; 3½-inch, high-density, 1.44MB; or 3½-inch, double-density, 720KB; also supports optional Epson tape drive; controller on main system board
Hard disk	Supports up to two drives; embedded controller; interface on main system board

Interfaces

Monitor	VGA adapter with 1MB of video memory built into main system board; non-interlaced mode only; supports up to 800 x 600 or 1024 x 768 (non-interlaced) pixels in 16 colors or up to 640 x 480 pixels in 256 colors; multi-frequency monitor required for resolutions over 640 x 480 15-pin D-shell connector
Serial	RS-232C, programmable, asynchronous; 9-pin, D-shell connector
Parallel	Standard 8-bit parallel, monodirectional; 25-pin, D-shell connector

Auxiliary	Mini DIN, 6-pin connector for PS/2 compatible mouse or other device
Keyboard	Mini DIN, 6-pin connector for PS/2 compatible keyboard
Option slots	Six standard ISA compatible input/output expansion slots (five 16-bit and one 8-bit); *8* MHz bus speed
Speaker	Internal; operation controllable by software

Power Supply

Type	200W, fan-cooled, automatic input voltage sensing, thermally protected
Input ranges	98 to 132 VAC and 195 to 264 VAC, *47* to 63 Hz
Maximum outputs	+5 VDC at 22 Amps, +12 VDC at 6.8 Amps -12 VDC at .50 Amps, -5 VDC at .50 Amps

Option slotpower limits

Maximum current	+5 Volts	+12 Volts	-5 and -12 Volts
For each slot	7 Amps	1.5 Amps	0.5 Amps
For all six slots	16 Amps	3 Amps	0.5 Amps

Mass Storage Bays

Up to five drives maximum; two half-height or one full-height internal drives; one third-height and two half-height or one third-height and one full-height externally-accessible drives

Keyboard

	Detachable, two position, 101/102 sculpted keys (country-dependent)
Layout	58-key QWERTY main keyboard; 17-key numeric/cursor pad; 10 cursor keys; additional 4-key cursor pad; 16 function keys (user-definable)
Function	Four levels (normal, shift, control, alternate); user-definable

Environmental Requirements

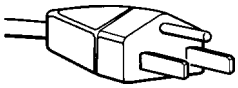
Condition	Operating range	Non-operating range	Storage range
Temperature	41° to 95° F (5° to 35° C)	-4° to 140° F (-20° to 60° C)	-4° to 140° F (-20° to 60° C)
Humidity (non-condensing)	20% to 80%	10% to 90%	10% to 90%
Altitude	-330 to 9900 ft (-100 to 3000 m)	-330 to 11880 ft (-100 to 3600 m)	-330 to 39600 ft (-100 to 12000 m)
Maximum wet bulb	68° F (20° C)	104° F (40° C)	134° F (57° C)

Physical Characteristics

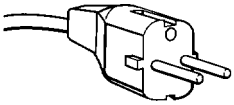
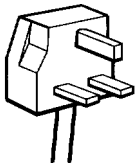
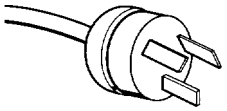
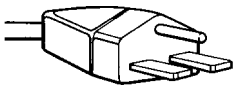
Width	17 inches (432 mm)
Depth	*16* inches (406 mm)
Height	6 inches (153 mm)
Weight	Single diskette drive model (without keyboard): 26 lb (11.8 kg)

Power Source Requirements

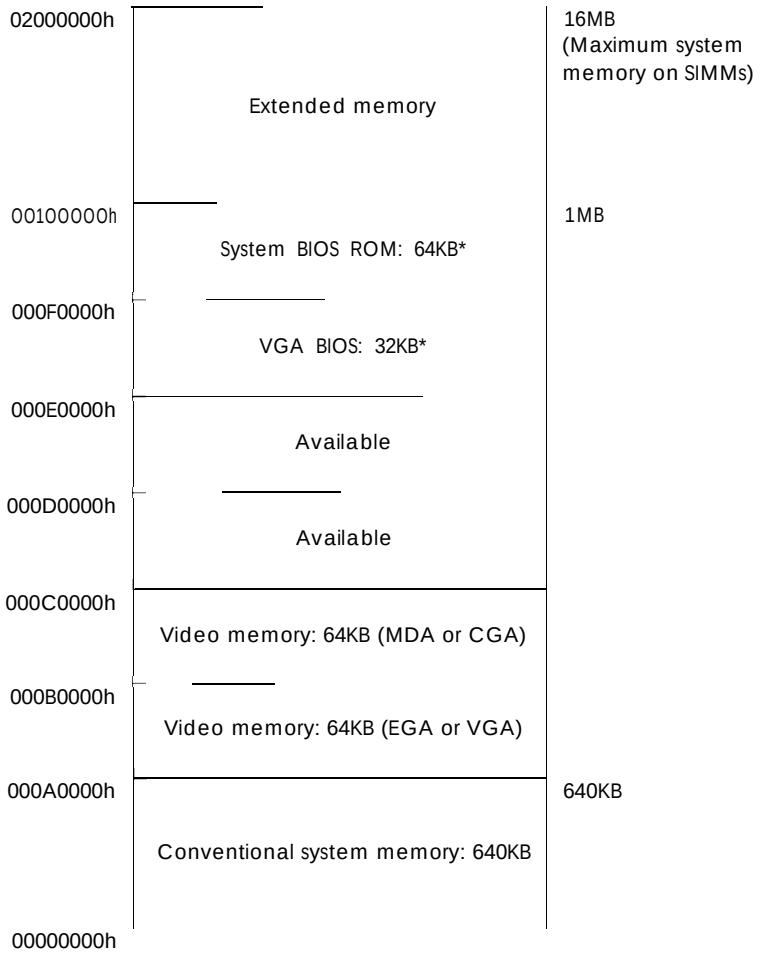
120 Volt power source requirements

AC plug	*Plug Type*	Reference standards	Power cord
	North America 125V, 10A	ANSI C73.11, NEMA 5-15-P IEC 83	UL/CSA Listed, Type SJT. no. 18/3AWG. or no. 16/3AWG, or <HAR> 300V, 10A or 13A

240 Volt power source requirements

AC plug	*Plug type*	Reference standards	Power cord
	Europe 240V, 10A to 16A	CEE 7/7 IEC 83 IEC 127 HD21	<HAR> 1.00 mm^2 300V. 10A
	UK 240V. 10A	BS 1362 BS 1363A IEC 83 IEC 127 HD 21 EN 60 320-1 ASTA mark	<HAR> 1.00 mm^2 300V, 10A
	Australia 240V. 10A	ASC112 IEC 127 HD 21	<HAR> 1.00 mm^2 300V, 10A
	North America 240V, 15A	ANSI C73.20. NEMA 6-15-P, IEC 83 UL 198.6	UL/CSA Listed Type SJT no. 18/3AWG. 300V, 10A

System Memory Map



- The system BIOS and VGA BIOS are contained in one 128KB EPROM. The 64KB system BIOS and 32KB VGA BIOS ROM are shadowed in RAM after the system completes power-on diagnostics. The system and VGA BIOS ROM area in the 000E0000h through 000F0000h range is shadowed at 000E0000h after the system completes power-on diagnostics.

Glossary

Address

A number or name that identifies the location where information is stored in a computer's memory.

Analog monitor

A monitor that generates, responds to, or acts upon analog data. Analog data is transmitted by varying the voltage levels in a continuous current.

Application program

A software program designed to perform a specific task, such as a word processing or spreadsheet program.

ASCII

American Standard Code for Information Interchange. A standardized coding system for representing characters, such as numbers, letters, and graphic symbols. An ASCII character occupies one byte of storage. Many different computers, printers, and programs can use files transmitted in ASCII code.

Asynchronous

A method of data transmission in which one machine sends data one character at a time to another machine at irregular intervals that do not need to be synchronized to a timing device.

AUTOEXEC.BAT file

The batch file that is executed automatically when you load MS-DOS. See also Batch *file.*

Automatic speed

The feature that enables the computer to switch automatically from high speed to low speed when accessing a diskette drive.

Backup

An extra copy of a program, data file, or disk, that is created in the event your working copy is damaged or lost.

Base memory

The memory in the computer below 1MB that is available to MS-DOS and application programs-usually 640KB. Also called conventional memory or main memory.

Batch file

A type of file that lets you execute a series of commands by typing one command. In MS-DOS, batch files are text files with the filename extension .BAT. In a batch file, each command is entered on a separate line. When you type the filename, MS-DOS executes all the commands in that file sequentially.

BIOS

Basic Input/Output System. Routines in ROM (Read Only Memory) that handle basic input/output functions of the operating system.

Bit

A binary digit (0 or 1). The smallest unit of computer storage. The value of a bit represents the presence (1) or absence (0) of an electric charge.

Boot

To load the operating system into the computer's memory.

Byte

A sequence or group of eight bits that represents one character.

Cache memory

A high-speed type of memory buffer that stores information from base or extended memory where your system can access it faster.

CGA

Color Graphics Adapter. A type of display adapter card that can generate up to 25 lines of text with 80 characters on each line, monochrome graphics at 640 x 200 resolution, or four-color graphics at 320 x 200 resolution.

Character

Anything that can be printed in a single space on the page or the screen; includes numbers, letters, punctuation marks, and graphic symbols.

CMOS

Complementary Metal-Oxide Semiconductor. A type of low-power silicon chip.

Code

A system of symbols for representing data or instructions. Also any software program or part of a program.

Command

An instruction you enter (usually on a keyboard) to direct your computer to perform a specific function.

Command prompt

The symbol or message that tells you MS-DOS is loaded and ready to receive instructions. The default command prompt displays the current drive and directory. If you are logged onto drive C, the command prompt may look like this: `C:>`.

Configuration

The particular setup of a group of components. A typical system configuration consists of a computer with one diskette drive, one hard disk drive, and a monitor, connected to a printer.

Control code

A command (generated when you hold down Ctrl and press another key on the keyboard) that instructs the computer to perform a specific function.

Conventional memory

The memory in your computer (up to 640KB) used by your operating system and application programs. Also called base memory or main memory.

Coprocessor

See Microprocessor.

Copy-protected program

A type of program that cannot be copied. Some copy-protected programs require you to leave the program diskette in the diskette drive while you are using it. Some also require the computer to be running at low speed instead of high speed. See also *Automatic speed.*

CPU

Central Processing Unit. The primary unit of the computer that interprets instructions, performs the tasks you indicate, keeps track of stored data, and controls all input and output operations.

Cursor

The highlighted marker that shows your position on the screen.

Cylinders

The vertical alignment of tracks in a hard disk that can be lined up under one read/write head. The number of tracks on a disk is equal to the number of cylinders times the number of heads.

Data

Information such as text or graphics stored or processed by a computer.

Data diskette

A formatted diskette on which you store data files (as opposed to program files).

Default

Any value or setting **that** takes effect when the computer is turned on or reset. A default value stays in effect unless you override it temporarily by changing a setting or you reset the default value itself.

Device

A piece of equipment that is part of a computer system and performs a specific task, such as a disk drive, a monitor, or a printer.

Device driver

A file containing instructions that allow your computer to recognize and control a device.

Diagnostics

The tests and procedures the computer performs to check its internal circuitry and set up its configuration.

DIP switch

Dual Inline Package switch. A small switch on a computer, option card, or printer that controls a particular function.

Directory

A list of files stored in a particular area on a disk; part of a structure for organizing files into groups. A directory listing shows the name, location, and size of the files in the directory. A directory can contain both files and subdirectories.

Disk

The collective term for diskettes and hard disks.

Disk drive

The physical device that allows the computer to read from and write to a disk. A diskette drive has a disk slot into which you insert a diskette. A hard disk is sealed inside a protective unit.

Diskette

A flat piece of flexible plastic coated with magnetic material used to store data permanently.

Display adapter card

A circuit board that can be installed in one of the computer's option slots to provide the monitor interface. The display adapter card controls the way the monitor displays text and graphics. (In this computer, a VGA display adapter is built into the system board.) Also called *Video card.*

DOS

Disk Operating System. A commonly used operating system that controls the computer's input and output functions. See also *Operating system.*

Double-density

A type of diskette format that allows you to store twice as much data as the standard-density format. A 5¼-inch double-density diskette can store 360KB of data. A 3½-inch double-density diskette can store 720KB of data.

Drive designator

The letter name of a disk drive, followed by a colon-for example, **C** :.

EGA

Enhanced Graphics Adapter. A type of display adapter card that allows you to display high-resolution graphics on a compatible monitor. It can display up to 43 lines of text with 80 characters on each line, or it can display monochrome or 16-color graphics at up to 640 x 350 resolution.

Expanded memory

Memory that specially written MS-DOS application programs can use with an Expanded Memory Specification (EMS) device driver such as EMM386.SYS.

Extended Memory

Memory above 1MB that is accessed by the protected mode of the microprocessor and is available to some application programs and operating systems.

Extended VGA mode

Special features of the built-in VGA adapter available when you are using certain display drivers and a multi-frequency monitor. These features include 132-column text mode, resolutions up to 800 x 600 or 1024 x 768 (non-interlaced) in 16 colors, and resolutions up to 640 x 480 in 256 colors.

Extension

A suffix of characters that you can add to a filename to better identify it.

File

A group of related pieces of information called records, or entries, stored together on a disk. Text files consist of words and sentences. Program files consist of codes and are used by computers to interpret and carry out instructions.

Filename

A name up to eight characters long that MS-DOS uses to identify a file.

Fixed disk

See Hard disk.

Format

To prepare a new disk (or an old one you want to reuse) so that it can store information. Formatting divides a disk into tracks and sectors and creates addressable locations on it.

Graphics

Lines, angles, curves, and other nonalphanumeric data.

Hard disk

The enclosed unit used to store large amounts of data. Unlike a diskette, it is fixed in place. It can process data more rapidly and store many more files than a diskette. Also called fixed disk.

Hardware

Any physical component of a computer system, such as a monitor, printer, keyboard, or CPU.

High-density

A type of format that allows you to store more data than on single- or double-density diskettes. A 5¼-inch high-density diskette can store 1.2MB of data. A 3½-inch high-density diskette can store 1.44MB of data.

Input/output (I/O) port

See Port.

Interface

A physical or software connection used to transmit data between devices or programs.

Jumper

A small device that connects two pins on an option card, a disk drive, or the main system board to activate a particular function.

Key disk

A diskette containing a copy-protected program that must remain in the diskette drive while you are using the program.

Kilobyte (KB)

A unit used to measure storage space in a computer's memory or on a disk. One kilobyte equals 1024 bytes.

LIM 4.0 EMS

Version 4.0 of the Lotus/Intel/Microsoft Expanded Memory Specification-a protocol that allows certain application programs to use memory that MS-DOS cannot use.

Main system board

The board built into your computer containing the circuitry the computer requires to operate.

Math coprocessor

A microprocessor that enables the computer to process certain mathematical calculations and display graphic images faster. In this computer, the 50 MHz model includes a built-in math coprocessor and the 25 MHz model can be upgraded with an 80487SX chip with built-in math coprocessor.

MCGA

Monochrome/Color Graphics Adapter. A type of display adapter that controls either a monochrome or color graphics monitor.

MDA

Monochrome Display Adapter. A type of display adapter that displays text in only one color, such as green or amber.

Megabyte (MB)

A unit used to measure storage space in a computer's memory or on a disk. One megabyte equals 1024KB.

Megahertz (MHz)

A unit used to measure oscillation frequency (of a computer's internal timing clock). A megahertz is one million cycles per second. Depending on the model you have, your computer operates at 25 MHz or 50 MHz and can simulate an 8 MHz operating speed.

Memory

The area where your computer stores data. Memory contents are either permanent (ROM) or temporary (RAM).

Memory module

A small circuit board that contains memory chips. You can add 256KB or 1MB memory modules to the memory card inside the computer to expand the computer's memory. A memory module is commonly called a SIMM (single inline memory module).

Memory on *card*

The additional memory on an optional memory card installed in the computer.

MGA

Multi-mode Graphics Adapter. A type of display adapter card that can display monochrome text and color graphics.

Microprocessor

A small version of a CPU contained on one semiconductor chip. See also CPU.

Modem

A device that allows a computer to transmit signals over telephone lines so it can send and receive data. Modem stands for MOdulator/DEModulator.

Monitor

The piece of hardware that contains the screen and displays information.

Monochrome monitor

A monitor that displays in only one color, such as green or amber, as opposed to a color monitor which can display in multiple colors.

Mouse

A hand-held pointing device with one or more buttons. When you slide the mouse over a flat surface in a certain direction, the cursor moves in the same direction on the screen.

MS-DOS

Microsoft Disk Operating System. The operating system most commonly used with your computer. See also Operating system.

Network server

The master computer in a network which provides storage space for the other computers connected to it. The network server can write files to and read files from the other computers in the network.

Network server mode

An optional password mode that provides extra security for a computer that is operating as a network server.

Non-inter/aced mode

A technique used by the built-in VGA display adapter that refreshes all the lines on the monitor screen sequentially from top to bottom.

Numeric keypad

The number keys grouped on the right side of the keyboard.

Operating speed

The speed at which the central processing unit executes commands. Depending on the model you have, your computer can run at 25 MHz or 50 MHz and can simulate an 8 MHz operating speed.

***Operating* system**

A collection of programs (such as MS-DOS, MS OS/2, or UNIX) that manages a computer's operations. The operating system determines how programs run on the computer and supervises all input and output.

Option card

A circuit board you install inside the computer to provide additional capabilities, such as a modem.

OS/2

Operating System/2. The enhanced operating system by Microsoft that provides dual mode processing and multitasking capabilities. See also *Operating system.*

Parallel

The type of interface that transmits all the bits in a byte of data simultaneously over separate lines. See also **Interface** and *Serial.*

Parameter

A qualifier added to a command that tells the program what particular conditions to look for and specifies information such as what data you want to process and where to locate or store a file.

Purity

A method used to verify the accuracy of data transmissions by adding a bit that makes the total of the byte count odd for odd parity or even for even parity.

Partition

(1) The area defined on a hard disk for use by an operating system; (2) to divide a hard disk into separate sections or logical drives. You can define a primary partition and one or more extended partitions on a hard disk.

Pathname

The directory name(s) you specify to locate a file. For example, the pathname for the file SALES, stored in the subdirectory BUSINESS, is \BUSINESS\SALES.

Peripheral ***device***

An external device (such as a printer or a modem) connected to a computer that depends on the computer for its operation.

Port

A physical input/output socket on a computer where you **can** connect a peripheral device.

***Power-on** diagnostics*

Tests that the computer runs to check its internal circuitry and configuration each time you turn it on.

***Power-on** password*

The sequence of characters you type after you turn on the computer in order to access and use your system. A power-on password can be up to seven characters long and can include letters, numbers, and blank spaces.

Processor speed

See Operating speed.

Program

A disk file that contains coded instructions and tells a computer what to do and how to do it.

Prompt

A message the screen displays to request information or tell you what action you need to perform next. See also *Command prompt.*

RAM

Random Access Memory. The portion of the computer's memory used to run programs and store data while you work. All data stored in RAM is erased when you turn off or reset the computer, so you must store any data you want to keep on a diskette or hard disk.

Read

To move data from one area to another. For example, when you open a text file stored on disk, the computer reads the data from the disk and displays it on the screen.

Read/write head

The physical device inside a disk drive that reads and records data on the magnetic surface of a disk.

Real-time clock

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

Reset

To reload a computer's operating system so you can retry a task or begin using a different operating system. Resetting erases all information in RAM.

RGB

Red Green Blue. A type of color monitor.

ROM

Read Only Memory. The portion of the computer's memory that can only be read and cannot be used for temporary storage. ROM retains its contents even when you turn off the power.

Root directory

The top-level directory in MS-DOS, designated by a \ (backslash). All other directories are subdirectories of the root directory.

RS-232C

A widely used, standard type of serial interface. You can connect an RS-232C compatible device to the built-in port on your computer.

Sector

A contiguous section of a disk track that provides an address at which the computer can access data.

Self test

The initial diagnostics procedures a system performs to check its hardware. Also called Power-on *diagnostics.*

Serial

The type of interface that transmits data one bit at a time. See *Interface* and **Parallel.**

Shadow RAM

The feature that enables the computer to copy the ROM BIOS and video ROM into the RAM area of memory to speed up processing.

SIMM

See Memory module.

Software

The programs that enable your computer to perform the tasks and functions you indicate.

Subdirectory

A directory or group of files that branches down from another subdirectory or from the root directory.

Switch

An option added to a command that modifies the way the command works. Switches are usually preceded by a / (forward slash). For example, if you add the /S switch to a FORMAT command, MS-DOS installs the operating system on the diskette as it formats it. *See* also *Parameter.*

System diagnostics

A series of checks you can perform on the computer to make sure the hardware is functioning correctly.

System diskette

A diskette that contains the operating system and allows you to boot the computer.

Tracks

Addressable, concentric circles on a disk, resembling the grooves on a record, which help to divide the disk into separate accessible areas.

UNIX

An operating system that supports multitasking and is suited to multi-user environments. UNIX is compatible with a range of computers, from personal computers to mainframes. See also *Operating system.*

VGA

Video Graphics Array. A type of high-resolution display adapter. The VGA adapter built into the system board of your computer can display 16-color graphics at resolutions up to 1024 x 768 or 256-color graphics at resolutions up to **640x480.**

Video *card*

See Display adapter card.

Write

To store data on a disk.

Write-protect

To protect the data on a diskette from being changed by placing a write-protect tab over the notch on the side of a 5¼-inch diskette or by setting the write-protect switch on a 3½-inch diskette. When a diskette is write-protected, you cannot erase, change, or record over its contents.

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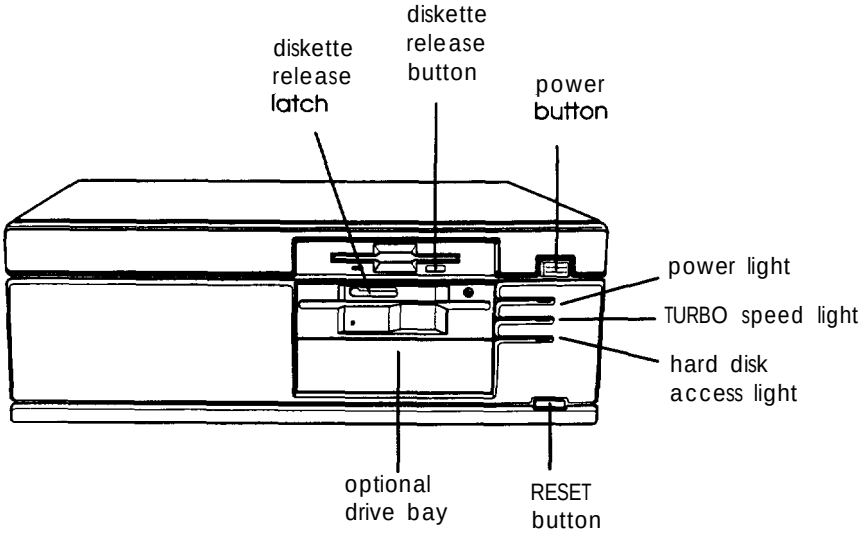
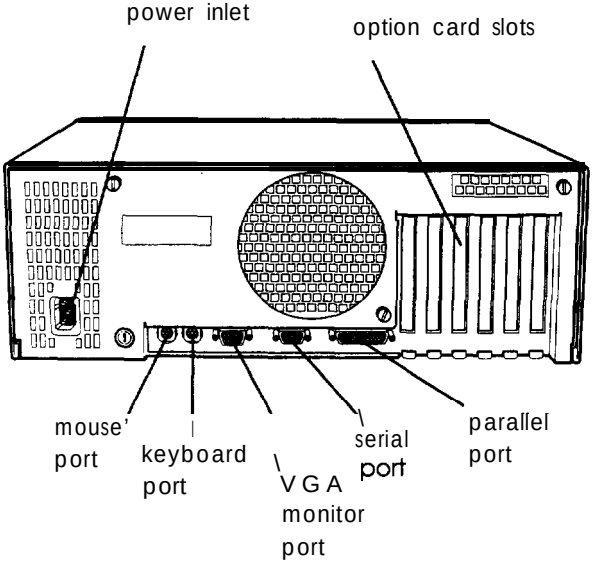

diskette release latch
diskette release button
power button
power light
TURBO speed light
hard disk access light
optional drive bay
RESET button

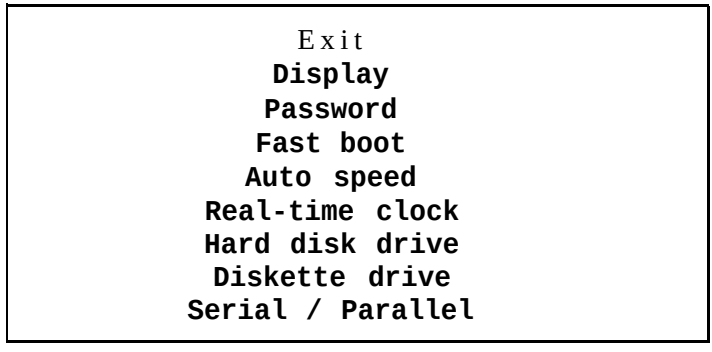

power inlet
option card slots
mouse' port
keyboard port
VGA monitor port
serial port
parallel port

User's Guide Update

To run any of the following programs from your Reference diskette, you need to access the Operation Menu:

- Setup
- Format hard disk
- System Diagnostics
- Prepare hard disk for moving.

The instructions in your User's Guide tell you that when you insert the Reference **diskette** in drive A and then turn on or reset your computer, the first screen you see is the Operation Menu. Under some circumstances, the first screen you see may be the Setup Utility screen, shown below:



If you are trying to run the Setup program, you can continue from this screen by following the instructions on page 2-6 of your User's Guide.

However, if this screen appears and you are trying to run a program other than Setup, follow these instructions to reach the Operation Menu:

1. Use ↑ to highlight **Exit;** then press Enter. At the bottom of the next screen, you see the following menu:

```
Change settings
Exit without saving
**EXIT AND SAVE**
```

2. **Press** ↓ to highlight **Exit without saving;** then press Enter. You see the Operation Menu. On this menu, you can use the arrow keys to highlight the name of the program you want to run and press Enter.

3. Now follow the remaining steps in the appropriate section of your User's Guide to use the program you selected.

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